

College Curriculum Committee Meeting Agenda
Tuesday, October 3, 2017
2:00 p.m. – 3:30 p.m.
President's Conference Room

Item	Action	Attachment(s)	Presenter
1. CCC Orientation	Information		Campbell
2. Minutes: June 20, 2017	Action	#10/3/17-1	Campbell
3. Report Out from Division Reps	Discussion		All
4. Announcements a. Notification of Proposed Requisites b. GE Subcommittee Membership c. CCC Priorities for 2017-18 d. 11/7 Meeting Date Change	Information	#10/3/17-2 #10/3/17-3	Campbell
5. DRC Curriculum Committee Proposal	1st Read	#10/3/17-4	Campbell
6. Stand Alone Approval Request: AHS 52	1st Read	#10/3/17-5	Campbell
7–33. Stand Alone Approval Requests: APSM 151A, 151B, 151C, 152A, 152B, 152C, 153A, 153B, 153C, 154A, 154B, 154C, 155A, 155B, 155C, 156A, 156B, 156C, 157A, 157B, 157C, 158A, 158B, 158C, 159A, 159B, 159C	1st Read	#10/3/17-6–32; 60–61	Campbell
34–60. Stand Alone Approval Requests: APSM 171A, 171B, 171C, 172A, 172B, 172C, 173A, 173B, 173C, 174A, 174B, 174C, 175A, 175B, 175C, 176A, 176B, 176C, 177A, 177B, 177C, 178A, 178B, 178C, 179A, 179B, 179C	1st Read	#10/3/17-33–59; 60–61	Campbell
61. Stand Alone Approval Request: NCEL 447	1st Read	#10/3/17-62	Campbell
62. Stand Alone Approval Request: THTR 46C	1st Read	#10/3/17-63	Campbell
63. Stand Alone Approval Request: THTR 46D	1st Read	#10/3/17-64	Campbell
64. Non-transcriptable Certificates	Information	#10/3/17-65	Campbell
65. New Program Application: Landscape Technician Certificate of Achievement	1st Read	#10/3/17-66–67	Campbell
66. Good of the Order			Campbell
67. Adjournment			Campbell

Attachments:

- #10/3/17-1 Draft Minutes: June 20, 2017
- #10/3/17-2 CCC Notification of Proposed Requisites
- #10/3/17-3 CCC Topics for 2017-18
- #10/3/17-4 DRC Division Curriculum Committee Proposal
- #10/3/17-5 Stand Alone Course Approval Request: AHS 52
- #10/3/17-6 Stand Alone Course Approval Requests: APSM 151A, 151B, 151C, 152A, 152B, 152C, 153A, 153B, 153C, 154A, 154B, 154C, 155A, 155B, 155C, 156A, 156B, 156C, 157A, 157B, 157C, 158A, 158B, 158C, 159A, 159B, 159C

- #10/3/17-33 Stand Alone Course Approval Requests: APSM 171A, 171B, 171C, 172A,
—59 172B, 172C, 173A, 173B, 173C, 174A, 174B, 174C, 175A, 175B, 175C,
176A, 176B, 176C, 177A, 177B, 177C, 178A, 178B, 178C, 179A, 179B,
179C
- #10/3/17-60 Supporting Evidence for APSM Stand Alone Forms
- #10/3/17-61 Supporting Evidence for APSM Stand Alone Forms
- #10/3/17-62 Stand Alone Course Approval Request: NCEL 447
- #10/3/17-63 Stand Alone Course Approval Request: THTR 46C
- #10/3/17-64 Stand Alone Course Approval Request: THTR 46D
- #10/3/17-65 Foothill College 2016-17 Non-transcriptable Certificates
- #10/3/17-66 Landscape Technician CA Narrative
- #10/3/17-67 Landscape Technician CA LMI

2017-2018 Curriculum Committee Meetings:

<u>Fall 2017 Quarter</u>	<u>Winter 2018 Quarter</u>	<u>Spring 2018 Quarter</u>
10/3/17	1/23/18	4/24/18
10/24/17	2/6/18	5/8/18
11/7/17	2/20/18	5/22/18
11/21/17	3/6/18	6/5/18
12/5/17	3/20/18	6/19/18

Standing reminder: Items for inclusion on the CCC agenda are due no later than one week before the meeting.

2017-2018 Curriculum Deadlines:

- 12/1/17 Deadline to submit courses to CSU for CSU GE approval (Articulation Office).
- 12/1/17 Deadline to submit courses to UC/CSU for IGETC approval (Articulation Office).
- 2/1/18 Curriculum Sheet updates for 2018-19 catalog (Faculty/Divisions).
- 2/15/18 Deadline to submit local GE applications for 2017-18 catalog (Faculty/Divisions).
- 6/1/18 Deadline to submit new/revised courses to UCOP for UC transferability (Articulation Office).
- 6/22/18 COR/Title 5 updates for 2019-20 catalog (Faculty/Divisions).
- Ongoing Submission of courses for C-ID approval and course-to-course articulation with individual colleges and universities (Articulation Office).

Distribution:

Mark Anderson (FA), Ben Armerding (LA), Rachelle Campbell (Faculty Co-Chair), Zachary Cembellin (PSME), Sara Cooper (BH), Bernie Day (Articulation Officer), LeeAnn Emanuel (DRC), Isaac Escoto (AS President), Hilda Fernandez (LA), Marnie Francisco (PSME), Evan Gilstrap (CNSL), Brenda Hanning (BH), Kurt Hueg (Dean, BSS), Eric Kuehnl (FA), Andrew LaManque (AVP Instruction, Administrator Co-Chair), Kristy Lisle (VP Instruction), Kent McGee (Evaluations), Bruce McLeod (Apprenticeship), Tiffany Rideaux (BSS), Katy Ripp (KA), Ben Schwartzman (DRC), Lety Serna (CNSL), Barbara Shewfelt (KA), Nanette Solvason (Dean, BH), Paul Starer (Dean, LA), Mary Thomas (LIBR), Mary Vanatta (Curriculum Coordinator), Anand Venkataraman (PSME), Bill Ziegenhorn (BSS)

COLLEGE CURRICULUM COMMITTEE

Committee Members – 2017-18

Meeting Date: 10/3/17Co-Chairs (2)

<input checked="" type="checkbox"/>	Rachelle Campbell	7469	Vice President, Academic Senate (tiebreaker vote only)	campbellrachelle@fhda.edu
<input checked="" type="checkbox"/>	Andrew LaManque	7179	Assoc. Vice President of Instruction and Institutional Research	lamanqueandrew@fhda.edu

Voting Membership (12 total; 1 vote per division)

<input checked="" type="checkbox"/>	Mark Anderson	7156	FA	andersonmark@fhda.edu
<input checked="" type="checkbox"/>	Benjamin Armerding	7453	LA	armerdingbenjamin@fhda.edu
<input checked="" type="checkbox"/>	Zachary Cembellin	7383	PSME	cembellinzachary@fhda.edu
<input checked="" type="checkbox"/>	Sara Cooper	7595	BH	coopersara@fhda.edu
<input checked="" type="checkbox"/>	Bernie Day	7225	Articulation	daybernie@fhda.edu
<input checked="" type="checkbox"/>	Hilda Fernandez	7542	LA	fernandezhilda@fhda.edu
<input checked="" type="checkbox"/>	Marnie Francisco	7420	PSME	franciscomarnie@fhda.edu
<input checked="" type="checkbox"/>	Evan Gilstrap	7675	CNSL	gilstrapevan@fhda.edu
<input checked="" type="checkbox"/>	Brenda Hanning	7466	BH	hanningbrenda@fhda.edu
<input type="checkbox"/>	Kurt Hueg	7394	Dean—BSS	huegkurt@fhda.edu
<input checked="" type="checkbox"/>	Eric Kuehnl	7479	FA	kuehneric@fhda.edu
<input type="checkbox"/>	Tiffany Rideaux	7412	BSS	rideauxtiffany@fhda.edu
<input type="checkbox"/>	Katy Ripp (W & S)	7355	KA	rippkaty@fhda.edu
<input checked="" type="checkbox"/>	Leticia Serna	7059	CNSL	sernaleticia@fhda.edu
<input checked="" type="checkbox"/>	Barbara Shewfelt (F)	7658	KA	shewfeltbarbara@fhda.edu
<input type="checkbox"/>	Nanette Solvason	7730	Dean—BH	solvasonnanette@fhda.edu
<input checked="" type="checkbox"/>	Paul Starer	7227	Dean—LA	starerpaul@fhda.edu
<input checked="" type="checkbox"/>	Mary Thomas	7522	Library	thomasmary@fhda.edu
<input checked="" type="checkbox"/>	Anand Venkataraman	7495	PSME	venkataramananand@fhda.edu
<input checked="" type="checkbox"/>	Bill Ziegenhorn	7799	BSS	ziegenhornbill@fhda.edu

Non-Voting Membership (4)

<input type="checkbox"/>		7231	ASFC Rep.	
<input checked="" type="checkbox"/>	Mary Vanatta	7439	Curr. Coordinator	vanattamary@fhda.edu
<input type="checkbox"/>	Kent McGee	7298	Evaluations	mcgeekent@fhda.edu
<input type="checkbox"/>			SLO Coordinator	

Visitors

Phuong Tran, Teresa Ong, Bruce McLeod, LeeAnn Emanuel,
Ben Schwartzman, David Sauter

**College Curriculum Committee
Meeting Minutes
Tuesday, June 20, 2017
2:00 p.m. – 3:30 p.m.
President’s Conference Room**

Item	Discussion
1. Minutes: June 6, 2017	<p>Approved by consensus. 1 abstention.</p> <p>Escoto noted that the posted minutes will soon be transferred from the windows near the Admin building doors to a new glass-case bulletin board, likely in the Admin building breezeway.</p>
<p>2. Announcements</p> <p>a. CCC Meeting Dates for 2017-18</p> <p>b. CCC Reps for 2017-18</p> <p>c. CSU GE & IGETC for 2017-18</p>	<p>Speaker: Isaac Escoto Farewell to Isaac! LaManque remarked that Escoto has been a fabulous co-chair; he always keeps curriculum and our students on his mind and in his heart. Thank you for your leadership, Isaac! President Nguyen stopped by to share her thanks to Escoto, as well.</p> <p>Day noted that this is also Kay Jones’ last CCC meeting. Thank you to Kay for your diligent work throughout the years! Escoto noted that Basil Farooq will be transferring to UC Berkeley, where he will be majoring in Economics. Thank you to Farooq for serving as ASFC rep and contributing to the committee!</p> <p>Meeting dates for the 2017-18 year have been scheduled. CCC will continue to meet every other Tuesday, from 2:00-3:30 p.m., in the President's Conference Room. Note that, due to ACCJC accreditation visit in October, the first CCC meeting of fall quarter will occur one week earlier than usual, with a two week break in between that meeting and the second of the quarter. This will allow the group to meet before the ACCJC visit. LaManque noted that it would be good to schedule the meeting during the visit; reps noted concern that this will be the first meeting for any new reps. Group agreed to keep the first meeting scheduled early. Note that dates are still tentative and subject to change; Vanatta will send calendar invitations once room reservations have been finalized.</p> <p>BSS: Rideaux and Ziegenhorn will continue. Bio Health: Cooper will continue; Brenda Hanning will return; Schultz will support but likely not attend CCC meetings. Language Arts: Armerding will continue; Hilda Fernandez will join; Fong to serve on academic senate. PSME: Francisco will continue; not yet sure who else will serve. Counseling: Serna will continue; Evan Gilstrap will join; DRC splitting off within division—Emanuel & Ben Schwartzman to serve. Library: Mary Thomas will join. Apprenticeship: McLeod will continue. Fine Arts: Rep not present; McLeod believes reps will be different. Deans: Hueg will continue; Simon Pennington and Ram Subramanian will join.</p> <p>Day sent email noting new approvals for 2017-18. 28 of 31 courses were approved! Please share with your constituents, particularly those in your division who teach those courses.</p>

<p>3. Stand Alone Approval Request: CHLD 72</p>	<p>Speaker: Isaac Escoto Second read of Stand Alone Approval Request for CHLD 72.</p> <p>Motion to approve M/S (Cooper, Knobel). Approved.</p>
<p>4. Guidelines for Placing Courses in Disciplines</p>	<p>Speaker: Isaac Escoto Document has been updated since previous meeting to include a link to the disciplines handbook (on the CCC webpage). Note that document is not a policy, but guidelines. Escoto asked the group when would be helpful to distribute—fall quarter; Campbell will distribute. Question regarding if document should include guidance on how to handle disagreements within divisions when multiple disciplines listed—such issues should be mentioned at CCC and discussed, as early in the process as possible.</p>
<p>5. Apprenticeship Resolution for Exemption to Curriculum Cycle</p>	<p>Speaker: Isaac Escoto Topic briefly discussed at previous meeting; request by Apprenticeship CC to allow new APSM courses to be taught before summer 2018. Multiple options available—move forward with resolution; group can recommend action without official resolution. Campbell noted agreement with option of group recommendation; recognized work done by Apprenticeship faculty/CC on curriculum. Serna moved to accept request for courses to be granted exemption to the cycle, without adopting resolution. LaManque reminded the group of comments at previous meeting noting that students do not browse course catalog for Apprenticeship courses; not as crucial for these courses to be listed in print catalog before offering. Jones seconded motion. Motion passed.</p> <p>Question (not directly related to topic) regarding whether there are any changes that can be made to a COR midyear. Vanatta noted annual deadline for any change to a COR, although certain changes/corrections that do not affect the COR (e.g., TOP Code) can be made midyear. Noted that any request for a deadline exemption or midyear change is forwarded to LaManque for approval. PSME rep suggested practice of keeping COR information flexible for those teaching; for example, listing multiple textbook options on the COR to allow faculty to choose. Clarification requested regarding substantial vs. nonsubstantial changes—Vanatta reminded the group that those designations pertain to the CCCCO's inventory system and are not distinctions we use locally. Question regarding catalog being the only factor limiting our deadline—Escoto noted that it is a big factor; another is that many CORs are not ready when submitted to Vanatta, requiring additional time/effort in order to fix COR. Vanatta reminded the group of this year's goal to submit clean CORs, which will hopefully allow for a speedier timeline or other sort of change to our process. LaManque noted that the CCCCO's approval system has sped up recently, which does help. Renewed request by rep(s) for small COR changes (e.g., number of essays) to not have to adhere to regular deadline, or otherwise be sped up. Day reminded the group that the majority of courses are transferable, for which we must follow non-flexible deadlines from outside bodies.</p> <p>BSS rep noted effort by division to be proactive regarding Title 5 review cycle; suggested that resources and assistance be targeted toward departments that need the most help with review. Suggestion regarding example of number of essays on COR—could be changed via word of mouth while COR update pending;</p>

	<p>Language Arts rep noted that part time faculty might not always be involved in such communicated changes. Counseling rep noted that students might refer to COR for information such as assignments, so should be accurate. Campbell suggested bringing in an outside person to help us review our current processes, address any issues departments/divisions might be having, and potentially help us streamline.</p>
<p>6. Early College Promise; Law Pathway</p>	<p>Speaker: Isaac Escoto Nazy Galoyan, Dean of Enrollment Services, present for discussion. Recent press release regarding Early College Promise (ECP) dual enrollment program. Foothill partnering with Los Altos High School, Mountain View High School, and Palo Alto High School; ECP is for students in the Advancement Via Individual Determination (AVID) program, including all students enrolled at Alta Vista High School. Existing dual enrollment courses already free for high school (HS) students; ECP students will receive free textbooks, in addition. Denise Swett and Galoyan working with Bookstore to implement lending library. Orientation for parents and students is tonight. Currently, about 10 students registered; timing issues with end of school year likely affected registration. Admission/registration via regular dual enrollment process; students will take English and Math placement tests. Some faculty have voiced concerns; ongoing effort to address concerns and communicate plans to faculty. Those involved in planning include Day, Escoto, Galoyan, Jazmine Garcia, Kurt Hueg, Andre Meggerson, Paul Starer. Escoto noted no specific pathways outlined yet. Some students might be planning to attend four-year schools as freshmen; some might plan to continue at Foothill. Question regarding difference between ECP and existing Middle College program—Middle College students take courses on Foothill campus to fulfill both HS and college credits. ECP students will take Foothill courses and HS courses concurrently, with some Foothill courses potentially fulfilling HS credits. LaManque noted that with Middle College some HS teachers teach here on campus. Question regarding state regulations on HS students taking community college courses—Galoyan noted local decision for colleges to admit HS students; must have permission of the HS and the student’s parents. Districts determine grade level and/or age restrictions; FHDA allows grades 9-12, though each campus may define its own dual enrollment procedures/criteria. Bio Health rep noted that Allied Health students cannot be in hospital-related courses until the age of 18. LaManque noted recent legislation allowing colleges to teach basic skills courses at HS; Foothill exploring but not yet implemented. Clarification requested regarding “double dipping”—term refers to funding, meaning that if college receives apportionment, HS cannot then also claim student for credit, for the same courses. These HS partners are basic aid and don’t submit for credit in the same way, so double dipping does not apply. Comment regarding importance of communicating to parents that students taking college courses are considered adults. Galoyan noted importance of making clear that failing grades remain on student’s academic record. Please contact Galoyan with any questions.</p> <p>Escoto shared information on Law Pathway program in place of Jazmine Garcia, unable to attend today. Goal is to help diversify the law profession and support underrepresented students. 28 community colleges partnering with six law schools; students who</p>

complete pathway will receive special admissions consideration (not a guarantee). Note that dual enrollment is shown to increase completion rates of underrepresented students. Specific Foothill courses targeted for program. Program will infuse dual enrollment, allowing students to take all or some of the pathway courses during HS. Question regarding SOC 7 being listed, and will cross-listed PSYC 7 be allowed—Escoto noted that question regarding cross-listed courses has been posed; working on updating to add cross-listed course options. Question regarding who involved in course selection—law schools involved; Escoto unsure of amount of Foothill faculty involvement. LaManque mentioned statewide model of general parameters for courses; Kurt Hueg and others at Foothill used model to see which of our courses fit. LaManque noted grey area of not being official program (i.e., degree/certificate), and related difficulty around scheduling courses. Similar to programs such as First Year Experience, in that there is no “owner” for program. Particulars still need to be worked out. Escoto noted that academic senate leadership sees this program as falling under the senate "10 +1," even if the student does not receive a degree/certificate; senate has noted to President Nguyen that faculty should be directly involved, who has been receptive to this feedback. Bio Health rep agreed and noted recent trend of groups of courses created as “a scheduling thing,” when they should be considered programs under 10+1, with faculty involvement and sign-off. Question regarding conflicting presentation slides: one references 2+2+3, stating that the college portion of program will take two years, yet another notes that program takes all four HS years—Escoto noted similar question has been presented to Nguyen, who said she will address. LaManque noted he believes original intention was to be 2+2+3, but recently it was decided to infuse with dual enrollment. Could hopefully create a pipeline for HS students to complete associate's degree here at Foothill.

Day noted that Law Pathway courses could be eligible to submit as a certificate of achievement, due to number of units. Question regarding if non-AVID students will also be able to take advantage of program—LaManque said there's no intent to limit to AVID students. PSME rep noted experience of having HS students in classes; can be extremely disruptive for other students if HS student is immature, which can happen. Not all college faculty are interested in teaching HS students. Question regarding if Foothill anticipates an influx of younger students—LaManque noted he believes direction is to make more connections with HS, including expanding Middle College and offering more Foothill courses on HS campuses; believes making such connections is an initiative for Nguyen. Escoto noted push, on behalf of senate and other faculty, for Professional Development to address this type of concern. BSS rep noted difference, from experience, of teaching on HS campus vs. HS students taking classes here; not just relationship with and between students, but logistics and on-campus support. Concern expressed for HS-aged students taking certain college-level courses, especially at HS freshman age. Concerns regarding possibility of students taking certain courses (e.g., COMM 1B) before junior and senior English. Comment regarding college courses being similar to AP courses; concern for student's workload and ability to handle potentially three college courses in one year. Escoto noted that senate will continue to advocate for broad discussion and addressing of these issues.

Draft Minutes, June 20, 2017

7. Non-transcriptable Certificate Approval Process	Speaker: Isaac Escoto Office of Instruction forwarded spreadsheet of current non-transcriptable certificates (as of 2017-18 catalog) to division deans, to gather information for each certificate—faculty contact names and number of certificates awarded in recent years. Prior discussion suggested surveying faculty contacts to see if programs still viable and, if applicable, would they be interested in submitting for state approval; CCC Team will move forward with survey. Please forward any missing information to Shawna Santiago.
8. CCC Topics for 2017-18	Speaker: Isaac Escoto Topic moved to next meeting, due to time constraint.
9. Report Out from Division Reps	Speaker: All Topic moved to next meeting, due to time constraint.
10. Good of the Order	
11. Adjournment	3:31 PM

Attendees: Ben Armerding (LA), Kathy Armstrong (PSME), Rachelle Campbell (BH), Sara Cooper (BH), Bernie Day (Articulation Officer), LeeAnn Emanuel (CNSL), Isaac Escoto (Faculty Co-Chair), Basil Farooq (ASFC), Valerie Fong (LA), Marnie Francisco (PSME), Nazy Galoyan (guest—Admission & Records), Evan Gilstrap (guest—CNSL), Kay Jones (LIBR), Marc Knobel (PSME), Andrew LaManque (Interim VP Instruction, Administrator Co-Chair), Don MacNeil (KA), Bruce McLeod (Apprenticeship), Tiffany Rideaux (BSS), Lety Serna (CNSL), Bill Ziegenhorn (BSS)

Minutes Recorded by: M. Vanatta

CCC Notification of Proposed Prerequisites/Co-Requisites

The following courses are currently undergoing review for requisite additions or changes. Please contact the Division Curriculum Rep if you have any questions or comments.

Target Course Number & Title	Editor	Requisite Course Number & Title	New/Ongoing
BIOL 1D: Introduction to Molecular Genetics	K. Erickson	Prereq: BIOL 1A (Principles of Cell Biology)	Ongoing
BIOL 45: Introduction to Human Nutrition	C. Holcroft	Prereq: BIOL 1A (Principles of Cell Biology) or BIOL 40A (Human Anatomy & Physiology I)	Ongoing
MATH 12: Calculus for Business & Economics	M. Francisco & M. Knobel	Prereq: MATH 11 (Finite Mathematics) or MATH 48A (Precalculus I)	New: MATH 11; Ongoing: MATH 48A
PHT 52B: Aseptic Technique & IV Preparation	A. Su	Prereq: PHT 52A (Inpatient Dispensing)	Ongoing
PHT 55B: Pharmacology B	A. Su	Prereq: PHT 55A (Pharmacology A)	Ongoing
PHT 55C: Pharmacology C	A. Su	Prereq: PHT 55B (Pharmacology B)	Ongoing
R T 52D: Digital Image Acquisition & Display	R. Campbell	Prereq: R T 55B (Principles of Radiologic Technology II)	Ongoing
R T 72: Venipuncture	R. Campbell	Prereq: R T 51C (Fundamentals of Radiologic Technology III)	Ongoing
RSPT 51B: Respiratory Physiology	B. Hanning	Prereq: RSPT 51A (Introduction to Respiratory Anatomy & Physiology)	Ongoing
V T 54B: Comparative Veterinary Anatomy & Physiology for the Veterinary Technician	L. Eshman	Prereq: V T 54A (Comparative Veterinary Anatomy & Physiology for the Veterinary Technician)	Ongoing
V T 84L: Veterinary Anesthesia Laboratory	L. Eshman	Coreq: V T 84 (Anesthesiology for Technicians); prereq: V T 83 (Pharmacology for Technicians)	New
V T 85: Veterinary Emergency & Critical Care	L. Eshman	Prereq: V T 83 (Pharmacology for Technicians)	New

**College Curriculum Committee
Topic Schedule Draft 2017-18**

October 3, 2017

Pending Topics

Topic	Summary	Discussion Schedule	Priority
Student Preparedness	Discussion regarding how prepared our students are for courses. Do they seem to be prepared enough in English? Math? Mention of requisite recency conversation. (Institutional policy?)	2017-18	
Equity and CCC	Continue discussion of how CCC can support college equity goals.	2017-18	
High School Articulation	Discussion/updates regarding Foothill College high school articulation.	2017-18	
Academic Integrity - bottom	Discuss concerns, decide best avenue for further discussion/action.	2017-18	
Reverse Articulation	Discussion regarding how courses from other colleges match up with ours, especially with the semester/quarter conversion.	2017-18	
Honors Courses	Continued discussion regarding courses beginning to add an extra unit to the honors version of a course.	2017-18	
Non Transcriptable Certificates	Continued work to create a uniform approval process for non-transcriptable certificates. Also, support the creation of a procedural/tracking process regarding these programs.	2017-18	
CLEP/Credit-by-Exam Policies	Review policies with a focus on expanding high school partnerships.	2017-18	
Curriculum Process	Perform a deep dive into the college wide curriculum process to determine opportunities for improvement.	2017-18	

Ongoing Topics

Topic	Proposed Action
ADTs	As new TMCs are approved and published, discipline faculty will continue to apply for those degrees for which FH has local programs and/or will develop courses and degree programs as appropriate for our community.
C-ID (State-wide Course Identification Numbering System)	As C-ID descriptors and TMCs continue to be developed, faculty will continue to collaborate in development of standards by which individual courses may be assigned.
Content Review	As courses are updated or new courses created, Content Review will be done for all prerequisites and co-requisites.
District Equivalency	On-going work to identify equivalent courses across our district.

**College Curriculum Committee
Topic Schedule Draft 2017-18**

Curricular Process Training	Provide training in order for more faculty to better understand campus curricular process
Support for Division Curriculum Committees	Discuss ways to better support CCC reps, in order to better divide curricular work.

Completed Topics

Topic	Action Taken
Curriculum Sheet Approval	CCC reps shared what process their division follows, and how they involved their division as a whole.
Substantial vs. Non-substantial Changes to COR	Discussed/clarified at CCC.
Review local GE area requirements	CCC discussed criteria and process for local GE course consideration. Approved multiple courses for inclusion in next year's GE pattern.
Created and approved cross-listed course policy	CCC created and approved a form/policy to be used when faculty would like to cross-list a course. This will help minimize any unintended consequences from cross-listing a course.
Considered and approved COR checklist, to help with COR review	CCC approved a checklist that can be used to help support CCC reps in submitting COR updates/new courses.
Approved ADTs	Social Justice Studies, Global Studies
Created an Apprenticeship Curriculum Committee	Guided by discussion last year, CCC created and implemented the apprenticeship curriculum committee.
Reviewed and Approved New Course Families	CCC discussed and approved the creation of new course families in the theater arts department.
Department Review of CORs	CCC reps shared how individual divisions allow for department feedback regarding COR content.

Proposal Summary:

What is the proposal-

To bring classes offered by DRC and FEI in Student Resource Center under one division and for this new division to be represented at Senate and Curriculum committee as its own entity.

The programs in the Student Resource Center include:

- Disability Resource Center
 - Specialized Counseling
 - Transition to Work
 - Community Based Program
 - Assistive Technology
 - Academic Coaching
- Veterans Resource Center
 - Specialized Counseling
 - GI Bill Certification
 - Speaker Series
- Family Engagement Institute
 - Noncredit Parenting
 - DREAMers, undocuALLY
 - Child Development Academy coordination
 - Bridge to College
- Guardian Scholars (Foster Youth)
 - Specialized Counseling
 - Book Vouchers

Why?

We have several reasons for this request to form our own curriculum committee:

Subject Area Expertise within the SRC

The Student Resource Center has subject area expertise and experience in serving diverse communities and special populations such as veterans, students with disabilities, foster youth, low-income students and undocumented students. SRC combines both specialized instruction with wrap around services for these students to ensure their success.

Streamline Faculty Resources

Curriculum approval for our entities currently exist in several other divisions namely Counseling, Business and Social Science and Physical Education. This makes it extremely difficult to write and advocate for curriculum that meet the needs of our students. Our faculty have to be present at several other division curriculum meetings for curriculum approval. This is inefficient and a strain on faculty resources. We have encountered delays for a variety of reasons. Many of our faculty who are involved with curriculum development are part-time faculty. The need to contact multiple people in the process is confusing to them. Most of our courses are also non-credit courses, which many curriculum representatives in other divisions do not always have expertise in.

Having our own curriculum division and representative will help reduce this confusion because PT faculty will have a familiar face and we can bring these proposals directly to the college curriculum committee.

Vested Interest

Since our curriculum is spread across so many other divisions who do not know what we do, we do not sense that there is any vested interest in advancing our curriculum or the pedagogical needs of our students. This responsibility should not fall to other division representatives, who are already burdened with other responsibilities of advocating for their “primary” division curriculum.

Our faculty want to be able to represent the different pedagogical needs of our diverse learners, and to advance curriculum that will meet their needs.

Special Class Revenue Classes

All DRC classes, including Adaptive Physical Education earn special class revenue for the college. There are specific requirements in order for these classes to earn special class revenues including minimum qualifications, adjustments and modifications to curriculum/ pedagogy and ensuring that the minimum number of students with disabilities in these classes is met.

Faculty, Disciplines and Courses

DRC Faculty -

Full time faculty: 6

Part time faculty: 30

Disciplines represented-

- DSPS Counseling
- DSPS DSPS
- DSPS Developmental Disabilities
- DSPS non-credit vocational
- DSPS Learning Disability
- DSPS: Adaptive Physical Education

FEI

Full time faculty: 0

Part time faculty: 15

Disciplines represented-

- Noncredit Parenting (NCP)

Courses

Active Courses that receive Special Class Funding for students with disabilities:

ALCA 201: Computer Access Evaluation

ALCB 201: Beginning Lip Reading

ALCB 202: Intermediate Lip Reading and Managing your Hearing Loss

ALCB 203: Advanced Lip Reading and Managing your Hearing Loss

ALCB 223: Career Resources

ALCB 400B: Lip Reading: Vowels

ALCB 400D Speech-reading Challenge

ALCB 406Y: World News Discussion

ALCB 407Y: Social Change

ALCB 408Y: Art Appreciation

ALCB 409Y: Music Appreciation

ALCB 413: Relaxation Techniques

ALCB 413Y: Relaxation Techniques

ALCB 414 Y: Stress Management
ALCB 421Y: Around the World in Travel Study
ALCB 431Y: Analysis of Current Events
ALCB: 451Y: Drawing & Painting
ALCB 462Y: Verbal Expression
ALCB 463Y: Creative Writing
ALCB 465Y: Creative Self-Expression
ALLD 206: Paragraph Remediation
ALLD 210: Understanding Learning Differences
ALTW 201: Basic English for the Disabled Student
ALTW: 202: Basic Math Skills for Students with Disabilities
ALTW 203: Learning Styles and Strategies for Students with Disabilities
ALTW 204: Communication Skills in the Workplace
ALTW 205: Office Skills for the Disabled Student
ALTW 209: Social Skills
ALTW 211: Introduction to Excel
ALTW 212: Job Search Skills: The Resume
ALTW 213: Work attitudes and Behavior on the Job
ALTW 214: Job Search Skills: Interview Preparation
ALTW 216: Disability and the Law
ALTW 217: Intermediate Computer Applications
ALTW 218: Current Events for the Disabled Student
ALTW 219: Using the Internet
ALTW 223: Independent Living Skills: Financial Literacy
ALTW 229: Healthy Relationships
PHDA: 16 Modified General Conditioning
PHDA 17: Modified Resistive Exercise
PHDA 18: Individualized Exercise for Special Populations
PHDA 19: Back Health & Fitness
PHDA 20: Modified Functional Fitness
PHDA 21A Modified Aquatics
PHDA 21B: Modified Water Exercise
PHDA 22: Team Sports for Special Populations
PHDA 23: Modified Aerobic Exercise
PHDA 24 Modified Stretching and Flexibility
PHDA 25: Balance and Functional Movement
SPED 8: Introduction to College and Accommodations

Family Engagement Institute Noncredit Parenting

NCP 400A: Strong Start for Children I: Birth - 8 years
NCP 400B: Strong Start for Children II: Navigating Middle School
NCP 400C: Strong Start for Children III: Pathways to College
NCP 401B: Nurturing Healthy Choices I Early Years
NCP 401B: Nurturing Healthy Choices II: Adolescent Years
NCP 402A: The Importance of Family in the lives of Children I: Early Years
NCP 402B: The importance of Family in the lives of Children II: Adolescent Years
NCP 403: Building Bridges, Opening Doors, Raising Emotionally Healthy Children

FOOTHILL COLLEGE

Stand-Alone Credit Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course.

In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: AHS 52

Course Title: Medical Terminology

Catalog Description:

This course is an introduction to medication terminology as used in the health professions. It provides opportunities for practical application of medical terminology and further development of skill in analyzing components of medical terms and building a medical vocabulary applicable to specialties of medicine. Course content includes anatomical and physiological terminology; basic structure, prefixes, suffixes; combining forms; abbreviations, clinical procedures, laboratory and diagnostic tests related to each body system.

Are you requesting Stand Alone Approval for the course on a temporary, or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify which degree/certificate to which the course will be added:

This would be a stand alone course until adopted as a pre-requisite to the R T, RSPT & DMS Allied Health programs. These allied health program directors have asked for the creation of this course for this purpose.

- What is the specific timeline for program application/approval? (e.g. is your program application complete and submitted to the State, or is it still in development and if so, what is your anticipated submission date?)

NOTE: If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. -- Appropriateness to Mission

California Education Code 66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that contribute to continuous work force improvement

3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level

Briefly explain how this course is consistent with one (or more) of these missions:

The goal is to prepare students to understand the language of medicine prior to entry into a Health Care Program or Health Science discipline. It meets all three of the criteria above.

***NOTE:** Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).*

Criteria B. – Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department’s Labor Market Information system,
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Need info below (primarily occupational):

This course will be a pre-requisite or required course for R T, RSPT & DMS at Foothill College. The creation of the course was based upon a request from these Allied Health Program Directors at Foothill College.

Criteria C. -- Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5.
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course.
- course to enable students to succeed in degree-applicable credit courses (e.g. college orientation and guidance courses, discipline-specific preparatory courses)
- pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses.

Criteria D. -- Adequate Resources (please initial as appropriate)

- This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment.

Criteria E. – Compliance (please initial as appropriate)

FOOTHILL COLLEGE

X The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards.

Faculty Requestor: Shirley Treanor **Date:** 11-12-16

Division Curriculum Representative: Sara Cooper **Date:** 5/19/17

Date of Approval by Division Curriculum Committee: **Date:** 5/19/17

College Curriculum Co-Chairperson: _____ **Date:** _____

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Biological and Health Sciences

AHS 52 MEDICAL TERMINOLOGY

[Edit Course Outline](#)

AHS 52

MEDICAL TERMINOLOGY

Summer
2018

3 hours lecture.

3 Units

Total Contact Hours: 36

(Total of All Lecture and Lab hours X 12)

Total Student Learning Hours: 108

(Total of All Lecture, Lab and Out of Class hours X 12)

Lecture Hours: 3

Lab Hours: 0

Weekly Out of Class Hours: 6

Note: If Lab hours are specified, the *item 10. Lab Content* field must be completed.

Repeatability -

Statement:

Not Repeatable.

Status -

Course Status: Active

Grading: Letter Grade Only

Degree Status: Applicable

Credit Status: Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability: CSU

Validation: 4/5/2017

Division Dean Information -

Seat Count:
50

Load Factor:
.075

FOAP Code:
114000141011120100

Instruction Office Information -

FSA Code:

Distance Learning: yes

**Stand Alone
Designation:** no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course will allow health care program students to satisfy required program prerequisites in the following programs: Dental Hygiene, Diagnostic Medical Sonography, Respiratory Technology, Radiologic Technology.

1. Description -

Introduction to medical terminology as used in the health professions. Provides opportunities for practical application of medical terminology and further development of skills in analyzing components of medical terms and building a medical vocabulary applicable to specialties of medicine. Course content includes anatomical and physiological terminology; basic structure, prefixes, suffixes; combining forms; abbreviations, clinical procedures, laboratory and diagnostic tests related to each body system.

Prerequisite: None

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. divide words into component parts.
- B. recognize basic combining of forms, suffixes, and prefixes.
- C. understand meanings of medical terminology.
- D. understand basic organization and complexity of the body.
- E. identify location and function of major body organs.
- F. recognize and recall Greek and Latin prefixes, suffixes and combining forms.
- G. apply rules to build medical terms from Greek and Latin word parts.
- H. analyze/decode medical terms to derive definitions.
 - I. spell word parts and terms correctly.
- J. recognize and define medical abbreviations.
- K. use rules to build common plural forms of medical terms.
- L. examine the medical record, and its various reports, abbreviations, and symbols.
- M. distinguish differences between body planes and cavities, directional and positional terms.
- N. identify common disorders and their associated symptoms for each body system.
- O. categorize common diagnostic procedures, laboratory tests, and abbreviations associated with each body system.
- P. correlate medical word parts with usage in anatomy, pathology, symptomatology, procedures, treatments, and medical specialties.
- Q. analyze medical reports.
- R. pronounce and spell medical terms correctly in oral and written communication.

3. Special Facilities and/or Equipment -

- A. When taught on campus: classroom with computer and internet access, document camera and DVD/CD player. For online work, must have access to a computer with internet.
- B. When taught via Foothill Global Access: must have access to a computer with internet.

4. Course Content (Body of knowledge) -

- A. Introduction to Medical Terminology
 - 1. Basic word structure
 - 2. Word roots, combining forms
 - 3. Spelling, pronunciation
 - 4. Prefixes
 - 5. Suffixes
- B. Organization of the Body

1. Terms pertaining to the body as a whole
2. Structure: cell, tissue, organs, and systems
3. Medical specialties
- C. The Medical Record
 1. Medical reports
 2. Abbreviations
 3. Symbols
- D. Additional Suffixes and Digestive System Terminology
- E. For the following systems, include: structure and function; medical terminology; pathology, conditions, symptoms; diagnostic, radiographic, clinical, and surgical procedures; pharmacology and treatment; abbreviations; and medical record analyses
 1. Urinary system
 2. Female reproductive system
 3. Male reproductive system
 4. Nervous system
 5. Cardiovascular system
 6. Respiratory system
 7. Blood system
 8. Lymphatic and immune systems
 9. Musculoskeletal system
 10. Skin
 11. Sense organs: the eye and the ear
 12. Endocrine system
- F. Cancer Medicine (Oncology)
- G. Radiology and Nuclear Medicine
- H. Pharmacology
- I. Psychiatry

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Quizzes
- B. Spelling tests
- C. Mid-term and final examinations
- D. Case study using medical information and terminology

7. Representative Text(s) -

Chabner, Davi-Ellen. The Language of Medicine. 11th ed. Saunders, 2016.

8. Disciplines -

Biological Sciences or Dental Technology or Diagnostic Medical Technology or Emergency Medical Technologies or Health or Nursing or Pharmacy Technology or Radiological Technology or Respiratory Technologies

9. Method of Instruction -

Lecture; practical application of terms; analogies/examples; pronunciation lists; threaded case study analysis; exercises requiring use of a medical dictionary; analysis of critical thinking questions; frequent quizzes and spelling tests.

10. Lab Content -

Not applicable.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Quizzes (pronunciation, abbreviations, practical applications, etc.)

- B. Exercise study aids
- C. Writing of terms
- D. Threaded case studies
- E. Spelling tests
- F. Exams

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FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

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In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 151A

Course Title: Service Introduction & Safety

Catalog Description:

Students receive an introduction to their building trade service apprenticeship and the union HVAC industry with an emphasis on safety.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air Conditioning Service Mechanic

- o What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
 - course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
 - pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17
Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17
Date of Approval by Division Curriculum Committee: 06/12/17
College Curriculum Co-Chairperson: _____ **Date:** _____

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Apprenticeship

APSM 151A SERVICE INTRODUCTION & SAFETY

[Edit Course Outline](#)

APSM 151A SERVICE INTRODUCTION & SAFETY Summer 2018
40 hours total: 30 hours lecture, 10 hours laboratory. 2.5 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active **Grading:** Letter Grade with P/NP option
Degree Status: Non-Applicable **Credit Status:** Credit
Degree or Certificate Requirement: Stand Alone Course
Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:
Transferability: **Validation:**

Division Dean Information -

Seat Count: 30 **Load Factor:** .060 **FOAP Code:** 115000142215095640

Instruction Office Information -

FSA Code:
Distance Learning: no
Stand Alone Designation: no
Program Title:
Program TOPs Code:
Program Unique Code:
Content Review Date:
Former ID:

Need/Justification -

The course is needed in the service sector of the sheet metal heating, ventilating, and air conditioning, (HVAC) industry for registered apprentices, and is critical to energy efficient system performance. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Air Conditioning Service Mechanic.

1. Description -

Students receive an introduction to their building trade service apprenticeship and the union HVAC industry with an emphasis on safety.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Understand construction safety to work safely
- B. Achieve EPA 608 Certification
- C. Understand the Sheet Metal Trade overview (history and organization)
- D. Explain the industry roles and responsibilities (code of excellence, labor, management, and customer relations)
- E. Receive and understand harassment training
- F. Understand the importance of basic record keeping
- G. Receive First Aid and CPR 2-year certification
- H. Achieve OSHA 10 certification

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal service tools
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Understand construction safety to work safely (Lec and Lab)
- B. Achieve EPA 608 certification
 - 1. Stratospheric ozone depletion (Lec)
 - 2. Rules and regulations of the Clean Air Act (Lec)
 - 3. Montreal Protocol (Lec)
 - 4. Refrigerant recovery, recycling, and reclamation (Lec)
 - 5. Recovery equipment and use (Lec)
 - 6. Regulations regarding small appliances (Lec)
 - 7. Regulations regarding high pressure appliances (Lec)
 - 8. Regulations regarding low pressure appliances (Lec)
- C. Understand the Sheet Metal Trade overview (history and organization)
 - 1. History of the Sheet Metal Trade (Lec)
 - 2. Organization of the trade (Lec)
 - 3. Job classification in the Sheet Metal Trade (Lec)
 - 4. SMWIA (Lec)
 - 5. SMACNA (Lec)
- D. Explain the industry roles and responsibilities (code of excellence, labor, management, and customer relations)
 - 1. Bay Area Training Trust and the JATC (Lec and Lab)
 - 2. SMWIA code of excellence (Lec and Lab)
 - 3. Customer relations (Lec and Lab)
 - 4. Getting along with coworkers (Lec and Lab)
- E. Receive and understand harassment training
 - 1. Understand what sexual harassment is (Lec)
 - 2. Understand what obvious and subtle harassment is (Lec)

- 3. How to deal with situations regarding biases and stereotypes (Lec)
- 4. Understand the difference between ignorance and malice (Lec)
- 5. The effects of not having respect for fellow workers (Lec)
- F. Understand the importance of basic record keeping (Lec)
- G. Receive First Aid and CPR 2-year certification (Lec and Lab)
- H. Achieve OSHA 10 certification
 - 1. Introduction to OSHA (Lec and Lab)
 - 2. Focus four hazards (Lec and Lab)
 - 3. Types and use of Personal Protective Equipment (Lec and Lab)
 - 4. Identifying health hazards in construction (Lec and Lab)
 - 5. OSHA hand and power tool use (Lec and Lab)
 - 6. Stairway and ladder safety (Lec and Lab)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Comprehensive written final examination
- D. Comprehensive final project
- E. Demonstration of assigned skills to acceptable level per instructor

7. Representative Text(s) -

International Training Institute. Core Sheet Metal Curriculum, International Training Institute for the Sheet Metal and Air Conditioning Industry (Student manual and workbook). Gainesville, VA: IDI Multimedia, 2010.
 ESCO Institute. EPA Certification Exam Preparatory Manual for Air Conditioning & Refrigeration Technicians Federal Clean Air Act - Section 608. 7th ed. Mount Prospect, IL: ESCO Press, 2006.
 Whitman, B., B. Johnson, J. Tomczyk, and E. Silberstein. Refrigeration and Air Conditioning Technology. 8th ed. Boston, MA: Cengage Learning, 2016.

NOTE: These are the standard Sheet Metal textbooks/workbooks used for this course. Although one or more may not be within 5 years of the required published date, they are the most current books used when teaching this course.

8. Disciplines -

Sheet Metal OR Air Conditioning, Refrigeration, Heating

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Observe and practice safety methods in laboratory.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Read assigned sections of the ESCO EPA 608 text.
- B. Complete written exam to achieve EPA 608 refrigerant handling certification.

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FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

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In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 151B

Course Title: Essential HVAC Service Skills

Catalog Description:

Students gain further understanding of the roles and responsibilities of a beginning level HVAC service apprentice, including maintenance, vehicle use, documentation and professional representation.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air Conditioning Service Mechanic

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
- course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
- pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17
Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17
Date of Approval by Division Curriculum Committee: 06/12/17
College Curriculum Co-Chairperson: _____ **Date:** _____

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Apprenticeship

APSM 151B ESSENTIAL HVAC SERVICE SKILLS

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APSM 151B

ESSENTIAL HVAC SERVICE SKILLS

Summer
2018

40 hours total: 30 hours lecture, 10 hours laboratory.

2.5 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active

Grading: Letter Grade Only

Degree Status: Non-Applicable

Credit Status: Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count:

30

Load Factor:

.060

FOAP Code:

115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

Stand Alone
Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the service sector of the sheet metal heating, ventilating, and air conditioning, (HVAC) industry for registered apprentices, and is critical to energy efficient system performance. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Air Conditioning Service Mechanic.

1. Description -

Students gain further understanding of the roles and responsibilities of a beginning level HVAC service apprentice, including maintenance, vehicle use, documentation and professional representation.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Review and be able to explain OJT requirements
- B. Know how to be responsible with a service vehicle
- C. Identify basic HVAC equipment and components
- D. Safely access different types of equipment and change filters and belts
- E. Understand how to write a service tag
- F. Explain how to represent the company in a professional and courteous manner
- G. Understand and demonstrate the safe use of basic hand tools required for air conditioning services

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal service tools
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Review and be able to explain OJT requirements
 1. Perform procedures for reporting, and importance of, OJT hours (Lec and Lab)
- B. Know how to be responsible with a service vehicle
 1. Understand the importance of keeping and organized truck (Lec and Lab)
 2. Understand how the appearance and operation of a company vehicle reflects upon the professional image of a company (Lec and Lab)
 3. Understand the importance of proper maintenance of a vehicle (Lec and Lab)
 4. Test the fluid levels and tire air pressure on a vehicle (Lec and Lab)
- C. Identify basic HVAC equipment and components
 1. Identify and explain the different types of equipment and their operation (Lec and Lab)
- D. Safely access different types of equipment and change filters and belts
 1. Demonstrate ability to safely perform basic preventative maintenance procedures (Lec and Lab)
- E. Understand how to write a service tag
 1. Demonstrate ability to write a serve tag using legible penmanship, grammar, punctuation, and use of proper terminology (Lec and Lab)
 2. Understand the value of, and methods of, record keeping and their importance for billing and project management (Lec and Lab)
- F. Explain how to represent the company in a professional and courteous manner
 1. Demonstrate the ability to interact with customers and avoid conflicts and when avoidable to resolve them in a professional and courteous manner (Lec and Lab)
 2. Describe hand tools used in Air Conditioning & Refrigeration Service (Lec and Lab)
 3. Describe equipment used to install and service air conditioning equipment (Lec and Lab)
- G. Understand and demonstrate the safe use of basic hand tools required for air conditioning services (Lec and Lab)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Comprehensive written final examination
- D. Comprehensive final project
- E. Demonstration of assigned skills to acceptable level per instructor

7. Representative Text(s) -

Whitman, B., B. Johnson, J. Tomczyk, and E. Silberstein. Refrigeration and Air Conditioning Technology. 8th ed. Boston, MA: Cengage Learning, 2016.

8. Disciplines -

Sheet Metal OR Air Conditioning, Refrigeration, Heating

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Demonstrate ability to safely perform basic preventative maintenance procedures.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. In the textbook, read Unit 5, Tools and Equipment
- B. Answer review questions from the textbook related to assigned reading

Ensure you're using the current version of this form by downloading a fresh copy from [the CCC webpage!](#)

FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course.

In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 151C

Course Title: Heat, Matter & Energy in HVAC Systems

Catalog Description:

Students are introduced to the physical laws governing heat and energy transfer as it pertains to HVAC.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air Conditioning Service Mechanic

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
- course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
- pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

Submissions Course Outline Editor

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Apprenticeship

APSM 151C HEAT, MATTER & ENERGY IN HVAC SYSTEMS

[Edit Course Outline](#)

APSM 151C HEAT, MATTER & ENERGY IN HVAC SYSTEMS Summer 2018
40 hours total: 35 hours lecture, 5 hours laboratory. 2.5 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active

Grading: Letter Grade Only

Degree Status: Non-Applicable

Credit Status: Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count:
30

Load Factor:
.060

FOAP Code:
115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

Stand Alone Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the service sector of the sheet metal heating, ventilating, and air conditioning, (HVAC) industry for registered apprentices, and is critical to energy efficient system performance. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Air Conditioning Service Mechanic.

1. Description -

Students are introduced to the physical laws governing heat and energy transfer as it pertains to HVAC.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Define energy and the states of matter
- B. Understand the different types, properties, and application of refrigerants
- C. Define heat and understand the relationship between pressure and temperature
- D. Review specific safety for service technicians involving electrical, pressure, heat and cold, and chemicals
- E. Understand the basic refrigeration cycle
- F. Demonstrate the safe use of service hand tools and hardware
- G. Use manifold gauges to take super heat and sub cooling readings
- H. Describe characteristics of refrigerant blends and oils

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal service tools
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Define energy and the states of matter
 1. Define matter (Lec)
 2. List the states of matter (Lec)
 3. Define density (Lec)
 4. Define specific gravity and specific volume (Lec)
 5. State two forms of energy important to the HVAC industry (Lec)
 6. Describe work and state the formula used to determine the amount in a given task (Lec)
 7. Define horsepower (Lec)
 8. Convert horsepower to watts (Lec and Lab)
 9. Convert horsepower to BTUs (Lec and Lab)
- B. Understand the different types, properties, and application of refrigerants
 1. List and describe the various types of refrigerants and their applications (Lec and Lab)
 2. Describe ozone depletion and global warming (Lec and Lab)
 3. Discuss how CFCs deplete the earth's ozone layer (Lec and Lab)
 4. Differentiate between CFCs, HCFCs, HFCs, and HCs (Lec and Lab)
 5. Discuss popular refrigerants (including R-410A) and their applications (Lec and Lab)
 6. Discuss refrigerant blends (Lec and Lab)
 7. Discuss temperature glide and fractionation as it applies to refrigerant blends (Lec and Lab)
- C. Define heat and understand the relationship between pressure and temperature
 1. Discuss Boyles law (Lec)
 2. State Charles law (Lec)
 3. Discuss Charles law (Lec)
- D. Review specific safety for service technicians involving electrical, pressure, heat and cold, and chemicals
 1. Describe the proper procedures for working with pressurized systems and vessels (Lec and

- Lab)
- 2. Describe the proper procedures for working with live electrical circuits (Lec and Lab)
- 3. Explain the importance of proper ventilation when working in confined spaces (Lec and Lab)
- E. Understand the basic refrigeration cycle
 - 1. Diagram a basic refrigerant cycle, noting components, refrigerant phase changes and pressure changes (Lec and Lab)
- F. Demonstrate the safe use of service hand tools and hardware
 - 1. Describe instruments used in heating, air conditioning and refrigeration (Lec and Lab)
 - 2. Test and calibrate a basic thermometer at low and high temperature ranges (Lec and Lab)
 - 3. Check an ohmmeter for accuracy (Lec and Lab)
 - 4. Describe the comparison test for an ammeter and a voltmeter (Lec and Lab)
 - 5. Describe the procedures for checking pressure instruments above and below atmospheric pressure (Lec and Lab)
 - 6. Check flue gas analysis instruments (Lec and Lab)
- G. Use manifold gauges to take super heat and sub cooling readings (Lec and Lab)
- H. Describe characteristics of refrigerant blends and oils (Lec and Lab)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Comprehensive written final examination
- D. Demonstration of assigned skills to acceptable level per instructor

7. Representative Text(s) -

Whitman, B., B. Johnson, J. Tomczyk, and E. Silberstein. Refrigeration and Air Conditioning Technology. 8th ed. Boston, MA: Cengage Learning, 2016.

8. Disciplines -

Sheet Metal OR Air Conditioning, Refrigeration, Heating

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Test and calibrate a basic thermometer at low and high temperature ranges.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: From the textbook, read unit, "Calibrating Instruments"
- B. Sample writing assignment: Complete review questions related to assigned reading

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FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

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In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 152A

Course Title: Piping, Refrigerant Evacuation & Recovery

Catalog Description:

Students are introduced to the materials and types of connections used in HVAC piping. Students learn how to safely evacuate and recover HVAC refrigerants.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air Conditioning Service Mechanic

- o What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
- course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
- pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

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Apprenticeship

APSM 152A PIPING, REFRIGERANT EVACUATION & RECOVERY

[Edit Course Outline](#)

APSM 152A PIPING, REFRIGERANT EVACUATION & RECOVERY Summer 2018
40 hours total: 12 hours lecture, 28 hours laboratory. 1.5 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active Grading: Letter Grade Only
Degree Status: Non-Applicable Credit Status: Credit
Degree or Certificate Requirement: Stand Alone Course
Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count: 30 Load Factor: .060 FOAP Code: 115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

Stand Alone Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the service sector of the sheet metal heating, ventilating, and air conditioning, (HVAC) industry for registered apprentices, and is critical to energy efficient system performance. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Air Conditioning Service Mechanic.

1. Description -

Students are introduced to the materials and types of connections used in HVAC piping. Students learn how to safely evacuate and recover HVAC refrigerants.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. List the various types of piping associated with heating and air conditioning
- B. Demonstrate the ability to measure, cut, bend, and make various types of tubing and piping connections
- C. Demonstrate the safe use of soldering and brazing equipment
- D. List proper evacuation practices
- E. Demonstrate standing pressure testing and leak detection procedures
- F. Demonstrate use of recovery equipment

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal service tools
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. List the various types of piping associated with heating and air conditioning
 1. List the different types of tubing used in heating and air conditioning operations (Lec and Lab)
- B. Demonstrate the ability to measure, cut, bend, and make various types of tubing and piping connections
 1. Describe two ways of cutting copper tubing (Lec and Lab)
 2. List procedures for bending tubing (Lec and Lab)
 3. Ability to braze and solder (Lec and Lab)
 4. Make flared joints (Lec and Lab)
 5. Swage joints (Lec and Lab)
 6. Prepare and thread steel pipe (Lec and Lab)
 7. List four types of plastic pipe and describe uses for each (Lec and Lab)
 8. Describe alternative methods of connecting pipe (Lec and Lab)
- C. Demonstrate the safe use of soldering and brazing equipment
 1. Pass written safety test on use of soldering and brazing equipment (Lec and Lab)
 2. Explain and demonstrate proper use of gas torches for safe operation (Lec and Lab)
- D. List proper evacuation practices
 1. List some of the proper evacuation practices (Lec and Lab)
 2. Describe two different types of evacuation (Lec and Lab)
 3. Describe two different types of vacuum measuring devices (Lec and Lab)
 4. Choose a proper high-vacuum pump (Lec and Lab)
 5. Describe a high-vacuum single evacuation (Lec and Lab)
 6. Describe a triple evacuation (Lec and Lab)
- E. Demonstrate standing pressure testing and leak detection procedures
 1. Describe a standing pressure test (Lec and Lab)
 2. Choose a leak detector for a particular type of leak (Lec and Lab)
- F. Demonstrate use of recovery equipment

1. Review EPA regulations regarding recovery of refrigerants and recovery equipment (Lec and Lab)
2. Demonstrate use of recovery equipment (Lec and Lab)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Comprehensive written final examination
- D. Demonstration of assigned skills to acceptable level per instructor

7. Representative Text(s) -

Whitman, B., B. Johnson, J. Tomczyk, and E. Silberstein. Refrigeration and Air Conditioning Technology. 8th ed. Boston, MA: Cengage Learning, 2016.

8. Disciplines -

Sheet Metal OR Air Conditioning, Refrigeration, Heating

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Demonstrate proper evacuation of HVAC refrigerant.
- B. Demonstrate proper recovery of HVAC refrigerant.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: From textbook, Unit 7, "Tubing and piping"
- B. Sample writing assignment: Complete review questions related to assigned reading

Ensure you're using the current version of this form by downloading a fresh copy from [the CCC webpage!](#)

FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course.

In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 152B

Course Title: Charging Refrigerant Systems

Catalog Description:

Students learn the fundamentals of charging refrigerant systems.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern

The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air Conditioning Service Mechanic

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
 - course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
 - pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

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Apprenticeship

APSM 152B CHARGING REFRIGERANT SYSTEMS

[Edit Course Outline](#)

APSM 152B

CHARGING REFRIGERANT SYSTEMS

Summer
2018

40 hours total: 20 hours lecture, 20 hours laboratory.

2 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active

Grading: Letter Grade Only

Degree Status: Non-Applicable

Credit Status: Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count:

30

Load Factor:

.060

FOAP Code:

115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

Stand Alone
Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the service sector of the sheet metal heating, ventilating, and air conditioning, (HVAC) industry for registered apprentices, and is critical to energy efficient system performance. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Air Conditioning Service Mechanic.

1. Description -

Students learn the fundamentals of charging refrigerant systems.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Determine the proper charging method for a specific system
- B. Use temperature measuring instruments
- C. Use pressure test instruments
- D. Use refrigerant leak detection devices
- E. Use charging equipment to achieve the proper charge for the system
- F. Determine factors that may adversely affect the correct charge of the system (existing duct design, piping size, ambient temperature, component location)
- G. Demonstrate other refrigerant charging techniques

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal service tools
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Determine the proper charging method for a specific system
 1. Describe how refrigerant is charged into systems in the vapor and liquid states (Lec and Lab)
 2. Describe how refrigerant is charged into systems in the vapor and liquid states (Lec and Lab)
 3. Describe two types of charging devices (Lec and Lab)
- B. Use temperature measuring instruments
 1. Demonstrate the use of type K and bead probe measuring instruments (Lec and Lab)
- C. Use pressure test instruments
 1. Demonstrate use of manifold gauge pressure sets (Lec and Lab)
- D. Use refrigerant leak detection devices
 1. Describe various types of leak detectors and demonstrate their use (Lec and Lab)
- E. Use charging equipment to achieve the proper charge for the system
 1. State the advantage of using electronic weighing scales (Lec and Lab)
- F. Determine factors that may adversely affect the correct charge of the system (existing duct design, piping size, ambient temperature, component location) (Lec and Lab)
- G. Demonstrate other refrigerant charging techniques
 1. Describe system charging using two different weighing methods (Lec and Lab)
 2. Use the sub-cooling method of charging units with a TXV (Lec and Lab)
 3. Charge fixed orifice, capillary tube and piston tube systems using charging charts and curves (Lec and Lab)
 4. Charge refrigerant blends incorporating a temperature glide and fractionation potential (Lec and Lab)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Comprehensive written final examination
- D. Comprehensive final project
- E. Demonstration of assigned skills to acceptable level per instructor

7. Representative Text(s) -

Whitman, B., B. Johnson, J. Tomczyk, and E. Silberstein. Refrigeration and Air Conditioning Technology. 8th ed. Boston, MA: Cengage Learning, 2016.

8. Disciplines -

Sheet Metal OR Air Conditioning, Refrigeration, Heating

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Demonstrate proper use of refrigerant pressure test instruments.
- B. Demonstrate proper use of refrigerant leak detection devices.
- C. Demonstrate use of refrigerant charging equipment to achieve proper charge for system.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: From the textbook, Unit 10, "System Charging"
- B. Sample writing assignment: Answer review questions related to the assigned reading

Ensure you're using the current version of this form by downloading a fresh copy from [the CCC webpage!](#)

FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course.

In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 152C

Course Title: Introduction to Electricity

Catalog Description:

Students receive an introduction to electricity as related to HVAC equipment, with an emphasis on safety when working with HVAC equipment.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air Conditioning Service Mechanic

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
- course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
- pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

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Apprenticeship

APSM 152C INTRODUCTION TO ELECTRICITY

[Edit Course Outline](#)

APSM 152C	INTRODUCTION TO ELECTRICITY	Summer 2018
40 hours total: 30 hours lecture, 10 hours laboratory.		2.5 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active	Grading: Letter Grade with P/NP option
Degree Status: Applicable	Credit Status: Credit
Degree or Certificate Requirement: Stand Alone Course	
Foothill GE Status: Non-GE	

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count:	Load Factor:	FOAP Code:
30	.060	115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

Stand Alone Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the service sector of the sheet metal heating, ventilating, and air conditioning, (HVAC) industry for registered apprentices, and is critical to energy efficient system performance. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Air Conditioning Service Mechanic.

1. Description -

Students receive an introduction to electricity as related to HVAC equipment, with an emphasis on safety when working with HVAC equipment.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Define electricity
- B. Define magnetism
- C. Use an electrical multi-meter to take electrical measurements
- D. Define different types of current (AC/DC)
- E. Explain the different electrical circuits (series and parallel)
- F. Understand the different units of measurement for electricity (voltage, amperage, resistance)
- G. Understand the usage and application of Ohm's Law
- H. Explain electrical circuit protection and automatic controls
 - I. Apply electrical units of measure to conductor sizing
- J. Identify circuit components function and operation
- K. Read and draw wiring diagrams
- L. Assemble a designated electrical circuit
- M. Explain purpose and function of primary and secondary voltages
- N. Perform troubleshooting on electrical circuits

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal service tools
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Define electricity
 - 1. Describe the structure of an atom (Lec)
 - 2. Identify atoms with a positive charge and a negative charge (Lec)
- B. Define magnetism
 - 1. Describe how magnetism is used to create electricity (Lec)
 - 2. Describe a solenoid (Lec)
 - 3. Describe the construction of a transformer and the way a current is induced in a secondary circuit (Lec)
- C. Use an electrical multi-meter to take electrical measurements
 - 1. List the units of measurement for electricity (Lec and Lab)
- D. Define different types of current (AC/DC)
 - 1. State the difference between alternating current and direct current (Lec and Lab)
 - 2. Describe a sine wave (Lec and Lab)
- E. Explain the different electrical circuits (series and parallel)
 - 1. Explain the difference between series and parallel circuits (Lec and Lab)
- F. Understand the different units of measurement for electricity (voltage, amperage, resistance)
 - 1. State the formula for determining electrical power (Lec and Lab)
 - 2. Explain inductance (Lec and Lab)
- G. Understand the usage and application of Ohm's Law
 - 1. State Ohm's Law (Lec and Lab)

- H. Explain electrical circuit protection and automatic controls (Lec)
- I. Apply electrical units of measure to conductor sizing
 - 1. State the reasons for using proper size wires (Lec and Lab)
 - 2. Explain the characteristics that make certain materials good conductors and good insulators (Lec and Lab)
- J. Identify circuit components function and operation
 - 1. Describe how a capacitor works (Lec and Lab)
 - 2. Describe the physical characteristics and the function of several semiconductors (Lec and Lab)
- K. Be able to read and draw wiring diagrams (Lec and Lab)
- L. Assemble a designated electrical circuit (Lec and Lab)
- M. Explain purpose and function of primary and secondary voltages (Lec)
- N. Perform troubleshooting on electrical circuits
 - 1. Describe procedures for making electrical measurements (Lec and Lab)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Comprehensive written final examination
- D. Comprehensive final project
- E. Demonstration of assigned skills to acceptable level per instructor

7. Representative Text(s) -

Whitman, B., B. Johnson, J. Tomczyk, and E. Silberstein. Refrigeration and Air Conditioning Technology. 8th ed. Boston, MA: Cengage Learning, 2016.

8. Disciplines -

Sheet Metal OR Air Conditioning, Refrigeration, Heating

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Assemble designated electrical circuits.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: From the textbook, Unit 13, "Basic Electricity and Magnetism and Introduction to Automatic Controls"
- B. Sample writing assignment: Answer review questions related to the assigned reading

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FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

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In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 153A

Course Title: Field Installation for the Service Technician

Catalog Description:

Students establish basic steps for installation and start-up of HVAC systems.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern

The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air Conditioning Service Mechanic

- o What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

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Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
 - course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
 - pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

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Apprenticeship

APSM 153A FIELD INSTALLATION FOR THE SERVICE TECHNICIAN

[Edit Course Outline](#)

APSM 153A FIELD INSTALLATION FOR THE SERVICE TECHNICIAN Summer 2018
40 hours total: 30 hours lecture, 10 hours laboratory. 2.5 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active

Grading: Letter Grade with P/NP option

Degree Status: Applicable

Credit Status: Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count:
30

Load Factor:
.060

FOAP Code:
115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

Stand Alone Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the service sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Air Conditioning Service Mechanic.

1. Description -

Students establish basic steps for installation and start-up of HVAC systems.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Understand the process of field installation
- B. Understand the equipment installation requirements overview (as per SMACNA standard, code requirements, and manufacturer's requirements)
- C. Find and perform penetration layout
- D. Understand the requirements of curb installation
- E. Understand the fire and smoke dampers installation overview as per code and manufacturer's requirements
- F. Understand the procedures of equipment start-up
- G. Achieve crane and rigging qualification
- H. Practice aerial lift safety

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal service tools
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Field installation
 1. List three crafts involved with air conditioning installation (Lec and Lab)
 2. Identify types of duct system installations (Lec and Lab)
 3. Describe the installation of metal duct (Lec and Lab)
 4. Describe the installation of duct board systems (Lec and Lab)
 5. Describe the installation of flexible duct (Lec and Lab)
- B. Equipment installation requirements overview (as per SMACNA standard, code requirements, and manufacturer's requirements)
 1. Describe split air conditioning system installation (Lec and Lab)
- C. Penetration layout (Lec and Lab)
- D. Curb installation
 1. Recognize good installation practices for packaged air conditioning equipment (Lec and Lab)
 2. Discuss different connections for packaged air conditioning equipment (Lec and Lab)
- E. Fire and smoke dampers installation overview as per code and manufacturer's requirements (Lec and Lab)
- F. Equipment start-up
 1. Recognize correct refrigeration piping practices (Lec and Lab)
 2. State start up procedures for air conditioning equipment (Lec and Lab)
- G. Crane and rigging qualification (Lec and Lab)
- H. Aerial lift safety (Lec and Lab)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Comprehensive written final examination
- D. Demonstration of assigned skills to acceptable level per instructor

7. Representative Text(s) -

Whitman, B., B. Johnson, J. Tomczyk, and E. Silberstein. Refrigeration and Air Conditioning Technology. 8th ed. Boston, MA: Cengage Learning, 2016.

8. Disciplines -

Sheet Metal OR Air Conditioning, Refrigeration, Heating

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Observe and practice installation demonstrations on lab equipment.
- B. Demonstrate proper techniques to achieve Crane and Rigging safety certification.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: From the textbook, read Unit 38, "Installation."
- B. Sample writing assignment: Answer review questions related to assigned reading.

Ensure you're using the current version of this form by downloading a fresh copy from [the CCC webpage!](#)

FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

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In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 153B

Course Title: Electric Motors & Motor Controls in HVAC Systems

Catalog Description:

Students learn the basic aspects of the types of motors and their controls used in HVAC systems.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern

The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air Conditioning Service Mechanic

- o What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
- course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
- pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17
Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17
Date of Approval by Division Curriculum Committee: 06/12/17
College Curriculum Co-Chairperson: _____ **Date:** _____

Need/Justification -

This course is needed in the service sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Air Conditioning Service Mechanic.

1. Description -

Students learn the basic aspects of the types of motors and their controls used in HVAC systems.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Describe application and operations of various types of electric motors
- B. Identify different types of motor controls
- C. Identify different motor protection devices
- D. Describe the types of motor drives
- E. Interpret motor nameplate data
- F. Troubleshoot motors and motor control devices

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal service tools
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Describe application and operations of various types of electric motors
 - 1. Describe the different types of open single phase motors used to drive fans, compressors, and pumps (Lec)
 - 2. Describe the applications of various types of motors (Lec)
 - 3. State which motors have high starting torque (Lec and Lab)
 - 4. List the components that cause a motor to have high starting torque (Lec and Lab)
 - 5. Describe a multi-speed permanent split-capacitor motor and indicate how the different speeds are obtained (Lec and Lab)
 - 6. Explain the operation of a three phase motor (Lec and Lab)
 - 7. Describe a motor used for a hermetic compressor (Lec and Lab)
 - 8. Explain the motor terminal connections used in various compressors (Lec and Lab)
 - 9. Describe the different types of compressors that use hermetic motors (Lec and Lab)
 - 10. Describe the use of variable speed motors (Lec and Lab)
- B. Identify different types of motor controls
 - 1. Identify the proper power supply for a motor (Lec and Lab)
 - 2. Describe the application of three phase versus single phase motors (Lec and Lab)
 - 3. Explain how the noise level in a motors can be isolated from the conditioned space (Lec and Lab)
 - 4. Describe the different types of motor mounts (Lec and Lab)
 - 5. Identify the various types of motor drive mechanisms (Lec and Lab)
- C. Identify different motor protection devices
 - 1. Describe the difference between a relay, a contactor, and a starter (Lec and Lab)
 - 2. State how the locked rotor of a motor affects the choice of a motor (Lec and Lab)
 - 3. List the basic components of a contactor and a starter (Lec and Lab)
 - 4. Compare two types of external motor overloads protection (Lec and Lab)
 - 5. Describe conditions that must be considered when resetting safety devices to restart electric motors (Lec and Lab)
- D. Describe the types of motor drives

1. Describe different types of electric motor problems (Lec and Lab)
 2. List common electrical problems in electric motors (Lec and Lab)
 3. Identify various mechanical problems in electric motor (Lec and Lab)
 4. Describe a capacitor checkout procedure (Lec and Lab)
 5. Explain the difference between troubleshooting a hermetic motor problem and troubleshooting an open motor problem (Lec and Lab)
- E. Interpret motor nameplate data (Lec and Lab)
- F. Troubleshoot motors and motor control devices (Lec and Lab)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Comprehensive written final examination
- D. Comprehensive final project
- E. Demonstration of assigned skills to acceptable level per instructor

7. Representative Text(s) -

Whitman, B., B. Johnson, J. Tomczyk, and E. Silberstein. Refrigeration and Air Conditioning Technology. 8th ed. Boston, MA: Cengage Learning, 2016.

8. Disciplines -

Sheet Metal OR Air Conditioning, Refrigeration, Heating

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Observe motor component demonstrations in the lab.
- B. Demonstrate tests and analysis for common motor problems.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: From the textbook, Units 17, 18, 19 and 20, "Types of Electric motors, Application of Motors, Motor Controls and Troubleshooting Electric Motors."
- B. Sample writing assignment: Answer review questions related to assigned reading.

Ensure you're using the current version of this form by downloading a fresh copy from [the CCC webpage!](#)

FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course.

In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 153C

Course Title: Components of the Refrigerant Cycle

Catalog Description:

Students learn the theory and components of the refrigerant cycle, as used to transfer heat.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air Conditioning Service Mechanic

- o What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
 - course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
 - pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

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Apprenticeship

APSM 153C COMPONENTS OF THE REFRIGERANT CYCLE

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APSM 153C	COMPONENTS OF THE REFRIGERANT CYCLE	Summer 2018
40 hours total: 30 hours lecture, 10 hours laboratory.		2.5 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active

Grading: Letter Grade with P/NP option

Degree Status: Applicable

Credit Status: Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count:
30

Load Factor:
.060

FOAP Code:
115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

**Stand Alone
Designation:** no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the service sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Air Conditioning Service Mechanic.

1. Description -

Students learn the theory and components of the refrigerant cycle, as used to transfer heat.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Explain functions of evaporators
- B. Explain functions of condensers
- C. Explain functions of compressors
- D. Explain functions of expansion devices
- E. Explain functions of special components: filter driers, sight glass, suction line accumulator, liquid line receiver, hot gas bypass, ambient controls

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal service tools
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Evaporators
 1. Define high, medium and low temperature refrigeration (Lec and Lab)
 2. Determine the boiling temperature in an evaporator (Lec and Lab)
 3. Identify the different types of evaporators (Lec and Lab)
 4. Describe a parallel flow, plate and fin evaporator (Lec and Lab)
 5. Describe multiple and single circuit evaporators (Lec and Lab)
- B. Condensers
 1. Explain the purpose of the condenser in a refrigerant cycle (Lec and Lab)
 2. Describe the differences between the operating characteristics of water cooled and air cooled systems (Lec and Lab)
 3. Describe the basics of heat exchange in a condenser (Lec and Lab)
 4. Explain the differences between the different types of water cooled condensers (Lec and Lab)
 5. Describe a wastewater system (Lec and Lab)
 6. Describe a recirculating system (Lec and Lab)
 7. Describe a cooling tower (Lec and Lab)
 8. Describe the operation of head pressure controls (Lec and Lab)
- C. Compressors
 1. Explain the function of the compressor in a refrigeration system (Lec and Lab)
 2. Discuss compression ratio (Lec and Lab)
 3. Describe four different methods of compression (Lec and Lab)
 4. State specific conditions under which a compressor is expected to operate (Lec and Lab)
 5. Explain the difference between a hermetic and a semi hermetic compressor (Lec and Lab)
 6. Describe the various working parts of reciprocating and rotary compressors (Lec and Lab)
- D. Expansion devices
 1. Describe the three most popular types of expansion devices (Lec and Lab)
 2. Describe the operating characteristics of the three most popular expansion devices (Lec and Lab)
 3. Describe how the three expansion devices respond to load changes (Lec and Lab)

4. Describe the operation of a balanced port expansion valve (Lec and Lab)
5. Describe the operation of a dual port expansion valve (Lec and Lab)
6. Describe how electronic expansion valves and their controllers work (Lec and Lab)
- E. Special components: filter driers, sight glass, suction line accumulator, liquid line receiver, hot gas bypass, ambient controls
 1. Distinguish between mechanical and electrical controls (Lec and Lab)
 2. Explain how and why mechanical controls work (Lec and Lab)
 3. Describe an automatic pump down system (Lec and Lab)
 4. Define low ambient operation (Lec and Lab)
 5. Describe electrical controls that apply to refrigeration (Lec and Lab)
 6. Describe off cycle defrost (Lec and Lab)
 7. Describe the various refrigeration accessories (Lec and Lab)
 8. Describe random and planned defrost (Lec and Lab)
 9. Explain temperature terminated defrost (Lec and Lab)
 10. Describe the low side components (Lec and Lab)
 11. Describe the high side components (Lec and Lab)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Comprehensive written final examination
- D. Demonstration of assigned skills to acceptable level per instructor

7. Representative Text(s) -

Whitman, B., B. Johnson, J. Tomczyk, and E. Silberstein. Refrigeration and Air Conditioning Technology. 8th ed. Boston, MA: Cengage Learning, 2016.

8. Disciplines -

Sheet Metal OR Air Conditioning, Refrigeration, Heating

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Observe and assess lab demonstrations of various components and systems.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: From the textbook, Units 21, 22, 23, 24 and 25, "Evaporators, Condensers, Compressors, Expansion Devices and Special Components."
- B. Sample writing assignment: Answer review questions related to assigned reading.

Ensure you're using the current version of this form by downloading a fresh copy from [the CCC webpage!](#)

FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

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In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 154A

Course Title: Refrigeration in Air Conditioning

Catalog Description:

Students apply the refrigerant cycle theory to its use in an HVAC system and investigate the functions of individual components in these systems.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air Conditioning Service Mechanic

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

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Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
 - course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
 - pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

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Apprenticeship

APSM 154A REFRIGERATION IN AIR CONDITIONING

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APSM 154A

REFRIGERATION IN AIR CONDITIONING

Summer
2018

40 hours total: 20 hours lecture, 20 hours laboratory.

2 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active

Grading: Letter Grade with P/NP option

Degree Status: Applicable

Credit Status: Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count:

30

Load Factor:

.060

FOAP Code:

115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

Stand Alone
Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the service sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Air Conditioning Service Mechanic.

1. Description -

Students apply the refrigerant cycle theory to its use in an HVAC system and investigate the functions of individual components in these systems.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Understand refrigeration as applied to air conditioning systems
- B. Understand and describe typical operating conditions of an air conditioning system
- C. Describe the function and operation of electrical controls for an air conditioning system
- D. Perform a compressor change out
- E. Troubleshoot air conditioning refrigerant cycle
- F. Troubleshoot compressor operation

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal service tools
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Understand refrigeration as applied to air conditioning systems
 1. Explain three ways in which heat transfers into a structure (Lec)
 2. State two ways that air is conditioned for cooling (Lec)
 3. Explain refrigeration as applied to air conditioning (Lec)
- B. Typical operating conditions of an air conditioning system
 1. Calculate the correct operating suction pressures for both standard and high efficiency air conditioning equipment under various operating conditions (Lec and Lab)
 2. Calculate the standard operating discharge pressures at various ambient conditions (Lec and Lab)
 3. Explain how "high efficiency" is accomplished (Lec and Lab)
 4. Describe package air conditioning equipment (Lec and Lab)
 5. Describe split system equipment (Lec and Lab)
- C. Electrical controls for an air conditioning system
 1. Describe the control sequence of an air conditioning system (Lec and Lab)
 2. Explain the function of the 24 volt control voltage (Lec and Lab)
 3. Describe the space thermostat (Lec and Lab)
 4. Describe the compressor contactor (Lec and Lab)
 5. Explain the operation of the high and low pressure controls (Lec and Lab)
 6. Discuss the function of the overloads and the motor winding thermostat (Lec and Lab)
 7. Discuss the winding thermostat and the internal relief valve (Lec and Lab)
 8. Identify operating and safety controls (Lec and Lab)
 9. Compare modern and older control concepts (Lec and Lab)
 10. Describe how crankcase heat is applied in some modern equipment (Lec and Lab)
- D. Perform a compressor change out
 1. Perform diagnostic on a compressor (Lec and Lab)
 2. Describe the steps in performing a compressor change out (Lec and Lab)
 3. Perform change out of a compressor (Lec and Lab)
- E. Troubleshoot air conditioning refrigerant cycle

1. Select the correct instruments for checking an air conditioning unit with a mechanical problem (Lec and Lab)
 2. Select the correct instruments for troubleshooting electrical problems in an air conditioning system (Lec and Lab)
 3. Check the line and low voltage power supplies, troubleshooting basic electrical problems in an air conditioning system (Lec and Lab)
 4. Use an ohmmeter to check the various components of an electrical system
- F. Troubleshoot compressor operation (Lec and Lab)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Comprehensive written final examination
- D. Comprehensive final project
- E. Demonstration of assigned skills to acceptable level per instructor

7. Representative Text(s) -

Whitman, B., B. Johnson, J. Tomczyk, and E. Silberstein. Refrigeration and Air Conditioning Technology. 8th ed. Boston, MA: Cengage Learning, 2016.

8. Disciplines -

Sheet Metal OR Air Conditioning, Refrigeration, Heating

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Perform diagnostic checks on a refrigerant compressor.
- B. Perform change out of an HVAC refrigerant compressor.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: From the textbook, Unit 36, "Refrigeration as applied to Air Conditioning."
- B. Sample writing assignment: Answer review questions related to assigned reading.

Ensure you're using the current version of this form by downloading a fresh copy from [the CCC webpage!](#)

FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course.

In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 154B

Course Title: Gas & Electric Heating

Catalog Description:

Students explore the operation, maintenance, and repair of gas and electric heating systems.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air Conditioning Service Mechanic

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
- course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
- pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

Submissions Course Outline Editor

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Apprenticeship

APSM 154B GAS & ELECTRIC HEATING

[Edit Course Outline](#)

APSM 154B

GAS & ELECTRIC HEATING

Summer
2018

40 hours total: 20 hours lecture, 20 hours laboratory.

2 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active

Grading: Letter Grade with P/NP option

Degree Status: Applicable

Credit Status: Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count:

30

Load Factor:

.060

FOAP Code:

115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

Stand Alone
Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the service sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Air Conditioning Service Mechanic.

1. Description -

Students explore the operation, maintenance, and repair of gas and electric heating systems.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Explain the application and operational sequence of electric and gas heating
- B. Explain electrical heating components and controls
- C. Troubleshoot electric heating
- D. Explain gas heating components
- E. Perform gas pressure measurements and gas pipe sizing
- F. Describe the process of combustion
- G. Understand and demonstrate the use of flue gas analysis instruments
- H. Describe the function of different types of gas valves
- I. Understand the requirements for sizing and installation of all types of venting for gas heat
- J. Troubleshoot and perform maintenance of gas heating
- K. Explain special requirements for propane heating

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal service tools
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Explain the application and operational sequence of electric and gas heating
 1. Discuss the efficiency and relative operating cost of electric heat (Lec and Lab)
 2. List types of electric heaters and state their use (Lec and Lab)
- B. Explain electrical heating components and controls
 1. Describe how sequencers operate in electric forced air furnaces (Lec and Lab)
 2. Trace the circuitry in a diagram of a forced air furnace (Lec and Lab)
- C. Troubleshoot electric heating
 1. Perform basic tests in troubleshooting electric heaters (Lec and Lab)
 2. Describe typical preventative maintenance procedures used in electric heating units and systems (Lec and Lab)
- D. Explain gas heating components
 1. Describe the components of a gas furnace (Lec and Lab)
 2. Discuss flame rollout switches (Lec and Lab)
 3. Discuss gas burners and heat exchangers (Lec and Lab)
 4. Discuss fan control (Lec and Lab)
 5. State the function of an off delay timing device (Lec and Lab)
 6. Describe the differences between induced draft and forced draft systems (Lec and Lab)
 7. Discuss pilot and ignition systems
 - a. List three flame proving devices and describe the operation of each (Lec and Lab)
 8. Discuss the reasons for the delay in starting and stopping the furnace fan (Lec and Lab)
 9. State the purpose of the limit switch (Lec and Lab)
- E. Perform gas pressure measurements and gas pipe sizing
 1. Explain gas piping as it pertains to furnaces (Lec and Lab)
 2. Discuss gas combustion, excess air, dilution air, combustion air, primary air, and secondary air

- (Lec and Lab)
- 3. Discuss gas pressure measurements (Lec and Lab)
- 4. Discuss excess air, dilution air, combustion air, primary air, and secondary air (Lec and Lab)
- F. Describe the process of combustion
 - 1. Discuss gas valves (Lec and Lab)
 - 2. List the functions of automatic combination gas valve (Lec and Lab)
 - 3. Discuss gas pressure regulators (Lec and Lab)
 - 4. Discuss the meaning of a redundant gas valve (Lec and Lab)
- G. Understand and demonstrate the use of flue gas analysis instruments
 - 1. Describe flue gas venting systems (Lec and Lab)
 - 2. Describe direct vented, non-direct vented and positive pressure systems (Lec and Lab)
 - 3. Discuss flame rectification (Lec and Lab)
 - 4. Discuss high efficiency furnaces (Lec and Lab)
 - 5. Explain dew point and how it relates to high efficiency systems (Lec and Lab)
 - 6. Describe condensate disposal system of a high efficiency systems (Lec and Lab)
 - 7. Identify furnace efficiency ratings (Lec and Lab)
 - 8. Describe a two stage furnace (Lec and Lab)
- H. Describe the function of different types of gas valves
 - 1. Interpret gas furnace wiring diagrams (Lec and Lab)
 - 2. Describe procedures for taking flue-gas carbon dioxide and temperature readings (Lec and Lab)
 - 3. Describe typical preventive maintenance procedures for gas furnaces (Lec and Lab)
 - 4. Discuss requirements for unit conversions to propane heating (Lec and Lab)
- I. Understand the requirements for sizing and installation of all types of venting for gas heat (Lec and Lab)
- J. Troubleshooting and maintenance of gas heating (Lec and Lab)
- K. Explain special requirements for propane heating (Lec and Lab)

5. **Repeatability** - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Comprehensive written final examination
- D. Comprehensive final project
- E. Demonstration of assigned skills to acceptable level per instructor

7. Representative Text(s) -

Whitman, B., B. Johnson, J. Tomczyk, and E. Silberstein. Refrigeration and Air Conditioning Technology. 8th ed. Boston, MA: Cengage Learning, 2016.

8. Disciplines -

Sheet Metal OR Air Conditioning, Refrigeration, Heating

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Perform gas pressure measurements and gas pipe sizing.
- B. Perform troubleshooting and maintenance on gas heat systems, as assigned.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

A. Sample reading assignment: From the textbook, Units 30 and 31.

B. Sample writing assignment: Answer review questions related to assigned reading.

Ensure you're using the current version of this form by downloading a fresh copy from [the CCC webpage!](#)

FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course.

In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 154C

Course Title: Hydronic Heating

Catalog Description:

Students will learn the basic principles of and equipment used in hydronic heating.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern

The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air Conditioning Service Mechanic

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
- course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
- pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

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Apprenticeship

APSM 154C HYDRONIC HEATING

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APSM 154C

HYDRONIC HEATING

Summer
2018

40 hours total: 25 hours lecture, 15 hours laboratory.

2 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active

Grading: Letter Grade with P/NP option

Degree Status: Applicable

Credit Status: Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count:

30

Load Factor:

.060

FOAP Code:

115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

Stand Alone
Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the service sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Air Conditioning Service Mechanic.

1. Description -

Students will learn the basic principles of and equipment used in hydronic heating.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Describe the basics of a hydronic heating system
- B. Understand the different types of heat sources for hydronic heating (water, steam, geothermal/waste heat, solar)
- C. Understand the basic components and operation of boilers
- D. Understand the different types of hydronic heating controls
- E. Understand the different types of piping systems for hydronic heating
- F. Troubleshoot and perform maintenance of boilers

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal service tools
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Describe the basics of a hydronic heating system
 1. Describe a basic hydronic heating system (Lec)
 2. Explain the difference between a wet base and a dry base boiler (Lec)
 3. Describe reasons for a hydronic heating system to have more than one zone (Lec)
- B. Understand the different types of heat sources for hydronic heating (water, steam, geothermal/waste heat, solar)
 1. List four heat sources commonly used in hydronic heating systems (Lec)
- C. Understand the basic components and operation of boilers
 1. State the reason a boiler is constructed in sections or tubes (Lec and Lab)
 2. Discuss the reasons why air should be eliminated from hydronic heating systems (Lec and Lab)
 3. Explain the effect air has on a cast iron or steel boiler (Lec and Lab)
 4. Describe the function of an air cushion or expansion tank (Lec and Lab)
 5. Explain the operation of circulating pumps as they apply to hydronic heating systems (Lec and Lab)
 6. Describe the importance of "point of no pressure change" (Lec and Lab)
 7. State the purpose of a pressure relief valve (Lec and Lab)
 8. State the purpose of a zone valve (Lec and Lab)
- D. Understand the different types of hydronic heating controls
 1. List the various types of zone valves that are available (Lec and Lab)
 2. Explain how "outdoor reset" can be used to increase system efficiency (Lec and Lab)
- E. Understand the different types of piping systems for hydronic heating
 1. Sketch a series loop hydronic system (Lec and Lab)
 2. Sketch a single pipe hydronic heating system (Lec and Lab)
 3. Explain the function of the diverter tee (Lec and Lab)
 4. Explain the difference between a two pipe direct return and a two pipe reverse return hydronic heating system (Lec and Lab)
 5. Explain the application that requires the use of a balancing valve (Lec and Lab)

6. List the benefits of primary-secondary pumping (Lec and Lab)
 7. Describe the operation and function of mixing valves (Lec and Lab)
 8. Describe the differences of radiant and conventional heating systems (Lec and Lab)
 9. List three common types of radiant heating system installations (Lec and Lab)
 10. Describe a tankless domestic hot water heater used with hydronic space heating (Lec and Lab)
- F. Troubleshooting and maintenance of boilers
1. List preventative maintenance procedures for hydronic heating systems (Lec and Lab)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Comprehensive written final examination
- D. Demonstration of assigned skills to acceptable level per instructor

7. Representative Text(s) -

Whitman, B., B. Johnson, J. Tomczyk, and E. Silberstein. Refrigeration and Air Conditioning Technology. 8th ed. Boston, MA: Cengage Learning, 2016.

8. Disciplines -

Sheet Metal OR Air Conditioning, Refrigeration, Heating

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Observe demonstration of balancing valves and mixing valves function and parts in the lab
- B. Assess the uses and effectiveness of the valve used in a hydronic heating system

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: From the textbook, Unit 33 "Hydronic Heat."
- B. Sample writing assignment: Answer review questions related to assigned reading.

Ensure you're using the current version of this form by downloading a fresh copy from [the CCC webpage!](#)

FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

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In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 155A

Course Title: Sheet Metal Fabrication

Catalog Description:

Students learn essential sheet metal fabrication as required in HVAC duct systems. Students build seams and selected common duct fittings.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air Conditioning Service Mechanic

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
 - course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
 - pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

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Apprenticeship

APSM 155A SHEET METAL FABRICATION

[Edit Course Outline](#)

APSM 155A

SHEET METAL FABRICATION

Summer
2018

40 hours total: 16 hours lecture, 24 hours laboratory.

1.5 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active

Grading: Letter Grade with P/NP option

Degree Status: Applicable

Credit Status: Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count:

30

Load Factor:

.060

FOAP Code:

115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

Stand Alone
Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the service sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Air Conditioning Service Mechanic.

1. Description -

Students learn essential sheet metal fabrication as required in HVAC duct systems. Students build seams and selected common duct fittings.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

Students will be able to:

- A. Demonstrate use of basic sheet metal shop equipment
- B. Demonstrate use of seams, locks, edges, and allowances
- C. Perform basic layout
- D. Measure and fabricate duct plenums and transitions
- E. Identify other fittings utilized to efficiently convey air in a duct system

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal service tools
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Basic sheet metal shop equipment
 1. Explain the purpose and use of different types of shop equipment (Lec and Lab)
 2. Safely use the shop equipment designated by instructor (Lec and Lab)
- B. Seams, locks, edges, and allowances
 1. Form and use hem and double hem (Lec and Lab)
 2. Form and use standing seam and Pittsburgh seam (Lec and Lab)
 3. Fabricate and use an end cap (Lec and Lab)
 4. Form and use a clinch lock
- C. Basic layout
 1. Name common layout tools and explain their use (Lec and Lab)
- D. Measure and fabricate duct plenums and transitions
 1. Layout and fabricate a rectangular duct (Lec and Lab)
 2. Layout and fabricate a rectangular transition (Lec and Lab)
- E. Identify other fittings utilized to efficiently convey air in a duct system
 1. Layout and fabricate an offset (Lec and Lab)
 2. Layout and fabricate an elbow (Lec and Lab)
 3. Layout and fabricate a saddle tap (Lec and Lab)
 4. Layout and fabricate a 45 degree shoe tap (Lec and Lab)
 5. Layout and fabricate a square to round (Lec and Lab)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Comprehensive written final examination
- D. Comprehensive final project

E. Demonstration of assigned skills to acceptable level per instructor

7. Representative Text(s) -

International Training Institute. Layout Curriculum for the Sheet Metal Industry, International Training Institute for the Sheet Metal and Air Conditioning Industry (Student manual and workbook), IDI Multimedia, 2010.

NOTE: This is the standard Sheet Metal textbook/workbook used for this course. Although it may not be within 5 years of the required published date, it is the most current book used when teaching this course.

8. Disciplines -

Sheet Metal OR Air Conditioning, Refrigeration, Heating

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Safely measure and fabricate duct plenums and transitions.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: From the textbook, Module 3, Square-to-round.
- B. Sample writing assignment: Students calculate stretch outs for blank offs (on separate sheet of paper) for the assigned transition project.

Ensure you're using the current version of this form by downloading a fresh copy from [the CCC webpage!](#)

FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course.

In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 155B

Course Title: Air Distribution & Efficient Duct Design

Catalog Description:

Students develop an understanding of air flow characteristics and the proper design of duct systems.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air Conditioning Service Mechanic

- o What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
- course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
- pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17
Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17
Date of Approval by Division Curriculum Committee: 06/12/17
College Curriculum Co-Chairperson: _____ **Date:** _____

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Apprenticeship

APSM 155B AIR DISTRIBUTION & EFFICIENT DUCT DESIGN

[Edit Course Outline](#)

APSM 155B AIR DISTRIBUTION & EFFICIENT DUCT DESIGN Summer 2018
40 hours total: 35 hours lecture, 5 hours laboratory. 2.5 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active

Grading: Letter Grade with P/NP option

Degree Status: Applicable

Credit Status: Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count:
30

Load Factor:
.060

FOAP Code:
115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

Stand Alone Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the service sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Air Conditioning Service Mechanic.

1. Description -

Students develop an understanding of air flow characteristics and the proper design of duct systems.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Understand the requirements for air distribution and balance
- B. Understand the use of an air duct calculator and the formula for $CFM = \text{Volume (cu. ft.)} \times \text{Area (sq. ft.)}$ of duct
- C. Demonstrate fan law calculations
- D. Describe the basic function of zone controls
- E. Calculate the requirements for and perform efficient duct design per industry standards
- F. Perform the diagnostics for start-up

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal service tools
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Understand the requirements for air distribution and balance
 1. Describe the characteristics of propeller and centrifugal blowers (Lec)
 2. Describe common types of motors and drives (Lec)
 3. Explain what constitutes good air flow in a duct system (Lec)
- B. Understand the use of an air duct calculator and the formula for $CFM = \text{Volume (cu. ft.)} \times \text{Area (sq. ft.)}$ of duct
 1. Demonstrate proper use of a duct calculator (Lec and Lab)
- C. Demonstrate fan law calculations
 1. Perform fan law calculations to predict air flow with different variables (Lec and Lab)
- D. Introduction to zone controls
 1. Explain different types of zone systems and how they modulate air flow (Lec and Lab)
- E. Efficient duct design per industry standards
 1. Design duct system utilizing industry standards to optimize air flow for energy efficiency (Lec and Lab)
- F. Diagnostics for start-up
 1. Demonstrate use of air measuring instruments (Lec and Lab)
 2. Plot air flow conditions on a friction chart (Lec and Lab)
 3. Perform an air balance of a system in the lab (Lec and Lab)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Comprehensive written final examination

D. Demonstration of assigned skills to acceptable level per instructor

7. Representative Text(s) -

Whitman, B., B. Johnson, J. Tomczyk, and E. Silberstein. Refrigeration and Air Conditioning Technology. 8th ed. Boston, MA: Cengage Learning, 2016.

8. Disciplines -

Sheet Metal OR Air Conditioning, Refrigeration, Heating

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Demonstrate use of airflow measuring instruments.
- B. Perform an airflow balance of a duct system in the lab.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: From the textbook, Unit 37, "Air Distribution and Balance."
- B. Sample writing assignment: Answer review questions related to assigned reading.

Ensure you're using the current version of this form by downloading a fresh copy from [the CCC webpage!](#)

FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course.

In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 155C

Course Title: Maintaining Efficient Operation of Electric Cooling & Heating Equipment

Catalog Description:

Students learn to perform maintenance procedures required for efficient operation of HVAC systems.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air Conditioning Service Mechanic

- o What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
- course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
- pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

Submissions Course Outline Editor

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Apprenticeship

APSM 155C MAINTAINING EFFICIENT OPERATION OF ELECTRIC COOLING & HEATING EQUIPMENT

[Edit Course Outline](#)

APSM 155C	MAINTAINING EFFICIENT OPERATION OF ELECTRIC COOLING & HEATING EQUIPMENT	Summer 2018
40 hours total: 25 hours lecture, 15 hours laboratory.		2 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active	Grading: Letter Grade with P/NP option
Degree Status: Applicable	Credit Status: Credit
Degree or Certificate Requirement: Stand Alone Course	
Foothill GE Status: Non-GE	

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count: 30 **Load Factor:** .060 **FOAP Code:** 115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

Stand Alone Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the service sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Air Conditioning Service Mechanic.

1. Description -

Students learn to perform maintenance procedures required for efficient operation of HVAC systems.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Explain and perform start-up, diagnosis, repair
- B. Provide maintenance of gas heating/electric cooling package units and split systems

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal service tools
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Explain and perform start-up, diagnosis, repair and maintenance of gas heating/electric cooling package units and split systems
 - 1. Start-up sheets (Lec and Lab)
 - a. Reasons for start-up sheets, both mechanical and legal (Lec and Lab)
 - b. Examples of different start-up sheets; discussion of differences (Lec and Lab)
 - c. How a start-up sheet can be used for troubleshooting (Lec and Lab)
 - 2. Maintenance (Lec and Lab)
 - a. Perform procedures and diagnostics typically performed at the various levels of preventative maintenance (Lec and Lab)
 - b. Describe importance of maintenance to companies (Lec and Lab)
 - 3. Importance of customer relationships (Lec and Lab)
 - a. Soft skills--generate revenue for the company and provide the customer with good service (Lec and Lab)
 - 4. Demonstrate the ability, both verbally and in writing proposals, for additional work over and above maintenance contracts (Lec and Lab)
 - 5. Perform preventative maintenance on various types of systems in the lab (Lec and Lab)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Comprehensive written final examination
- D. Comprehensive final project
- E. Demonstration of assigned skills to acceptable level per instructor

7. Representative Text(s) -

Whitman, B., B. Johnson, J. Tomczyk, and E. Silberstein. Refrigeration and Air Conditioning Technology. 8th ed. Boston, MA: Cengage Learning, 2016.

8. Disciplines -

Sheet Metal OR Air Conditioning, Refrigeration, Heating

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Perform preventative maintenance on various assigned HVAC systems in the lab.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: From the textbook, Unit 40, "Typical Operating Conditions."
- B. Sample writing assignment: Answer review questions related to assigned reading.

Ensure you're using the current version of this form by downloading a fresh copy from [the CCC webpage!](#)

FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

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In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

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Course #: APSM 156A

Course Title: Heat Pump Efficient Operation & Service

Catalog Description:

Students learn how heat pumps function to transfer heat in either direction and apply theory with actual components.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air Conditioning Service Mechanic

- o What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
- course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
- pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

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Apprenticeship

APSM 156A HEAT PUMP EFFICIENT OPERATION & SERVICE

[Edit Course Outline](#)

APSM 156A	HEAT PUMP EFFICIENT OPERATION & SERVICE	Summer 2018
40 hours total: 30 hours lecture, 10 hours laboratory.		2.5 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active

Grading: Letter Grade with P/NP option

Degree Status: Applicable

Credit Status: Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count:
30

Load Factor:
.060

FOAP Code:
115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

**Stand Alone
Designation:** no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the test and balance sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance certification. This course will be a required core course for the forthcoming certificates of achievement in Sheet Metal Air Conditioning Service Mechanic and Sheet Metal Test & Air Balance.

1. Description -

Students learn how heat pumps function to transfer heat in either direction and apply theory with actual components.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Understand the theory of heat pump systems
- B. Understand the different components of heat pumps (e.g., air source, water source, geothermal, etc.)
- C. Perform start-up, diagnosis, repair and maintenance of air and water source heat pumps

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal service tools
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Understand the theory of heat pump systems
 - 1. Describe year-round air conditioning (heat pump) systems (Lec and Lab)
 - 2. Explain the five ways to condition air (Lec and Lab)
- B. Understand the different components of heat pumps (e.g., air source, water source, geothermal, etc.)
 - 1. Discuss the three typical year-round (heat pump) air conditioning systems (Lec and Lab)
 - 2. Explain the function and operation of components specific to heat pumps (Lec and Lab)
 - 3. Explain the defrost cycle and they ways it is accomplished in heat pump systems (Lec and Lab)
- C. Perform start-up, diagnosis, repair and maintenance of air and water source heat pumps
 - 1. Perform a start up/diagnostic of a heat pump (Lec and Lab)
 - 2. Discuss preventative maintenance supplement (Lec and Lab)
 - 3. Discuss service call supplements (Lec and Lab)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Comprehensive written final examination
- D. Comprehensive final project
- E. Demonstration of assigned skills to acceptable level per instructor

7. Representative Text(s) -

Whitman, B., B. Johnson, J. Tomczyk, and E. Silberstein. Refrigeration and Air Conditioning Technology. 8th ed. Boston, MA: Cengage Learning, 2016.

8. Disciplines -

Sheet Metal OR Air Conditioning, Refrigeration, Heating

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Perform start-up and diagnostic procedures on assigned air and water source heat pumps in the lab.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: From the textbook, Units 43 and 44.
- B. Sample writing assignment: Answer review questions related to assigned reading.

Ensure you're using the current version of this form by downloading a fresh copy from [the CCC webpage!](#)

FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course.

In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 156B

Course Title: Cooling Towers, Pumps & Piping

Catalog Description:

Students develop an understanding of cooling towers, pumps, and condensing water circulation system requirements, using theory and system materials.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern

The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air Conditioning Service Mechanic

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
 - course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
 - pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

Submissions Course Outline Editor

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Apprenticeship

APSM 156B COOLING TOWERS, PUMPS & PIPING

[Edit Course Outline](#)

APSM 156B

COOLING TOWERS, PUMPS & PIPING

Summer
2018

40 hours total: 35 hours lecture, 5 hours laboratory.

2.5 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active

Grading: Letter Grade with P/NP option

Degree Status: Applicable

Credit Status: Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count:

30

Load Factor:

.060

FOAP Code:

115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

Stand Alone
Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the service sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Air Conditioning Service Mechanic.

1. Description -

Students develop an understanding of cooling towers, pumps, and condensing water circulation system requirements, using theory and system materials.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Explain the purpose and operation of cooling towers and pumps
- B. Explain the types and function of cooling towers and related piping
- C. Perform start-up, diagnosis, repair, and maintenance of cooling towers and pumps

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal service tools
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Explain the purpose and operation of cooling towers and pumps
 1. Describe the purpose of cooling water towers used with chilled water systems (Lec and Lab)
 2. State the relationship of the cooling capacity of the water tower and the wet bulb temperature of the outside air (Lec and Lab)
 3. State the means by which the cooling tower reduces water temperature (Lec and Lab)
 4. Describe three types of cooling water towers (Lec and Lab)
- B. Explain the types and function of cooling towers and related piping
 1. Explain the various uses of fill material in cooling water towers (Lec and Lab)
 2. List the two types of fan drives (Lec and Lab)
 3. State the two types of fans used in water cooling towers (Lec and Lab)
 4. Explain the purpose of the water tower sump (Lec and Lab)
 5. Explain the purpose of make-up water (Lec and Lab)
 6. Describe a centrifugal pump (Lec and Lab)
- C. Perform start-up, diagnosis, repair, and maintenance of cooling towers and pumps
 1. Describe water vortexing (Lec and Lab)
 2. Explain two types of motor pump alignment (Lec and Lab)
 3. Perform start-up of a cooling tower (Lec and Lab)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Comprehensive written final examination
- D. Comprehensive final project
- E. Demonstration of assigned skills to acceptable level per instructor

7. Representative Text(s) -

Whitman, B., B. Johnson, J. Tomczyk, and E. Silberstein. Refrigeration and Air Conditioning Technology. 8th ed. Boston, MA: Cengage Learning, 2016.

8. Disciplines -

Sheet Metal OR Air Conditioning, Refrigeration, Heating

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Perform start-up on a cooling tower in the lab.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: From the textbook, Unit 48, "Cooling Towers and Pumps."
- B. Sample writing assignment: Answer review questions related to assigned reading.

Ensure you're using the current version of this form by downloading a fresh copy from [the CCC webpage!](#)

FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course.

In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 156C

Course Title: Chilled Water HVAC Systems & Components

Catalog Description:

Students receive an introduction to the operation, maintenance and repair of chilled water systems.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air Conditioning Service Mechanic

- o What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
- course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
- pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

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Apprenticeship

APSM 156C CHILLED WATER HVAC SYSTEMS & COMPONENTS

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APSM 156C

CHILLED WATER HVAC SYSTEMS & COMPONENTS

Summer
2018

40 hours total: 35 hours lecture, 5 hours laboratory.

2.5 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active

Grading: Letter Grade with P/NP option

Degree Status: Applicable

Credit Status: Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count:
30

Load Factor:
.060

FOAP Code:
115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

**Stand Alone
Designation:** no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the service sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Air Conditioning Service Mechanic.

1. Description -

Students receive an introduction to the operation, maintenance and repair of chilled water systems.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Explain the purpose and some applications of chillers
- B. Identify the types of chillers
- C. Explain the functions of chiller controls for energy efficient operation
- D. Perform start-up, diagnosis, repair, and maintenance of chillers and chilled water fan coils

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal service tools
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Explain the purpose and some applications of chillers
 1. Explain the purpose and some applications of chillers (Lec)
 2. Identify and explain difference between industrial and commercial chillers (Lec)
- B. Identify the types of chillers
 1. Identify the types of chilled water systems (Lec and Lab)
 2. Explain the difference between direct expansion and flooded chiller evaporators (Lec and Lab)
 3. State the type of compressor used in low pressure chiller systems (Lec and Lab)
 4. Describe the operation of a centrifugal compressor in a high pressure chiller (Lec and Lab)
 5. Explain the purge system used on a low pressure chiller condenser (Lec and Lab)
 6. Describe the absorption cooling system process (Lec and Lab)
 7. State the cooling medium generally used on large absorption chillers (Lec and Lab)
- C. Explain the functions of chiller controls for energy efficient operation
 1. Explain the operations of components and the functions of chiller controls (Lec and Lab)
 2. State the types of compressors used with high pressure chillers (Lec and Lab)
 3. State two types of condensers used in chilled water systems (Lec and Lab)
 4. List the types of metering devices used in high pressure chillers (Lec and Lab)
 5. Describe the metering devices used in a low pressure chiller system (Lec and Lab)
- D. Perform start-up, diagnosis, repair, and maintenance of chillers and chilled water fan coils
 1. Perform start-up, diagnosis, repair, and maintenance of chillers (Lec and Lab)
 2. Prepare a chiller for commissioning (Lec and Lab)
 3. Identify components and describe their functions (Lec and Lab)
 4. Identify sequence of operation of a typical chiller (Lec and Lab)
 5. Troubleshoot all system components (Lec and Lab)
 6. Calculate system efficiency (Lec and Lab)
 7. Record and analyze operating temperatures and pressures (Lec and Lab)
 8. Navigate chiller controller menus (Lec and Lab)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Comprehensive written final examination
- D. Comprehensive final project
- E. Demonstration of assigned skills to acceptable level per instructor

7. Representative Text(s) -

Whitman, B., B. Johnson, J. Tomczyk, and E. Silberstein. Refrigeration and Air Conditioning Technology. 8th ed. Boston, MA: Cengage Learning, 2016.

8. Disciplines -

Sheet Metal OR Air Conditioning, Refrigeration, Heating

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Perform diagnosis and maintenance on assigned chillers and/or chilled water fan coils.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: From the textbook, Unit 49, "Operation, Maintenance, and Troubleshooting of Chilled Water Air Conditioning Systems."
- B. Sample writing assignment: Answer review questions related to assigned reading.

Ensure you're using the current version of this form by downloading a fresh copy from [the CCC webpage!](#)

FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course.

In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 157A

Course Title: Plans & Specifications for the Service Technician

Catalog Description:

Students gain an introduction to and experience in reading and interpretation of building plans and specifications, especially as related to mechanical systems and equipment.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air Conditioning Service Mechanic

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
 - course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
 - pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

Need/Justification -

This course is needed in the service sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Air Conditioning Service Mechanic.

1. Description -

Students gain an introduction to and experience in reading and interpretation of building plans and specifications, especially as related to mechanical systems and equipment.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Explain the organization of construction documents (plans and specifications)
- B. Define line types, symbols, and abbreviations typically used on plans and specifications
- C. Identify and use plan views, elevation views, coordinates, section views, isometric drawings, and detail drawings
- D. Find specific information about a project in the plans and specifications provided, as typically referenced by service technicians
- E. Compare typical residential drawings with typical commercial drawings

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal service tools
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Explain the organization of construction documents (plans and specifications)
 1. Identify site, architectural, structural, mechanical, electrical, control, and specialty drawing sections of the plans
 2. Identify the list of divisions in the specifications
- B. Define line types, symbols, and abbreviations typically used on plans and specifications
- C. Identify and use plan views, elevation views, coordinates, section views, isometric drawings, and detail drawings
- D. Find specific information about a project in the plans and specifications provided, as typically referenced by service technicians
 1. Refer to equipment schedules, specifications, and submittals to prepare for "start-up" of new equipment
 2. Use contract documents to prepare a detailed order list of filters, belts, refrigerant and other maintenance items as assigned
- E. Compare typical residential drawings with typical commercial drawings
 1. Determine ordering information for a thermostat sensor and associated wiring in a given commercial project, versus a given residential project
 2. Prepare an order for a replacement compressor for an air conditioner on a commercial building using plans, specifications, and submittals
 3. Prepare an order for a replacement compressor for an air conditioner on a residential project using plans, specifications, and submittals

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Demonstrated mastery of course topics as measured by the results of written quizzes, tests, and lab practical
- B. Class participation
- C. Comprehensive written final examination
- D. Comprehensive final project

7. Representative Text(s) -

International Training Institute. Reading Plans and Specs, International Training Institute for the Sheet Metal and Air Conditioning Industry, (Student Manual, Student Workbook, Selected Specifications and Submittals, and Selected Plans). Progressive AE, 2006.

NOTE: This is the standard Sheet Metal textbook/workbook used for this course. Although it may not be within 5 years of the required published date, it is the most current book used when teaching this course.

8. Disciplines -

Sheet Metal OR Air Conditioning, Refrigeration, Heating

9. Method of Instruction -

- A. Discussion
- B. Laboratory instruction
- C. Demonstration

10. Lab Content -

- A. For an assigned lab unit, access nameplate and manufacturer's data to determine if the unit is within given specifications for a building.
- B. From given specifications, determine the minimum SEER for an air conditioner.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: Read Unit 1 in the Student Manual, explaining the function of plans and specifications for a construction project and how they are organized
- B. Sample writing assignment: Complete Module 1, Activity 1, using plans to find information

Ensure you're using the current version of this form by downloading a fresh copy from [the CCC webpage!](#)

FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course.

In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 157B

Course Title: HVAC Energy Codes & Standards

Catalog Description:

Students are introduced to the California mechanical code, Building Energy Use Index, Title 24, and "Green" LEED construction, with particular attention to the role of HVAC Service in energy conservation.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air Conditioning Service Mechanic

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
- course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
- pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

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Apprenticeship

APSM 157B HVAC ENERGY CODES & STANDARDS

[Edit Course Outline](#)

APSM 157B

HVAC ENERGY CODES & STANDARDS

Summer
2018

40 hours total: 35 hours lecture, 5 hours laboratory.

2.5 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active

Grading: Letter Grade with P/NP option

Degree Status: Applicable

Credit Status: Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count:

30

Load Factor:

.060

FOAP Code:

115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

Stand Alone
Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the service sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Air Conditioning Service Mechanic.

1. Description -

Students are introduced to the California mechanical code, Building Energy Use Index, Title 24, and "Green" LEED construction, with particular attention to the role of HVAC service in energy conservation.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Demonstrate an understanding of green construction and energy conservation as it applies to the HVAC industry in California
- B. Perform basic energy usage calculations
- C. Identify common energy and resource losses in HVAC systems
- D. Explain the LEED rating system, and how it involves HVAC maintenance over the life of the building
- E. Be aware of and research California Title 24 HVAC requirements

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal service tools
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Demonstrate an understanding of green construction and energy conservation as it applies to the HVAC industry in California (Lec & Lab)
 1. Explain the importance of green technology for world energy production and current and future energy demands (Lec)
 2. Describe green responsibilities in HVAC, service, industrial, and architectural sheet metal work (Lec)
 3. Follow green practices on the job (Lab)
- B. Perform basic energy usage calculations
 1. Evaluate a utility bill and calculate energy costs (Lec)
 2. Define material heat conductivity and resistance, and climate characteristics as used in heat and cooling load calculations (Lec & Lab)
 3. Read HVAC equipment nameplates and determine their energy effectiveness (Lec & Lab)
- C. Identify common energy and resource losses and solutions in HVAC systems
 1. Losses: Duct Leakage, restricted air flow, heat transfer, dirty filters, refrigerant charge (Lec & Lab)
 2. Solutions: Sealing and insulation, system adjustments to conditions, maintenance (Lec & Lab)
- D. Explain the LEED rating system, and how it involves HVAC maintenance over the life of the building (Lec)
 1. Be familiar with the need for and purpose of a total building energy audit (Lec)
 2. Explain the LEED point system and demonstrate its use in the sheet metal industry (Lec & Lab)
- E. Be aware of and research California Title 24 HVAC requirements
 1. Definition of Title 24 and California Energy Code (Lec)
 2. Introduction to HERS Residential (Lec & Lab)
 3. Introduction to Commercial MECH form verifications (Lec & Lab)
 4. Update on changing requirements (Lec & Lab)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Comprehensive written final examination
- D. Demonstration of assigned skills to acceptable level per instructor

7. Representative Text(s) -

International Training Institute. Energy Audit Manual, Total HVAC Systems, International Training Institute for the Sheet Metal and Air Conditioning Industry (Student Manual). IDI Multimedia, 2010.

International Training Institute. Energy Audit Manual, Total Building, International Training Institute for the Sheet Metal and Air Conditioning Industry (Student Manual). IDI Multimedia, 2010.

International Training Institute. Energy Audit Manual, Energy Audit Manual, International Training Institute for the Sheet Metal and Air Conditioning Industry (Student Manual). IDI Multimedia, 2010.

International Training Institute. Green/LEED Construction for the Sheet Metal Industry, International Training Institute for the Sheet Metal and Air Conditioning Industry (Student Manual). IDI Multimedia, 2010.

NOTE: These are the standard Sheet Metal textbooks/workbooks used for this course. Although one or more may not be within 5 years of the required published date, they are the most current books used when teaching this course.

8. Disciplines -

Sheet Metal OR Air Conditioning, Refrigeration, Heating

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Practice examples of duct sealing and insulation.
- B. Research and calculate heat transfer for assigned construction materials in the lab.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: Unit 6, Renewable Energy and LEED
- B. Sample writing assignment: Complete the "knowledge check" review questions on page 194 regarding renewable energy and LEED

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FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course.

In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 157C

Course Title: Indoor Air Quality & Energy Efficiency

Catalog Description:

Students will consider factors of indoor air quality versus energy efficiency, including airflow, filtration, air changes per hour, and humidity. Related HVAC equipment solutions, including economizers and duct system designs will also be discussed. Students will be introduced to typical measurements and requirements.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air Conditioning Service Mechanic

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

NOTE: If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. **Primary:** offer academic and vocational instruction at the lower division level; and
2. **Primary:** to advance California's economic growth and global competitiveness through education, training, and services that contribute to continuous work force improvement.
3. **Secondary:** provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the

industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
- course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
- pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17
Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17
Date of Approval by Division Curriculum Committee: 06/12/17
College Curriculum Co-Chairperson: _____ **Date:** _____

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Apprenticeship

APSM 157C INDOOR AIR QUALITY & ENERGY EFFICIENCY

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APSM 157C

INDOOR AIR QUALITY & ENERGY EFFICIENCY

Summer
2018

40 hours total: 35 hours lecture, 5 hours laboratory.

2.5 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active

Grading: Letter Grade with P/NP option

Degree Status: Applicable

Credit Status: Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count:
30

Load Factor:
.060

FOAP Code:
115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

**Stand Alone
Designation:** no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the service sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Air Conditioning Service Mechanic.

1. Description -

Students will consider factors of indoor air quality versus energy efficiency, including airflow, filtration, air changes per hour, and humidity. Related HVAC equipment solutions, including economizers and duct system designs will also be discussed. Students will be introduced to typical measurements and requirements.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Describe heat/cooling load calculations
- B. Consider and calculate environmental factors, including comfort index, enthalpy, degree days
- C. Demonstrate understanding and use of psychometric equipment and charts
- D. Understand importance of indoor air quality and requirements for filtration, ventilation, and other solutions
- E. Identify factors affecting HVAC equipment sizing and apply to system diagnosis
- F. Explain the function of an economizer
- G. Install and verify operation of an economizer
- H. Troubleshoot/diagnose economizer operation
- I. Explain purpose and operation of demand control ventilation

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal service tools
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Heat/cooling load calculations
 1. Formulas for heat load calculations will be presented and used (Lec and Lab)
- B. Consider and calculate environmental factors, including comfort index, enthalpy, degree days
 1. Perform heating and cooling load calculations on various scenarios (Lec and Lab)
- C. Demonstrate understanding and use of psychometric equipment and charts
 1. Demonstrate reading and interpretation of psychrometric charts (Lec and Lab)
 2. Perform actual wet and dry bulb readings; plot on a psychrometric chart (Lec and Lab)
- D. Understand importance of indoor air quality and requirements for filtration, ventilation, and other solutions
 1. Methods of air filtration; types of air filters (Lec and Lab)
 2. Perform filter changes on actual equipment (Lec and Lab)
- E. Identify factors affecting HVAC equipment sizing and apply to system diagnosis
 1. Troubleshooting procedures that verify the diagnosis of under or over-sized equipment (Lec and Lab)
- F. Explain the function of an economizer
 1. Nomenclature, controls and operation of an economizer (Lec and Lab)
 2. Economizer components and their functions (Lec and Lab)
 3. Requirements of economizers in the code and title 24 (Lec and Lab)
- G. Install and verify operation of an economizer
 1. Install and program an economizer as part of a unit start-up (Lec and Lab)
- H. Troubleshoot/diagnose economizer operation
 1. Troubleshoot an economizer with manipulated failures and provide solutions to correct failures

(Lec and Lab)

- I. Explain purpose and operation of demand control ventilation
 1. Purpose, operation, and programming of demand control ventilation (Lec and Lab)
 2. Install and program demand control ventilation on an HVAC unit (Lec and Lab)
 3. Measure percentage of outside air on a unit with and economizer controlled by demand control ventilation (Lec and Lab)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Comprehensive written final examination
- D. Comprehensive final project
- E. Demonstration of assigned skills to acceptable level per instructor

7. Representative Text(s) -

Whitman, B., B. Johnson, J. Tomczyk, and E. Silberstein. Refrigeration and Air Conditioning Technology. 8th ed. Boston, MA: Cengage Learning, 2016.

8. Disciplines -

Sheet Metal OR Air Conditioning, Refrigeration, Heating

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Students will perform actual wet and dry bulb readings and plot them on a psychrometric chart.
- B. Students will troubleshoot an economizer with manipulated failures and provide solutions to correct failures.
- C. Students will install and program demand control ventilation on an actual economizer unit.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Read sections 35.12, 35.13, and 35.14, regarding the psychrometric chart, fresh air, infiltration and ventilation.
- B. Provide written answers to review questions at the end of section 50.6, "Demand Control Ventilation (DCV)".

Ensure you're using the current version of this form by downloading a fresh copy from [the CCC webpage!](#)

FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

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In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 158A

Course Title: Introduction to Direct Digital HVAC Controls

Catalog Description:

Students are introduced to the components and principles that comprise a direct digital control system.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern

The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air Conditioning Service Mechanic

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
- course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
- pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

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Apprenticeship

APSM 158A INTRODUCTION TO DIRECT DIGITAL HVAC CONTROLS

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APSM 158A INTRODUCTION TO DIRECT DIGITAL HVAC CONTROLS Summer
2018
40 hours total: 28 hours lecture, 12 hours laboratory. 2 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active

Grading: Letter Grade with P/NP option

Degree Status: Applicable

Credit Status: Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count:
30

Load Factor:
.060

FOAP Code:
115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

Stand Alone
Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the service sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Air Conditioning Service Mechanic.

1. Description -

Students are introduced to the components and principles that comprise a direct digital control system.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Identify various types of system architectures and components
- B. Demonstrate knowledge of different grounding schemes
- C. Demonstrate knowledge of various cables and connector types
- D. Explain definitions of system programming terminology and understand the programming variables

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal service tools
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Identify various types of system architectures and components
 - 1. Demonstrate knowledge of system layouts and identify the different components within each tier and know their function (Lec and Lab)
 - 2. Demonstrate knowledge of various buses (Lec and Lab)
 - 3. Demonstrate knowledge of how to properly install and calibrate system sensors as well as know their functions and capacities within the system (Lec and Lab)
- B. Demonstrate knowledge of different grounding schemes
 - 1. Demonstrate the ability to identify different grounding schemes (Lec and Lab)
 - 2. Demonstrate the ability to install the correct grounding for different system (Lec and Lab)
- C. Demonstrate knowledge of various cables and connector types
 - 1. Demonstrate knowledge of different cable types and connectors commonly used in DDC systems (Lec and Lab)
 - 2. Understand the effects of long wire runs on DDC sensors and other devices (Lec and Lab)
 - 3. Demonstrate knowledge of connectors commonly used for specific functions (Lec and Lab)
 - 4. Demonstrate the ability to de-pin and re-pin various connectors (Lec and Lab)
 - 5. Demonstrate the ability to test various cables (Lec and Lab)
- D. Explain definitions of system programming terminology and understand the programming variables
 - 1. Demonstrate knowledge of various terms used in DDC systems (Lec and Lab)
 - 2. Demonstrate the knowledge of various programming variables within a DDC system (Lec and Lab)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Comprehensive written final examination
- D. Comprehensive final project

E. Demonstration of assigned skills to acceptable level per instructor

7. Representative Text(s) -

Whitman, B., B. Johnson, J. Tomczyk, and E. Silberstein. Refrigeration and Air Conditioning Technology. 8th ed. Boston, MA: Cengage Learning, 2016.

8. Disciplines -

Sheet Metal OR Air Conditioning, Refrigeration, Heating

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Demonstrate the ability to install the correct grounding for different systems.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: From the textbook, Section 16.6, "Direct Digital controls (DDCs)."
- B. Sample writing assignment: Answer review questions related to assigned reading.

Ensure you're using the current version of this form by downloading a fresh copy from [the CCC webpage!](#)

FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course.

In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 158B

Course Title: Pneumatic Controls for HVAC Systems

Catalog Description:

Students apply theory using components of a pneumatic control system to develop a sound understanding of a pneumatic control system operation.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air Conditioning Service Mechanic

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
- course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
- pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

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Apprenticeship

APSM 158B PNEUMATIC CONTROLS FOR HVAC SYSTEMS

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APSM 158B

PNEUMATIC CONTROLS FOR HVAC SYSTEMS

Summer
2018

40 hours total: 30 hours lecture, 10 hours laboratory.

2.5 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active

Grading: Letter Grade with P/NP option

Degree Status: Applicable

Credit Status: Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count:
30

Load Factor:
.060

FOAP Code:
115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

**Stand Alone
Designation:** no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the service sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Air Conditioning Service Mechanic.

1. Description -

Students apply theory using components of a pneumatic control system to develop a sound understanding of a pneumatic control system operation.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Identify the components of a pneumatic central air station and explain the operation of these components
- B. Identify controls commonly used on a pneumatic VAV system and explain their operation
- C. Assemble a basic pneumatic control system
- D. Maintain, troubleshoot, calibrate and repair a pneumatic control system
- E. Understand interfaces between pneumatic and electronic controls

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal service tools
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Identify the components of a pneumatic central air station and explain the operation of these components
 1. Pneumatic central air stations (Lec and Lab)
 2. Demonstrate knowledge of common compressors, filters, dryers, regulators, separators (Lec and Lab)
 3. Demonstrate proper air compressor and air station maintenance procedures (Lec and Lab)
 4. Demonstrate knowledge causes of common air compressor failures (Lec and Lab)
 5. Demonstrate knowledge of checking and adjusting compressor controls (Lec and Lab)
- B. Identify controls commonly used on a pneumatic VAV system and explain their operation
 1. Common controls on a pneumatic VAV (Lec and Lab)
 2. Demonstrate the operation and differences of various velocity controllers (Lec and Lab)
 3. Demonstrate ability to determine spring ranges of commonly controlled pneumatic devices and explain how these differences impact calibration (Lec and Lab)
 4. Demonstrate the differences between reverse and direct-acting thermostats (Lec and Lab)
- C. Assemble a basic pneumatic control system
 1. Assemble a basic pneumatic control system (Lec and Lab)
 2. Demonstrate the ability to diagram, select proper components and assemble a pneumatic control system (Lec and Lab)
- D. Maintain, troubleshoot, calibrate and repair a pneumatic control system
 1. Perform maintenance troubleshooting calibration and repair of a pneumatic controls system (Lec and Lab)
 2. Demonstrate the ability to maintain, calibrate and troubleshoot common pneumatic devices, such as averaging relays, reversing relays, thermostats (Lec and Lab)
 3. Demonstrate the knowledge and impact of spring-pressure and spring range shift on a pneumatic VAV control system (Lec and Lab)
 4. Demonstrate the ability to install, configure and adjust common velocity controllers (Lec and Lab)

- E. Understand interfaces between pneumatic and electronic controls
 - 1. Interfaces between pneumatic and electronic controls (Lec and Lab)
 - 2. Demonstrate operation, component selection, installation, calibration of pneumatic electronic interfaces (Lec and Lab)
 - 3. Demonstrate the ability to troubleshoot pneumatic/electronic interfaces (Lec and Lab)

5. **Repeatability** - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Comprehensive written final examination
- D. Comprehensive final project
- E. Demonstration of assigned skills to acceptable level per instructor

7. Representative Text(s) -

Whitman, B., B. Johnson, J. Tomczyk, and E. Silberstein. Refrigeration and Air Conditioning Technology. 8th ed. Boston, MA: Cengage Learning, 2016.

8. Disciplines -

Sheet Metal OR Air Conditioning, Refrigeration, Heating

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Assemble, test and calibrate a pneumatic control loop.

11. **Honors Description** - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: From the textbook, Unit 16, portions 16.3, 16.4, and 16.5, regarding pneumatic controls.
- B. Sample writing assignment: Answer review questions related to assigned reading.

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FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

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In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

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Course #: APSM 158C

Course Title: Inverter, VRF & Heat Recovery Technology

Catalog Description:

Students explore the components and principals that comprise inverter, variable refrigerant flow (VRF), and heat recovery systems as used in the HVAC industry.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air Conditioning Service Mechanic

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
 - course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
 - pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

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Apprenticeship

APSM 158C INVERTOR, VRF & HEAT RECOVERY TECHNOLOGY

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APSM 158C

INVERTOR, VRF & HEAT RECOVERY TECHNOLOGY

Summer
2018

40 hours total: 35 hours lecture, 5 hours laboratory.

2.5 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active

Grading: Letter Grade with P/NP option

Degree Status: Applicable

Credit Status: Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count:
30

Load Factor:
.060

FOAP Code:
115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

**Stand Alone
Designation:** no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the service sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Air Conditioning Service Mechanic.

1. Description -

Students explore the components and principals that comprise inverter, variable refrigerant flow (VRF), and heat recovery systems as used in the HVAC industry.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Explain theory and operation of inverter technology.
- B. Perform installation, repair and maintenance of variable refrigerant flow (VRF) systems.
- C. Explain operation of heat recovery systems.
- D. Install, maintain and repair heat recovery systems.

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal service tools
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Explain theory and operation of inverter technology.
 1. Explain the capabilities and advantages of modulated refrigerant flow for energy efficiency (Lec and Lab)
 2. Explain how voltage is inverted to enable a compressor to modulate refrigerant flow (Lec and Lab)
- B. Perform installation, repair and maintenance of variable refrigerant flow (VRF) systems.
 1. Demonstrate piping techniques required for installation of VRF and heat recovery systems (Lec and Lab)
 2. Explain and demonstrate refrigerant charging procedures required for VRF and heat recovery systems (Lec and Lab)
- C. Explain operation of heat recovery systems.
 1. Explain how heat is recovered and utilized in a heat recovery system (Lec and Lab)
- D. Install, maintain and repair heat recovery systems.
 1. Install and charge an inverter and heat recovery system (Lec and Lab)
 2. Discuss troubleshooting of inverter and heat recovery systems (Lec and Lab)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Comprehensive written final examination
- D. Comprehensive final project
- E. Demonstration of assigned skills to acceptable level per instructor

7. Representative Text(s) -

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8. Disciplines -

Sheet Metal OR Air Conditioning, Refrigeration, Heating

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Install and charge an inverter and heat recovery system.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Assigned reading from the textbook.
- B. Sample writing assignment: Diagram a heat recovery system, labeling components and using notes to explain the function of each component.

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Course #: APSM 159A

Course Title: Introduction to Testing Adjusting & Balancing HVAC Systems

Catalog Description:

Students will gain an overview of the fundamental process of heat transfer and how pressures relate to air movement in HVAC systems.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air Conditioning Service Mechanic

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

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2. **Primary:** to advance California's economic growth and global competitiveness through education, training, and services that contribute to continuous work force improvement.
3. **Secondary:** provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

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NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

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Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

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- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
- course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
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Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

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Apprenticeship

APSM 159A INTRODUCTION TO TESTING ADJUSTING & BALANCING HVAC SYSTEMS

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APSM 159A	INTRODUCTION TO TESTING ADJUSTING & BALANCING HVAC SYSTEMS	Summer 2018
40 hours total: 30 hours lecture, 10 hours laboratory.		2.5 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active

Grading: Letter Grade with P/NP option

Degree Status: Applicable

Credit Status: Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count:
30

Load Factor:
.060

FOAP Code:
115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

Stand Alone Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the service sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Air Conditioning Service Mechanic.

1. Description -

Students will gain an overview of the fundamental process of heat transfer and how pressures relate to air movement in HVAC systems.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Describe the flow of heat in objects
- B. Describe common airflow measurements
- C. Describe the pressures measured in airflow
- D. Identify airflow formulas
- E. Calculate airflow volume, velocity, velocity pressure and area
- F. Describe standard air and correction tables for non-standard air
- G. Describe temperature scales
- H. Describe heat and heat transfer terminology

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal service tools
- B. Sheet metal test and balance tools and sample system components
- C. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Describe the flow of heat in objects (Lec and Lab)
- B. Describe common airflow measurements
 - 1. Describe CFM, FPM and area used in air balance formulas (Lec and Lab)
- C. Describe the pressures measured in airflow
 - 1. Describe total, static and velocity pressure (Lec and Lab)
 - 2. Perform airflow calculations for volume, flow rate and pressure (Lec and Lab)
- D. Identify airflow formulas
 - 1. Discuss air density and properties of moist air (Lec and Lab)
- E. Calculate airflow volume, velocity, velocity pressure and area
 - 1. Calculate correct flow rates for non-standard air (Lec and Lab)
- F. Describe standard air and correction tables for non-standard air
 - 1. Define value for standard air (Lec and Lab)
 - 2. Describe weight and volume of standard air (Lec and Lab)
 - 3. Calculate corrections to standard air for temperature and elevation (Lec and Lab)
- G. Describe temperature scales
 - 1. Define Fahrenheit, Celsius, Kelvin and Rankine temperature scales (Lec and Lab)
 - 2. Convert temperatures from different scales (Lec and Lab)
- H. Describe heat and heat transfer terminology
 - 1. Define the terms BTU, BTUH, MBH and $[\Delta]T$ (Lec and Lab)
 - 2. Define and perform calculations using heat transfer formulas (Lec and Lab)
 - 3. Explain total, sensible and latent heat (Lec and Lab)
 - 4. Calculate percentage of outside air (Lec and Lab)
 - 5. Describe functions of coils in heat transfer (Lec and Lab)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Demonstrated mastery of course topics as measured by the results of written quizzes, tests, and lab practical
- B. Class participation
- C. Comprehensive written final examination
- D. Comprehensive final project

7. Representative Text(s) -

International Training Institute for the Sheet Metal and Air Conditioning Industry. Testing, Adjusting & Balancing of Environment Systems. Alexandria, VA: International Training Institute, 2003.

NOTE: This is the standard Sheet Metal textbook/workbook used for this course. Although it may not be within 5 years of the required published date, it is the most current book used when teaching this course.

8. Disciplines -

Sheet Metal OR Air Conditioning, Refrigeration, Heating

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Observe lab demonstrations of airflow characteristics and heat transfer.
- B. Demonstrate proper set up of an air data meter and pitot tube.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: From the textbook, Unit 4, "Airflow."
- B. Sample writing assignment: Write formulas for the following airflow variables: CFM, total pressure, static pressure, velocity pressure.

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FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course.

In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 159B

Course Title: Air Flow & Psychometrics for TAB

Catalog Description:

Students will gain an overview of the purpose for commercial HVAC systems, the main characteristics of psychometrics and methods to measure airflow in HVAC systems.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air Conditioning Service Mechanic

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
- course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
- pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

Submissions Course Outline Editor

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Apprenticeship

APSM 159B AIRFLOW & PSYCHROMETRICS FOR TAB

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APSM 159B

AIRFLOW & PSYCHROMETRICS FOR TAB

Summer
2018

40 hours total: 32 hours lecture, 8 hours laboratory.

2.5 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active

Grading: Letter Grade with P/NP option

Degree Status: Applicable

Credit Status: Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count:
30

Load Factor:
.060

FOAP Code:
115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

Stand Alone
Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the service sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Air Conditioning Service Mechanic.

1. Description -

Students will gain an overview of the purpose for commercial HVAC systems, the main characteristics of psychrometrics and methods to measure airflow in HVAC systems.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Describe the purpose of commercial HVAC systems
- B. Identify the components in a commercial HVAC system
- C. Define psychrometrics and its importance in the HVAC industry
- D. Measure and determine values on a psychrometric chart
- E. Measure common pressures in an HVAC system
- F. Measure airflow in HVAC systems using various instruments

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal service tools
- B. Sheet metal test and balance tools and sample system components
- C. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Describe the purpose of commercial HVAC systems (Lec)
- B. Identify the components in a commercial HVAC system
 1. Describe the usage and purpose of components in commercial HVAC systems (Lec and Lab)
 2. Describe the importance of ventilation rates (Lec and Lab)
 3. Determine the ventilation rates of various types of buildings (Lec and Lab)
- C. Define psychrometrics and its importance in the HVAC industry
 1. Describe the weight and volume of standard air (Lec and Lab)
 2. Define wet bulb, dry bulb, relative humidity, and dew point (Lec and Lab)
- D. Measure and determine values on a psychrometric chart
 1. Determine wet bulb, dry bulb, relative humidity, dew point, enthalpy, and grains of moisture using a psychrometric chart (Lec and Lab)
 2. Measure dry bulb and wet bulb temperatures using a psychrometer (Lec and Lab)
 3. Determine relative humidity using a psychrometer and hygrometer (Lec and Lab)
- E. Measure common pressures in an HVAC system
 1. Describe the usage and application of a manometer, digital micro manometer, and magnetically linked gauge (Lec and Lab)
 2. Identify a pitot tube, static probe, airfoil probe, velocity probe and velocity grid (Lec and Lab)
 3. Describe the use of a pitot tube, static probe, airfoil probe, velocity probe and velocity grid (Lec and Lab)
 4. Properly calculate average velocity using a pitot tube and manometer (Lec and Lab)
- F. Measure airflow in HVAC systems using various instruments
 1. Properly perform a pitot tube rectangular duct traverse (Lec and Lab)
 2. Properly perform a pitot tube round duct traverse (Lec and Lab)
 3. Properly measure airflows using a total capture flow hood (Lec and Lab)
 4. Define and calculate an Ak factor (Lec and Lab)
 5. Determine airflow using a rotating vane anemometer and thermal anemometer (Lec and Lab)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Comprehensive written final examination
- D. Comprehensive final project
- E. Demonstration of assigned skills to acceptable level per instructor

7. Representative Text(s) -

International Training Institute for the Sheet Metal and Air Conditioning Industry. Testing, Adjusting & Balancing of Environment Systems. Alexandria, VA: International Training Institute, 2003.

NOTE: This is the standard Sheet Metal textbook/workbook used for this course. Although it may not be within 5 years of the required published date, it is the most current book used when teaching this course.

8. Disciplines -

Sheet Metal OR Air Conditioning, Refrigeration, Heating

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Demonstrate the proper use of the psychrometer to determine dry bulb temperature, wet bulb temperature and relative humidity.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: From the textbook, "Psychrometrics" unit.
- B. Sample writing assignment: Provide written definitions for the following terms: Psychrometrics, Dry Bulb, Wet Bulb, Relative Humidity, Enthalpy.

Ensure you're using the current version of this form by downloading a fresh copy from [the CCC webpage!](#)

FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

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In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

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Course #: APSM 159C

Course Title: Testing Adjusting & Balancing of HVAC Systems

Catalog Description:

Students will continue to explore methods of testing, adjusting and balancing HVAC systems. More complex systems will be explored, using applicable measuring equipment. Written reports will be produced.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air Conditioning Service Mechanic

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
- course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
- pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

Need/Justification -

This course is needed in the test and balance sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance certification. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Air Conditioning Service Mechanic.

1. Description -

Students will continue to explore methods of testing, adjusting and balancing HVAC systems. More complex systems will be explored, using applicable measuring equipment. Written reports will be produced.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Define common proportion balancing terms
- B. Calculate ratio of tolerance
- C. Calculate percentage of design
- D. Determine the key outlet
- E. Perform a proportion balance on classroom simulator
- F. Perform a proportion balance on a single zone constant volume HVAC system
- G. Perform a proportion balance on a VAV zone branch
- H. Perform a proportion balance on a Hydronics Water Board

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal service tools
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Define common proportion balancing terms
 1. Define design flow rates from a mechanical drawing and schedule (Lec)
 2. Define actual flow rate (Lec)
 3. Define design tolerance (Lec)
- B. Calculate ratio of tolerance (Lec and Lab)
- C. Calculate percentage of design
 1. Calculate percentage of design for system totals (Lec and Lab)
 2. Calculate percentage of design for individual outlets (Lec and Lab)
- D. Determine the key outlet
 1. Determine key outlet using percentage of design
- E. Perform a proportion balance on classroom simulator (Lec and Lab)
- F. Perform a proportion balance on a single zone constant volume HVAC system (Lec and Lab)
- G. Perform a proportion balance on a VAV zone branch (Lec and Lab)
- H. Perform a proportion balance on a Hydronics Water Board
 1. Determine flow through a calibrated balance valve (Lec and Lab)
 2. Perform a proportion balance on a Hydronics Water Board in lab (Lec and Lab)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Comprehensive written final examination

- D. Comprehensive final project
- E. Demonstration of assigned skills to acceptable level per instructor

7. Representative Text(s) -

International Training Institute for the Sheet Metal and Air Conditioning Industry. Testing, Adjusting & Balancing of Environment Systems. Alexandria, VA: International Training Institute, 2003.

NOTE: This is the standard Sheet Metal textbook/workbook used for this course. Although it may not be within 5 years of the required published date, it is the most current book used when teaching this course

8. Disciplines -

Sheet Metal OR Air Conditioning, Refrigeration, Heating

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. In the TAB lab, demonstrate the proper use of a flow hood to proportion the supply air outlets on the low pressure air handler.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: From the textbook, Unit 19, "Methods of Balancing."
- B. Sample writing assignment: Provide written definitions for the following terms: Proportional Balancing, Tolerance, Ratio of Tolerance.

Ensure you're using the current version of this form by downloading a fresh copy from [the CCC webpage!](#)

FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

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In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

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Course #: APSM 171A

Course Title: HVAC Trade History & Introduction to Testing, Adjusting & Balancing

Catalog Description:

Students will gain an introductory overview of TAB in the HVAC industry. Students will be able to describe human comfort and HVAC industry process needs.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air TAB

- o What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that can contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
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- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
- course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
- pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

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Apprenticeship

APSM 171A HVAC TRADE HISTORY & INTRODUCTION TO TESTING, ADJUSTING & BALANCING

[Edit Course Outline](#)

APSM 171A	HVAC TRADE HISTORY & INTRODUCTION TO TESTING, ADJUSTING & BALANCING	Summer 2018
40 total hours: 36 hours lecture, 4 hours laboratory		3 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active

Grading: Letter Grade with P/NP option

Degree Status: Applicable

Credit Status: Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count: 30 **Load Factor:** .060 **FOAP Code:** 115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

Stand Alone Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the test and balance sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance certification. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Test & Air Balance.

1. Description -

Students will gain an introductory overview of TAB in the HVAC industry. Students will be able to describe human comfort and HVAC industry process needs.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Describe the evolution of HVAC in buildings
- B. Describe job skills needed in HVAC fabrication, installation, servicing and testing
- C. Describe history and role of SMART, SMACNA, ASHRAE, TABB
- D. Identify common TAB instruments and their applications
- E. Identify and perform mathematic functions used in the TAB industry

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal test and balance tools and sample system components
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Describe the evolution of HVAC in buildings
 1. Describe human comfort needs (Lec)
 2. Describe industry HVAC process needs (Lec)
 3. Describe processes to control humidity, temperature, pressure, noise (Lec)
- B. Describe job skills needed in HVAC fabrication, installation, servicing and testing
 1. Discuss various work processes in the sheet metal/HVAC industry (Lec)
 2. Discuss skills required to perform work processes in the trade (Lec)
- C. Describe history and role of SMART, SMACNA, ASHRAE, TABB
 1. Describe industry partners and stake holders (SMART, SMACNA, ASHRAE, TABB) and their histories and roles (Lec)
- D. Identify common TAB instruments and their applications
 1. Display common instruments used in the TAB industry (Lec and Lab)
 2. Describe precision, accuracy, digital and analog parallax and calibration (Lec and Lab)
 3. Describe and demonstrate usage of common TAB instruments in lab (Lec and Lab)
 4. Discuss safety issues when using instruments (Lec and Lab)
- E. Identify and perform mathematic functions used in the TAB industry
 1. Demonstrate and review basic mathematic functions, fractions, decimals, ratios and equations (Lec and Lab)
 2. Describe and demonstrate common equations and formulas used in the TAB industry (Lec and Lab)
 3. Demonstrate ITI calculator and describe common functions (Lec and Lab)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Demonstrated mastery of course topics as measured by the results of written quizzes and tests

- B. Responses in class discussions
- C. Comprehensive written final examination

7. Representative Text(s) -

International Training Institute. Testing, Adjusting & Balancing of Environmental Systems. International Training Institute, 2003.

International Training Institute. Sheet Metal Math, International Training Institute for the Sheet Metal and Air Conditioning Industry (Student manual and workbook). Madisonfilm, Inc., 2007

NOTE: These are the standard Sheet Metal textbooks/workbooks used for this course. Although one or more may not be within 5 years of the required published date, they are the most current books used when teaching this course.

8. Disciplines -

Sheet Metal

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration

10. Lab Content -

- A. Demonstration and use of test and balance specialized tools and meters
- B. Demonstration of typical components

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: From the textbook, introductory chapter.
- B. Sample writing assignment: Complete assigned math calculations.

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FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course.

In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 171B

Course Title: Basics of Air Flow, Heat Energy & Heat Transfer

Catalog Description:

Students obtain an overview of the fundamental process of heat transfer and how pressures relate to air movement in HVAC systems.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air TAB

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that can contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
 - course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
 - pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

Submissions Course Outline Editor

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Apprenticeship

APSM 171B BASICS OF AIRFLOW, HEAT ENERGY & HEAT TRANSFER

[Edit Course Outline](#)

APSM 171B **BASICS OF AIRFLOW, HEAT ENERGY & HEAT TRANSFER** **Summer
2018**

40 hours total: 30 hours lecture, 10 hours laboratory. **2.5 Units**

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active **Grading:** Letter Grade with P/NP option
Degree Status: Applicable **Credit Status:** Credit
Degree or Certificate Requirement: Stand Alone Course
Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability: **Validation:**

Division Dean Information -

Seat Count: **Load Factor:** **FOAP Code:**
30 .060 115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

**Stand Alone
Designation:** no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the test and balance sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance certification. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Test & Air Balance.

1. Description -

Students obtain an overview of the fundamental process of heat transfer and how pressures relate to air movement in HVAC systems.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Describe the flow of heat in objects
- B. Describe cubic feet per minute (CFM)
- C. Describe the pressures measured in airflow
- D. Identify airflow formulas
- E. Calculate airflow volume, velocity, velocity pressure and area
- F. Describe standard air and correction tables for non-standard air
- G. Describe temperature scales
- H. Describe heat and heat transfer terminology

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal test and balance tools and sample system components
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Describe the flow of heat in objects
 - 1. Describe how heat flows in objects (Lec and Lab)
- B. Describe cubic feet per minute (CFM)
 - 1. Describe CFM, FPM and area used in air balance formulas (Lec and Lab)
- C. Describe the pressures measured in airflow
 - 1. Describe total, static and velocity pressure (Lec and Lab)
 - 2. Perform airflow calculations for volume, flow rate and pressure (Lec and Lab)
- D. Identify airflow formulas
 - 1. Discuss air density and properties of moist air (Lec and Lab)
- E. Calculate airflow volume, velocity, velocity pressure and area
 - 1. Calculate correct flow rates for non-standard air (Lec and Lab)
- F. Describe standard air and correction tables for non-standard air
 - 1. Define value for standard air (Lec and Lab)
 - 2. Describe weight and volume of standard air (Lec and Lab)
 - 3. Calculate corrections to standard air for temperature and elevation (Lec and Lab)
- G. Describe temperature scales
 - 1. Define Fahrenheit, Celsius, Kelvin and Rankine temperature scales (Lec and Lab)
 - 2. Convert temperatures from different scales (Lec and Lab)
- H. Describe heat and heat transfer terminology
 - 1. Define the terms BTU, BTUH, MBH and ΔT (Lec and Lab)
 - 2. Define and perform calculations using heat transfer formulas (Lec and Lab)
 - 3. Explain total, sensible and latent heat (Lec and Lab)
 - 4. Calculate percentage of outside air (Lec and Lab)
 - 5. Describe functions of coils in heat transfer (Lec and Lab)

5. **Repeatability** - Moved to header area.

6. **Methods of Evaluation** -

- A. Results of written quizzes and tests
- B. Evaluation of progress by periodic assignments
- C. Comprehensive written final examination
- D. Comprehensive final project

7. **Representative Text(s)** -

International Training Institute for the Sheet Metal and Air Conditioning Industry. Testing, Adjusting & Balancing of Environment Systems. Alexandria, VA: International Training Institute, 2003.

NOTE: This is the standard Sheet Metal textbook/workbook used for this course. Although it may not be within 5 years of the required published date, it is the most current book used when teaching this course.

8. **Disciplines** -

Sheet Metal

9. **Method of Instruction** -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. **Lab Content** -

- A. Measure total, static, and velocity pressure
- B. Measure total, sensible and latent heat

11. **Honors Description** - No longer used. Integrated into main description section.

12. **Types and/or Examples of Required Reading, Writing and Outside of Class Assignments** -

- A. Sample reading assignment: Assigned text section on heat flow in objects.
- B. Sample writing assignment: Perform airflow calculations for volume, flow rate and pressure.

Course status: *Active*

Development status: Review2

Owner-Editor: cuneofrancis@fhda.edu

Edit History: User: Administrator - ID: vanattamary@fhda.edu - Modified: 2017-09-27 13:11:22
User: Administrator - ID: creamerbradley@foothill.edu - Modified: 2017-09-27 13:02:59
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FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

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In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 171C

Course Title: Safety Training for TAB Apprenticeship

Catalog Description:

Students will gain certifications in OSHA 10 compliance, CPR and first aid, fall protection and NFPA70E arc flash compliance.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air TAB

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that can contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
- course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
- pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

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Apprenticeship

APSM 171C SAFETY TRAINING FOR TAB APPRENTICESHIP

[Edit Course Outline](#)

APSM 171C SAFETY TRAINING FOR TAB APPRENTICESHIP Summer 2018
40 hours total: 30 hours lecture, 10 hours laboratory. 2.5 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active

Grading: Letter Grade with P/NP option

Degree Status: Applicable

Credit Status: Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count:
30

Load Factor:
.060

FOAP Code:
115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

Stand Alone Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the test and balance sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance certification. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Test & Air Balance.

1. Description -

Students will gain certifications in OSHA 10 compliance, CPR and first aid, fall protection and NFPA 70E arc flash compliance.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Successfully complete training for OSHA 10 requirements
- B. Successfully complete first aid/CPR training
- C. Successfully complete fall protection training
- D. Successfully complete NFPA 70E training

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal test and balance tools and sample system components
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Successfully complete training for OSHA 10 requirements
 - 1. Describe basic OSHA safety requirements for construction (Lec)
 - 2. Describe the focus four hazards (Lec)
 - 3. Describe types of personal protective equipment and demonstrate their usage (Lec)
 - 4. Describe health hazards in the construction industry (Lec)
 - 5. Describe proper safety techniques when using power tools (Lec)
 - 6. Describe the proper safety protocols for stairwell and ladder usage (Lec)
- B. Successfully complete first aid/CPR training
 - 1. Successfully complete basic first aid and CPR training (Lec and Lab)
 - 2. Describe the various types of eye protection (Lec and Lab)
- C. Successfully complete fall protection training
 - 1. Describe fall protection equipment (Lec and Lab)
 - 2. Demonstrate proper usage of fall protection equipment (Lec and Lab)
- D. Successfully complete NFPA 70E training
 - 1. Define the NFPA 70E standard and its application (Lec and Lab)
 - 2. Define "qualified" vs "non-qualified" personnel (Lec and Lab)
 - 3. Describe protective clothing and how to utilize the PPE tables in NFPA 70E
 - 4. Describe electrical and arc flash dangers when servicing equipment (Lec and Lab)
 - 5. List common electrical hazards found on construction sites (Lec and Lab)
 - 6. Describe best practices to avoid injury from electrical hazards and arc flash (Lec and Lab)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Demonstration of assigned skills to acceptable level per instructor

7. Representative Text(s) -

International Training Institute for the Sheet Metal and Air Conditioning Industry. Testing, Adjusting & Balancing of Environment Systems. Alexandria, VA: International Training Institute, 2003.

NOTE: This is the standard Sheet Metal textbook/workbook used for this course. Although it may not be within 5 years of the required published date, it is the most current book used when teaching this course.

8. Disciplines -

Sheet Metal

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Demonstrate proper usage of fall protection equipment
- B. Demonstrate skills required for first aid and CPR training

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: From the textbook, read safety sections.
- B. Sample writing assignment: List common electrical hazards found on construction sites.

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FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course.

In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 172A

Course Title: Basic HVAC systems, Psychrometrics, Air Pressures & Measurements of Air

Catalog Description:

Students will confirm an understanding of the main characteristics of psychrometrics and methods to measure airflow in commercial HVAC systems.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air TAB

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that can contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
- course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
- pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

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Apprenticeship

APSM 172A BASIC HVAC SYSTEMS, PSYCHROMETRICS, AIR PRESSURES & MEASUREMENTS OF AIR

[Edit Course Outline](#)

APSM 172A	BASIC HVAC SYSTEMS, PSYCHROMETRICS, AIR PRESSURES & MEASUREMENTS OF AIR	Summer 2018
40 hours total: 32 hours lecture, 8 hours laboratory.		2.5 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active

Grading: Letter Grade with P/NP option

Degree Status: Applicable

Credit Status: Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count: 30 **Load Factor:** .060 **FOAP Code:** 115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

Stand Alone Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the test and balance sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance certification. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Test & Air Balance.

1. Description -

Students will confirm an understanding of the main characteristics of psychrometrics and methods to measure airflow in commercial HVAC systems.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Describe the purpose of commercial HVAC systems
- B. Identify the components in a commercial HVAC system
- C. Define psychrometrics and its importance in the HVAC industry
- D. Measure and determine values on a psychrometric chart
- E. Measure common pressures in an HVAC system
- F. Measure airflow in HVAC systems using various instruments

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal test and balance tools and sample system components
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Describe the purpose of commercial HVAC systems
 1. Describe the purpose and function of heating, cooling, ventilation and exhaust systems (Lec)
- B. Identify the components in a commercial HVAC system
 1. Identify the various components in commercial HVAC systems (Lec)
 2. Describe the usage and purpose of components in commercial HVAC systems (Lec)
 3. Describe the importance of ventilation rates (Lec)
 4. Determine the ventilation rates of various types of buildings (Lec)
- C. Define psychrometrics and its importance in the HVAC industry
 1. Describe the weight and volume of standard air (Lec and Lab)
 2. Define wet bulb, dry bulb, relative humidity and dew point (Lec and Lab)
- D. Measure and determine values on a psychrometric chart
 1. Determine dry bulb, wet bulb, relative humidity, dew point, enthalpy and grains of moisture using a psychrometric chart (Lec and Lab)
 2. Measure dry bulb and wet bulb temperatures using a psychrometer (Lec and Lab)
 3. Determine relative humidity using a psychrometer and hygrometer
- E. Measure common pressures in an HVAC system (Lec and Lab)
 1. Describe the usage and application of a manometer, digital micro manometer and Magnetically Linked Gauge (Lec and Lab)
 2. Identify a pitot tube, static probe, airfoil probe, velocity probe and velocity grid (Lec and Lab)
 3. Describe the use of a pitot tube, static probe, airfoil probe, velocity probe and vel-grid (Lec and Lab)
 4. Properly calculate average velocity using a pitot tube and manometer (Lec and Lab)
- F. Measure airflow in HVAC systems using various instruments
 1. Properly perform a pitot tube rectangular duct traverse (Lec and Lab)
 2. Properly perform a pitot tube round duct traverse (Lec and Lab)

3. Properly measure airflows using a total capture flow hood (Lec and Lab)
4. Define and calculate an Ak factor (Lec and Lab)
5. Determine airflow using a rotating vane anemometer and thermal anemometer (Lec and Lab)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Comprehensive written final examination
- D. Comprehensive final project
- E. Demonstration of assigned skills to acceptable level per instructor

7. Representative Text(s) -

International Training Institute. Testing, Adjusting & Balancing of Environmental Systems. International Training Institute, 2003.

NOTE: This is the standard Sheet Metal textbook/workbook used for this course. Although it may not be within 5 years of the required published date, it is the most current book used when teaching this course.

8. Disciplines -

Sheet Metal

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Properly perform a pitot tube rectangular duct transverse
- B. Properly measure airflows using a total capture flow hood
- C. Determine airflow using a rotating vane anemometer and thermal anemometer

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: From the textbook, chapter on airflow measurements.
- B. Sample writing assignment: Determine dry bulb, wet bulb, relative humidity, dew point, enthalpy and grains of moisture using a psychrometric chart.

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FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course.

In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 171B

Course Title: Basics of Air Flow, Heat Energy & Heat Transfer

Catalog Description:

Students obtain an overview of the fundamental process of heat transfer and how pressures relate to air movement in HVAC systems.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air TAB

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that can contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
 - course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
 - pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17
Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17
Date of Approval by Division Curriculum Committee: 06/12/17
College Curriculum Co-Chairperson: _____ **Date:** _____

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Apprenticeship

APSM 171B BASICS OF AIRFLOW, HEAT ENERGY & HEAT TRANSFER

[Edit Course Outline](#)

APSM 171B **BASICS OF AIRFLOW, HEAT ENERGY & HEAT TRANSFER** **Summer
2018**

40 hours total: 30 hours lecture, 10 hours laboratory. **2.5 Units**

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active **Grading:** Letter Grade with P/NP option
Degree Status: Applicable **Credit Status:** Credit
Degree or Certificate Requirement: Stand Alone Course
Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability: **Validation:**

Division Dean Information -

Seat Count: **Load Factor:** **FOAP Code:**
30 .060 115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

Stand Alone Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the test and balance sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance certification. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Test & Air Balance.

1. Description -

Students obtain an overview of the fundamental process of heat transfer and how pressures relate to air movement in HVAC systems.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Describe the flow of heat in objects
- B. Describe cubic feet per minute (CFM)
- C. Describe the pressures measured in airflow
- D. Identify airflow formulas
- E. Calculate airflow volume, velocity, velocity pressure and area
- F. Describe standard air and correction tables for non-standard air
- G. Describe temperature scales
- H. Describe heat and heat transfer terminology

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal test and balance tools and sample system components
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Describe the flow of heat in objects
 - 1. Describe how heat flows in objects (Lec and Lab)
- B. Describe cubic feet per minute (CFM)
 - 1. Describe CFM, FPM and area used in air balance formulas (Lec and Lab)
- C. Describe the pressures measured in airflow
 - 1. Describe total, static and velocity pressure (Lec and Lab)
 - 2. Perform airflow calculations for volume, flow rate and pressure (Lec and Lab)
- D. Identify airflow formulas
 - 1. Discuss air density and properties of moist air (Lec and Lab)
- E. Calculate airflow volume, velocity, velocity pressure and area
 - 1. Calculate correct flow rates for non-standard air (Lec and Lab)
- F. Describe standard air and correction tables for non-standard air
 - 1. Define value for standard air (Lec and Lab)
 - 2. Describe weight and volume of standard air (Lec and Lab)
 - 3. Calculate corrections to standard air for temperature and elevation (Lec and Lab)
- G. Describe temperature scales
 - 1. Define Fahrenheit, Celsius, Kelvin and Rankine temperature scales (Lec and Lab)
 - 2. Convert temperatures from different scales (Lec and Lab)
- H. Describe heat and heat transfer terminology
 - 1. Define the terms BTU, BTUH, MBH and $[\Delta]T$ (Lec and Lab)
 - 2. Define and perform calculations using heat transfer formulas (Lec and Lab)
 - 3. Explain total, sensible and latent heat (Lec and Lab)
 - 4. Calculate percentage of outside air (Lec and Lab)
 - 5. Describe functions of coils in heat transfer (Lec and Lab)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Evaluation of progress by periodic assignments
- C. Comprehensive written final examination
- D. Comprehensive final project

7. Representative Text(s) -

International Training Institute for the Sheet Metal and Air Conditioning Industry. Testing, Adjusting & Balancing of Environment Systems. Alexandria, VA: International Training Institute, 2003.

NOTE: This is the standard Sheet Metal textbook/workbook used for this course. Although it may not be within 5 years of the required published date, it is the most current book used when teaching this course.

8. Disciplines -

Sheet Metal

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Measure total, static, and velocity pressure
- B. Measure total, sensible and latent heat

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: Assigned text section on heat flow in objects.
- B. Sample writing assignment: Perform airflow calculations for volume, flow rate and pressure.

Ensure you're using the current version of this form by downloading a fresh copy from [the CCC webpage!](#)

FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

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In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

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Course #: APSM 172C

Course Title: Duct Leakage Testing

Catalog Description:

Students will gain an overview of the various methods of duct leakage testing, per requirements applied in the commercial HVAC industry.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air TAB

- o What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that can contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
- course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
- pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

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Apprenticeship

APSM 172C DUCT LEAKAGE TESTING

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APSM 172C

DUCT LEAKAGE TESTING

Summer
2018

40 hours total: 28 hours lecture, 12 hours laboratory.

2 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active

Grading: Letter Grade with P/NP option

Degree Status: Applicable

Credit Status: Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count:

30

Load Factor:

.060

FOAP Code:

115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

Stand Alone
Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the test and balance sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance certification. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Test & Air Balance.

1. Description -

Students will gain an overview of the various methods of duct leakage testing, per requirements applied in the commercial HVAC industry.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Define duct leakage testing
- B. Identify commonly used leakage standards
- C. Identify common components used in duct leakage testing
- D. Demonstrate the proper use of testing equipment
- E. Define duct pressure and sealant class
- F. Calculate surface area of a duct test section
- G. Document required information on a leakage test report
- H. Describe usage procedure for a duct leakage test kit
 - I. Demonstrate methods of identifying duct leaks
- J. Properly seal duct leaks
- K. Properly perform a duct leakage test on sample duct system

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal test and balance tools and sample system components
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Define duct leakage testing
 - 1. Define the process and methodology of duct leakage testing (Lec)
- B. Identify commonly used leakage standards
 - 1. Describe the SMACNA duct leakage testing methodology (Lec and Lab)
 - 2. Describe the percent of total flow duct leakage testing methodology (Lec and Lab)
 - 3. Describe the HERS/Title 24 duct leakage testing methodology (Lec and Lab)
 - 4. Discuss the roles and responsibilities of designers, technicians and contractors (Lec and Lab)
- C. Identify common components used in duct leakage testing
 - 1. Describe components in a duct leakage test kit (Lec and Lab)
- D. Demonstrate the proper use of testing equipment
 - 1. Properly connect a duct leakage test kit to a sample duct test section (Lec and Lab)
- E. Define duct pressure and sealant class
 - 1. Define pressure, sealant and leakage class per SMACNA (Lec and Lab)
- F. Calculate surface area of a duct test section
 - 1. Calculate the surface area of a given duct test section (Lec and Lab)
- G. Document required information on a leakage test report
 - 1. Complete a sample test report from sample drawing and information sheet (Lec and Lab)
- H. Describe usage procedure for a duct leakage test kit
 - 1. Properly conduct a positive pressure duct leakage test on a sample duct section (Lec and Lab)
 - 2. Properly conduct a negative pressure duct leakage test on a sample duct section (Lec and Lab)
- I. Demonstrate methods of identifying duct leaks
 - 1. Demonstrate methods of determining duct leak locations (Lec and Lab)

- 2. Demonstrate visual smoke test methods (Lec and Lab)
- J. Properly seal duct leaks
 - 1. Describe sealants used in HVAC duct construction (Lec and Lab)
 - 2. Demonstrate ways of properly sealing duct leaks (Lec and Lab)
- K. Properly perform a duct leakage test on sample duct system (Lec and Lab)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Comprehensive written final examination
- D. Comprehensive final project
- E. Demonstration of assigned skills to acceptable level per instructor

7. Representative Text(s) -

International Training Institute for the Sheet Metal and Air Conditioning Industry. Testing, Adjusting & Balancing of Environment Systems. Alexandria, VA: International Training Institute, 2003.

NOTE: This is the standard Sheet Metal textbook/workbook used for this course. Although it may not be within 5 years of the required published date, it is the most current book used when teaching this course.

8. Disciplines -

Sheet Metal

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Properly conduct a positive pressure duct leakage test on a sample duct section
- B. Properly conduct a negative pressure duct leakage test on a sample duct section
- C. Demonstrate methods of determining duct leak locations
- D. Demonstrate visual smoke test methods

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: From the textbook, read section on duct leakage testing.
- B. Sample writing assignment: Calculate the surface area of a given duct test section.

Ensure you're using the current version of this form by downloading a fresh copy from [the CCC webpage!](#)

FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course.

In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 173A

Course Title: Electrical Fundamentals, Electric Motors & Rotational Measurements

Catalog Description:

Students will gain an overview of common electrical terminology, electrical formulas, types of motors used in the HVAC industry and measuring rotational speed.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air TAB

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that can contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
- course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
- pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17
Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17
Date of Approval by Division Curriculum Committee: 06/12/17
College Curriculum Co-Chairperson: _____ **Date:** _____

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Apprenticeship

APSM 173A ELECTRICAL FUNDAMENTALS, ELECTRIC MOTORS & ROTATIONAL MEASUREMENTS

[Edit Course Outline](#)

APSM 173A	ELECTRICAL FUNDAMENTALS, ELECTRIC MOTORS & ROTATIONAL MEASUREMENTS	Summer 2018
40 hours total: 30 hours lecture, 10 hours laboratory.		2.5 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active

Grading: Letter Grade with P/NP option

Degree Status: Applicable

Credit Status: Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count: 30 **Load Factor:** .060 **FOAP Code:** 115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

Stand Alone Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the test and balance sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance certification. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Test & Air Balance.

1. Description -

Students will gain an overview of common electrical terminology, electrical formulas, types of motors used in the HVAC industry and measuring rotational speed.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Define common electrical measurement terms
- B. Calculate electrical values for power and energy
- C. Identify common electrical symbols on drawings in the HVAC industry
- D. Diagram simple electrical circuits
- E. Properly measure Volts, amps and ohms
- F. Describe common motors used in the HVAC industry
- G. Identify common information on motor nameplates
- H. Describe common accessories used with electric motors
- I. Identify instruments used to determine rotational speed
- J. Properly determine RPM using various instruments

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal test and balance tools and sample system components
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Define common electrical measurement terms
 1. Define voltage, amperage, resistance, ohms, watts and power (Lec and Lab)
- B. Calculate electrical values for power and energy
 1. Calculate power and energy (Lec and Lab)
 2. Define Ohm's law (Lec and Lab)
- C. Identify common electrical symbols on drawings in the HVAC industry
 1. Describe a common electrical ladder and schematic diagrams (Lec and Lab)
 2. Identify and illustrate common electrical symbols used in the HVAC industry (Lec and Lab)
- D. Diagram simple electrical circuits
 1. Diagram simple electrical circuits for a furnace (Lec and Lab)
 2. Identify wye and delta electrical connections, single and three phase electrical circuits (Lec and Lab)
- E. Properly measure volts, amps and ohms (Lec and Lab)
 1. Properly measure volts, amps and ohms using various meters (Lec and Lab)
 2. Define true RMS and its importance (Lec and Lab)
 3. Describe safety concerns and protocols when taking electrical measurements (Lec and Lab)
- F. Describe common motors used in the HVAC industry
 1. Describe the common types of motors used in modern HVAC systems (Lec and Lab)
- G. Identify common information on motor nameplates
 1. Describe and define the information found on a motor nameplate (Lec and Lab)
- H. Describe common accessories used with electric motors

1. Describe to purpose and use of VFD, circuit breaker, disconnect switch, starter, and various thermal overload devices used with motors (Lec and Lab)
2. Calculate brake horsepower for single and three phase motor circuits (Lec and Lab)
- I. Identify instruments used to determine rotational speed
 1. Describe the use of the four most commonly used styles of tachometers (Lec and Lab)
 2. Define and identify contact and non-contact style tachometers (Lec and Lab)
 3. Describe safety concerns when using tachometers (Lec and Lab)
- J. Properly determine RPM using various instruments
 1. Properly obtain RPM readings using various styles of tachometers (Lec and Lab)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Comprehensive written final examination
- D. Demonstration of assigned skills to acceptable level per instructor

7. Representative Text(s) -

International Training Institute for the Sheet Metal and Air Conditioning Industry. Testing, Adjusting & Balancing of Environment Systems. Alexandria, VA: International Training Institute, 2003.

NOTE: This is the standard Sheet Metal textbook/workbook used for this course. Although it may not be within 5 years of the required published date, it is the most current book used when teaching this course.

8. Disciplines -

Sheet Metal

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Properly measure volts, amps and ohms in HVAC applications
- B. Properly determine RPM using standard industry instruments

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: From the textbook, unit on electrical fundamentals and motors.
- B. Sample writing assignment: Define common electrical measurement terms.

Ensure you're using the current version of this form by downloading a fresh copy from [the CCC webpage!](#)

FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course.

In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 173B

Course Title: Temperature Measurements, Duct Systems & Basic Controls

Catalog Description:

Students will gain an understanding of a variety of temperature measurements, the use of temperature measurement instruments, basic overview of HVAC duct systems and the control devices used to regulate temperature and humidity in HVAC systems.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air TAB

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

NOTE: *If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that can contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
 - course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
 - pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

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Apprenticeship

APSM 173B TEMPERATURE MEASUREMENTS, DUCT SYSTEMS & BASIC CONTROLS

[Edit Course Outline](#)

APSM 173B	TEMPERATURE MEASUREMENTS, DUCT SYSTEMS & BASIC CONTROLS	Summer 2018
40 hours total: 32 hours lecture, 8 hours laboratory.		2.5 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active	Grading: Letter Grade with P/NP option
Degree Status: Applicable	Credit Status: Credit
Degree or Certificate Requirement: Stand Alone Course	
Foothill GE Status: Non-GE	

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count: 30	Load Factor: .060	FOAP Code: 115000142215095640
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Instruction Office Information -

FSA Code:

Distance Learning: no

Stand Alone Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the test and balance sector of the sheet metal heating, ventilating, and air conditioning, (HVAC) industry for registered apprentices, and is critical to energy efficient system performance certification. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Test & Air Balance.

1. Description -

Students will gain an understanding of a variety of temperature measurements, the use of temperature measurement instruments, basic overview of HVAC duct systems and the control devices used to regulate temperature and humidity in HVAC systems.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Discuss procedures used to take temperature measurements using various instruments
- B. Describe the process of field verifying a thermometers accuracy
- C. Define the types of duct systems used in HVAC
- D. Identify the common symbols representing duct components on HVAC drawings
- E. Identify and illustrate the difference between single and dual path duct systems
- F. Describe the characteristics of pressure dependent and pressure independent VAV systems
- G. Describe the main functions of HVAC control systems
- H. Describe the three main elements of a control loop
 - I. Describe the types of control loop inputs and outputs
 - J. Describe a device's control action and normal state
 - K. Describe various control devices and their functions

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal test and balance tools and sample system components
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Discuss procedures used to take temperature measurements using various instruments
 1. Determine the proper scale of the thermometer (Lec)
 2. Describe types of thermometers used in HVAC testing (Lec)
 3. Describe common procedure to take temperature readings in air (Lec)
 4. Describe common procedure to take temperature readings in liquids (Lec)
- B. Describe the process of field verifying a thermometers accuracy
 1. Describe ice bath field accuracy check (Lec and Lab)
- C. Define the types of duct systems used in HVAC
 1. Define supply air, return air, exhaust air, relief air and ventilation air (Lec and Lab)
- D. Identify the common symbols representing duct components on HVAC drawings
 1. Identify and illustrate the common symbols representing duct components on HVAC (Lec and Lab)
- E. Identify and illustrate the difference between single and dual path duct systems
 1. Describe the characteristics used to describe duct systems (Lec and Lab)
 2. Identify and illustrate single and dual path duct systems (Lec and Lab)
- F. Demonstrate an understanding of pressure dependent and pressure independent VAV systems
 1. Define the characteristics of a VAV system (Lec and Lab)
 2. Describe the characteristics of pressure dependent vs. pressure independent VAV systems (Lec and Lab)
- G. Describe the main functions of HVAC control systems
 1. Describe the main functions of HVAC control systems (Lec and Lab)

- H. Describe the three main elements of a control loop
 - 1. Describe the three main elements of a control loop (Lec and Lab)
- I. Describe the types of control loop inputs and outputs
 - 1. Describe analog and digital loop inputs and outputs (Lec and Lab)
- J. Describe a device's control action and normal state
 - 1. Describe a device's control action and normal state (Lec and Lab)
- K. Describe various control devices and their functions
 - 1. Describe various control devices and their functions in an HVAC system (Lec and Lab)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Comprehensive written final examination
- D. Demonstration of assigned skills to acceptable level per instructor

7. Representative Text(s) -

International Training Institute for the Sheet Metal and Air Conditioning Industry. Testing, Adjusting & Balancing of Environment Systems. Alexandria, VA: International Training Institute, 2003.

NOTE: This is the standard Sheet Metal textbook/workbook used for this course. Although it may not be within 5 years of the required published date, it is the most current book used when teaching this course.

8. Disciplines -

Sheet Metal

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Demonstrate selection, scale and proper use of a variety of thermometers used in the HVAC industry.
- B. Field verify the accuracy of a thermometer.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: From the textbook, section on temperature measurements.
- B. Sample writing assignment: Identify the common symbols representing duct components on HVAC drawings.

Ensure you're using the current version of this form by downloading a fresh copy from [the CCC webpage!](#)

FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

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In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 173C

Course Title: HVAC Fans, Fan Laws & V-Belt Drives

Catalog Description:

Students will survey common types of fans used in HVAC systems and learn the factors that affect fan performance and fan drive packages.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air TAB

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that can contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
- course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
- pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

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Apprenticeship

APSM 173C HVAC FANS, FAN LAWS & V-BELT DRIVES

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APSM 173C

HVAC FANS, FAN LAWS & V-BELT DRIVES

Summer
2018

40 hours total: 30 hours lecture, 10 hours laboratory.

2.5 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active

Grading: Letter Grade with P/NP option

Degree Status: Applicable

Credit Status: Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count:

30

Load Factor:

.060

FOAP Code:

115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

Stand Alone
Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the test and balance sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance certification. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Test & Air Balance.

1. Description -

Students will survey common types of fans used in HVAC systems and learn the factors that affect fan performance and fan drive packages.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Describe how a fan causes air movement
- B. Describe the two main styles of fans generally used in HVAC
- C. Identify common centrifugal fans
- D. Identify common axial fans
- E. Describe the characteristics found on a fan curve or performance chart
- F. Describe the AMCA fan classifications
- G. Describe how system effect relates to fan performance
- H. Define the components in a V-Belt drive package
- I. Calculate new fan operating values using fan law formulas

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal test and balance tools and sample system components
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Describe how a fan causes air movement
 1. Describe the pressures that cause air movement across a fan (Lec)
- B. Describe the two main styles of fans generally used in HVAC
 1. Describe the characteristics of centrifugal fans (Lec)
 2. Describe the characteristics of axial fans (Lec)
- C. Identify common centrifugal fans
 1. Identify radial-blade fans (Lec)
 2. Identify forward curved blade fans (Lec)
 3. Identify backward inclined blade fans (Lec)
- D. Identify common axial fans
 1. Identify propeller fans (Lec)
 2. Identify vaneaxial and tubeaxial fans (Lec)
- E. Describe the characteristics found on a fan curve or performance chart
 1. Describe the fan characteristics found on a fan curve or performance chart (Lec and Lab)
 2. Determine operating values using a fan curve or performance table (Lec and Lab)
- F. Describe the AMCA fan classifications
 1. Describe the characteristics of AMCA fan classes (Lec and Lab)
- G. Describe how system effect relates to fan performance
 1. Describe duct system effect (Lec and Lab)
 2. Describe the effects on fan performance due to system effect (Lec and Lab)
- H. Define the components in a V-Belt drive package
 1. Identify V-Belt, motor sheave and fan sheave (Lec and Lab)
 2. Calculate belt length and describe pitch diameter (Lec and Lab)
- I. Calculate new fan operating values using fan law formulas
 1. Calculate new CFM, RPM, diameter, static pressure and BHP using fan laws (Lec and Lab)

2. Calculate new motor and fan sheave (Lec and Lab)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Comprehensive written final examination

7. Representative Text(s) -

International Training Institute for the Sheet Metal and Air Conditioning Industry. Testing, Adjusting & Balancing of Environment Systems. Alexandria, VA: International Training Institute, 2003.

NOTE: This is the standard Sheet Metal textbook/workbook used for this course. Although it may not be within 5 years of the required published date, it is the most current book used when teaching this course.

8. Disciplines -

Sheet Metal

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Observe demonstrations of fan types and characteristics.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: From the textbook, unit on fans and fan laws.
- B. Sample writing assignments:
 - 1. Describe the effects on fan performance due to system effect.
 - 2. Calculate a new motor and fan sheave.

Ensure you're using the current version of this form by downloading a fresh copy from [the CCC webpage!](#)

FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course.

In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 174A

Course Title: Hydronic Systems, Pumps & Hydronic Balancing

Catalog Description:

Students will gain an overview of the components and design of hydronic systems used in HVAC. Students will be able to measure pressures and determine flow through a pump and across various hydronic components.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern

The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air TAB

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that can contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
- course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
- pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

Submissions Course Outline Editor

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Apprenticeship

APSM 174A HYDRONIC SYSTEMS, PUMPS & HYDRONIC BALANCING

[Edit Course Outline](#)

APSM 174A	HYDRONIC SYSTEMS, PUMPS & HYDRONIC BALANCING	Summer 2018
40 hours total: 30 hours lecture, 10 hours laboratory.		2.5 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active

Grading: Letter Grade with P/NP option

Degree Status: Applicable

Credit Status: Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count:
30

Load Factor:
.060

FOAP Code:
115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

**Stand Alone
Designation:** no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the test and balance sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance certification. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Test & Air Balance.

1. Description -

Students will gain an overview of the components and design of hydronic systems used in HVAC. Students will be able to measure pressures and determine flow through a pump and across various hydronic components.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Define the components of a hydronic system
- B. Describe piping arrangements in a hydronic system
- C. Identify common styles of valves used in HVAC hydronic systems and their applications
- D. Identify common symbols used in HVAC drawings
- E. Identify a bourdon tube gauge and differential pressure gauge
- F. Describe PSI, PSIG, PSIA
- G. Determine flow from various hydronic devices
- H. Define cavitation in a pump
- I. Determine pump operating pressures
- J. Define the characteristics and determine pump impeller diameter, Bhp and estimated flow from a pump curve
- K. Use the pump laws to determine flow, pressure and horsepower
- L. Identify the parts of a centrifugal pump

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal test and balance tools and sample system components
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Define the components of a hydronic system
 1. Define and identify the energy conversion unit, heat exchanger, prime mover, conductor, control and metering valves and auxiliary devices in a hydronic system (Lec)
- B. Describe piping arrangements in a hydronic system
 1. Describe the flow and control arrangements in a piping system (Lec)
- C. Identify common styles of valves used in HVAC hydronic systems and their applications
 1. Describe the uses of valves in a piping system (Lec)
 2. Identify and describe the application of common valves in a hydronic system (Lec)
- D. Identify common symbols used in HVAC drawings
 1. Identify common hydronic symbols used in HVAC drawings (Lec)
- E. Identify a bourdon tube gauge and differential pressure gauge (Lec and Lab)
- F. Describe PSI, PSIG, PSIA
 1. Determine pressures in a hydronic system using different gauges (Lab)
- G. Determine flow from various hydronic devices (Lab)
 1. Determine flow through a Venturi (Lab)
 2. Determine flow through a CBV and auto flow device (Lab)
 3. Determine flow through a coil or valve using CV (Lab)
- H. Define cavitation in a pump
 1. Describe two types of cavitation in a pump (Lec)

- I. Determine pump operating pressures (Lab)
 - 1. Determine block tight pump suction pressure and discharge pressure (Lab)
 - 2. Determine pump operating suction pressure and discharge pressure (Lab)
- J. Define the characteristics and determine pump impeller diameter, Bhp and estimated flow from a pump curve (Lec and Lab)
 - 1. Describe the characteristics of a pump curve (Lec)
 - 2. Determine pump impeller diameter, Bhp and estimated flow from a pump curve
- K. Use the pump laws to determine flow, pressure and horsepower (Lec)
- L. Identify the parts of a centrifugal pump (Lec)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Comprehensive written final examination
- D. Comprehensive final project
- E. Demonstration of assigned skills to acceptable level per instructor

7. Representative Text(s) -

International Training Institute for the Sheet Metal and Air Conditioning Industry. Testing, Adjusting & Balancing of Environment Systems. Alexandria, VA: International Training Institute, 2003.

NOTE: This is the standard Sheet Metal textbook/workbook used for this course. Although it may not be within 5 years of the required published date, it is the most current book used when teaching this course.

8. Disciplines -

Sheet Metal

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Determine block tight pump suction pressure and discharge pressure
- B. Define and determine PSIA and atmospheric absolute pressure

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: From the textbook, pages on hydronic systems.
- B. Sample writing assignment: Use pump laws to determine flow, pressure, and horsepower.

Ensure you're using the current version of this form by downloading a fresh copy from [the CCC webpage!](#)

FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

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In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 174B

Course Title: Balancing Documentation, Cooling Towers & TAB Related Skills

Catalog Description:

Students will use Microsoft Word and Excel to complete reporting documentation used in the TAB industry. Students will determine performance values of cooling towers used in HVAC systems.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air TAB

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

NOTE: *If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that can contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
- course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
- pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

Submissions Course Outline Editor

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Apprenticeship

APSM 174B BALANCING DOCUMENTATION, COOLING TOWERS & TAB RELATED SKILLS

[Edit Course Outline](#)

APSM 174B	BALANCING DOCUMENTATION, COOLING TOWERS & TAB RELATED SKILLS	Summer 2018
40 hours total: 24 hours lecture, 16 hours laboratory.		2 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active

Grading: Letter Grade with P/NP option

Degree Status: Applicable

Credit Status: Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count: 30 **Load Factor:** .060 **FOAP Code:** 115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

Stand Alone Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the test and balance sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance certification. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Test & Air Balance.

1. Description -

Students will use Microsoft Word and Excel to complete reporting documentation used in the TAB industry. Students will determine performance values of cooling towers used in HVAC systems.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Define required information to complete balancing test forms
- B. Record preliminary data required to proportion balance a system
- C. Identify forms required to complete
- D. Discuss and perform proper coding of an HVAC drawing
- E. Complete balance report forms for an HVAC system
- F. Describe the purpose of a cooling tower
- G. Determine the components and function of a cooling tower
- H. Identify different styles of cooling towers
 - I. Define the formulas for cooling tower range and approach
 - J. Calculate cooling tower range and approach
- K. Define Net Positive Suction Head (NPSH) and Net Positive Suction Head Available (NPSHa)
- L. Demonstrate the basic functions of Microsoft Word
- M. Demonstrate the basic functions of Microsoft Excel

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal test and balance tools and sample system components
- B. Personal protective equipment
- C. Computers with Microsoft Word and Excel

4. Course Content (Body of knowledge) -

- A. Define required information to complete balancing test forms (Lec)
 1. Define the required information on a completed balance report (Lec)
 2. Describe where information to complete a balance report can be located (Lec)
- B. Record preliminary data required to proportion balance a system (Lec and Lab)
 1. Record required preliminary information onto sample report forms (Lec)
- C. Identify forms required to complete a balance report (Lec)
- D. Discuss and perform proper coding of an HVAC drawing
 1. Discuss methods of coding HVAC drawings for TAB testing (Lec)
 2. Properly code a sample HVAC drawing for TAB testing (Lec and Lab)
- E. Complete balance report forms for an HVAC system (Lec)
 1. Properly identify and complete sample report forms for an HVAC system (Lec)
- F. Describe the purpose of a cooling tower
 1. Describe the purpose and function of a cooling tower (Lec)
- G. Determine the components and function of a cooling tower
 1. Describe the components in a cooling tower (Lec and Lab)
 2. Describe the function of various components in a cooling tower (Lec and Lab)
- H. Identify different styles of cooling towers (Lec and Lab)
- I. Define the formulas for cooling tower range and approach (Lec)
 1. Define the formula for cooling tower range and its purpose (Lec)
 2. Define the formula for cooling tower approach and its purpose (Lec)

- J. Calculate cooling tower range and approach (Lec)
 - 1. Calculate cooling tower range and approach values from given readings (Lec and Lab)
- K. Define Net Positive Suction Head (NPSH) and Net Positive Suction Head Available (NPSHa)
 - 1. Define NPSH in a cooling tower system (Lec and Lab)
 - 2. Describe the importance of NPSH in a cooling tower system (Lec and Lab)
 - 3. Calculate NPSHa in a cooling tower system (Lec and Lab)
- L. Demonstrate the basic functions of Microsoft Word
 - 1. Demonstrate the use of open, save, input and edit features in Microsoft Word (Lec and Lab)
- M. Demonstrate the basic functions of Microsoft Excel
 - 1. Demonstrate the use of open, save, input and edit features in Microsoft Excel (Lec and Lab)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Demonstration of assigned skills to acceptable level per instructor

7. Representative Text(s) -

International Training Institute for the Sheet Metal and Air Conditioning Industry. Testing, Adjusting & Balancing of Environment Systems. Alexandria, VA: International Training Institute, 2003.

NOTE: This is the standard Sheet Metal textbook/workbook used for this course. Although it may not be within 5 years of the required published date, it is the most current book used when teaching this course.

8. Disciplines -

Sheet Metal

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Properly code a sample HVAC drawing for TAB testing
- B. Calculate Net Positive Suction Head Available (NPSHa) in a cooling tower system

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: From the textbook, sections on cooling towers
- B. Sample writing assignment: Properly identify and complete sample report forms for an HVAC system

Ensure you're using the current version of this form by downloading a fresh copy from [the CCC webpage!](#)

FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course.

In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 174C

Course Title: Fire Life Safety Level 1

Catalog Description:

Students will gain an overview of various types of fire dampers used in HVAC systems. Upon completion, students will be able to perform fire damper operational tests and inspections.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air TAB

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that can contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
- course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
- pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

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Apprenticeship

APSM 174C FIRE LIFE SAFETY LEVEL 1

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APSM 174C

FIRE LIFE SAFETY LEVEL 1

Summer
2018

40 hours total: 32 hours lecture, 8 hours laboratory.

2.5 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active

Grading: Letter Grade with P/NP option

Degree Status: Applicable

Credit Status: Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count:

30

Load Factor:

.060

FOAP Code:

115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

Stand Alone
Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the test and balance sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance certification. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Test & Air Balance.

1. Description -

Students will gain an overview of various types of fire dampers used in HVAC systems. Upon completion, students will be able to perform fire damper operational tests and inspections.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Describe fire life safety objectives and basic functions
- B. Describe the role of construction documents, building authorities and designers
- C. Identify codes and standards used in fire life safety
- D. Discuss basic fire damper testing procedures and ratings
- E. Define building construction classifications
- F. Define wall assembly construction classifications
- G. Identify different fire damper types and various accessories
- H. Describe relevant fire damper testing standards and their applications
- I. Describe proper installation procedures of various damper types
- J. Identify improper installation of fire dampers
- K. Describe required testing and inspections for fire life safety systems and components
- L. Identify common fire life safety symbols used in HVAC drawings

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal test and balance tools and sample system components
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Describe fire life safety objectives and basic functions
 1. Describe the function of basic components in a fire life safety system (Lec)
- B. Describe the role of construction documents, building authorities and designers
 1. Describe the common construction documents impacted in FLS systems (Lec)
 2. Describe the role of building and fire officials (Lec)
 3. Describe the role of architects, HVAC designers and installers (Lec)
- C. Identify codes and standards used in fire life safety
 1. Discuss the various codes impacting a FLS system (Lec)
 2. Define the difference between a code and a standard (Lec)
 3. Define the standards that impact a FLS system (Lec)
- D. Discuss basic fire damper testing procedures and ratings
 1. Describe the UL testing procedures used on fire dampers (Lec)
 2. Describe the UL rating requirements used on fire dampers (Lec)
- E. Define building construction classifications
 1. Define the five types of building construction classifications defined by the IBC (Lec)
- F. Define wall assembly construction classifications
 1. Define four types of wall assembly classifications defined by the IBC (Lec and Lab)
- G. Identify different fire damper types and various accessories
 1. Identify the five basic types of fire dampers (Lec and Lab)
 2. Identify fire damper accessories (Lec and Lab)
- H. Describe relevant fire damper testing standards and their applications
 1. Define the UL fire damper test standards and their application (Lec)

2. Identify the individual tests within the UL 555 test standards (Lec)
 - I. Describe proper installation procedures of various damper types
 1. Describe proper installation factors and procedures of various damper types (Lec and Lab)
 - J. Identify improper installation of fire dampers (Lec and Lab)
 1. Identify improper installation factors of fire dampers (Lec and Lab)
 - K. Describe required testing and inspections for fire life safety systems and components
 1. Describe common requirements of commissioning, component and system operational testing (Lec)
 2. Describe NFPA testing and manufacturers testing requirements (Lec)
 - L. Identify common fire life safety symbols used in HVAC drawings
 1. Identify commonly used drawing symbols recommended by SMACNA (Lec)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Comprehensive written final examination

7. Representative Text(s) -

International Training Institute for the Sheet Metal and Air Conditioning Industry. HVAC Fire Life Safety Level 1 Technician. Student Reference Manual. Alexandria, VA: International Training Institute, 2010.

International Training Institute for the Sheet Metal and Air Conditioning Industry. Testing, Adjusting & Balancing of Environment Systems. Alexandria, VA: International Training Institute, 2003.

NOTE: These are the standard Sheet Metal textbooks/workbooks used for this course. Although one or more may not be within 5 years of the required published date, they are the most current books used when teaching this course.

8. Disciplines -

Sheet Metal

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Perform an inspection of fire dampers as assigned in the lab, and document results.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: From the textbook, the section on Code Authorities.
- B. Sample writing assignment: Describe the UL rating requirements used on fire dampers.

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FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course.

In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 175A

Course Title: TABB Technician Certification

Catalog Description:

Students will demonstrate proper test and balance skills and achieve TABB Technician certification.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air TAB

- o What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that can contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
- course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
- pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17
Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17
Date of Approval by Division Curriculum Committee: 06/12/17
College Curriculum Co-Chairperson: _____ **Date:** _____

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Apprenticeship

APSM 175A TABB TECHNICIAN CERTIFICATION

[Edit Course Outline](#)

APSM 175A

TABB TECHNICIAN CERTIFICATION

Summer
2018

40 hours total: 20 hours lecture, 20 hours laboratory.

2 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active

Grading: Letter Grade with P/NP option

Degree Status: Applicable

Credit Status: Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count:

30

Load Factor:

.060

FOAP Code:

115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

Stand Alone
Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the test and balance sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance certification. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Test & Air Balance.

1. Description -

Students will demonstrate proper test and balance skills and achieve TABB Technician certification.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Describe formulas used in TAB industry
- B. Describe fundamentals of psychrometrics
- C. Describe basic HVAC control strategies in HVAC
- D. Calculate BTU in heat transfer functions
- E. Determine ratio of tolerance and key outlets in air systems
- F. Determine pump impeller diameter and flow in hydronic pumps
- G. Calculate absolute pressure from gauge pressures
- H. Perform a static profile of an HVAC system
- I. Calibrate a velocity reset controller for a VAV terminal unit
- J. Perform a duct pitot tube traverse on a HVAC system
- K. Proportionally balance a constant volume HVAC air system
- L. Proportionally balance a constant volume HVAC hydronic system

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal test and balance tools and sample system components
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Describe formulas used in TAB industry
 1. Describe the belt length calculation formula and calculate Bhp and fan static efficiency (Lec and Lab)
 2. Determine Ak factor for an air register (Lec and Lab)
- B. Describe fundamentals of psychrometrics
 1. Describe dry bulb, wet bulb, dew point and relative humidity (Lec and Lab)
 2. Determine psychrometric values on a psychrometric chart (Lec and Lab)
- C. Describe basic HVAC control strategies in HVAC
 1. Discuss the three main components in a control loop (Lec)
 2. Discuss electric, pneumatic, hybrid and DDC control systems (Lec)
- D. Calculate BTU in heat transfer functions
 1. Calculate BTU in an air stream and water coil (Lab)
 2. Determine heat transfer between air and water (Lab)
- E. Determine ratio of tolerance and key outlets in air systems
 1. Describe the ratio of tolerance when performing TAB (Lec and Lab)
 2. Calculate the ratio of tolerance allowed from a given tolerance standard (Lec and Lab)
 3. Calculate percentage of design with given airflow readings (Lec and Lab)
 4. Determine key outlet from percentage of design (Lec and Lab)
- F. Determine pump impeller diameter and flow in hydronic pumps
 1. Perform a block tight test on a pump to determine TDH (Lec and Lab)
 2. Determine pump impeller using TDH and a pump curve (Lec and Lab)
 3. Determine flow using TDH and a pump curve (Lec and Lab)
- G. Calculate absolute pressure from gauge pressures

1. Determine PSIG from a gauge and calculate PSIA (Lab)
- H. Perform a static profile of an HVAC system
 1. Perform a static profile of an air handling unit and its components (Lab)
- I. Calibrate a velocity reset controller for a VAV terminal unit
 1. Calibrate the maximum and minimum flow set point on a pneumatic reset controller (Lec and Lab)
- J. Perform a duct pitot tube traverse on a HVAC system
 1. Perform a rectangular and round duct pitot traverse to SMACNA standards (Lab)
- K. Proportionally balance a constant volume HVAC air system
 1. Perform a proportion balance on a HVAC air system to SMACNA standards (Lab)
- L. Proportionally balance a constant volume HVAC hydronic
 1. Perform a proportion balance on a HVAC hydronic system to SMACNA standards (Lab)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Comprehensive written examination to certification level
- D. Comprehensive practical skills demonstration to certification level

7. Representative Text(s) -

International Training Institute for the Sheet Metal and Air Conditioning Industry. Testing, Adjusting & Balancing of Environment Systems. Alexandria, VA: International Training Institute, 2003.

NOTE: This is the standard Sheet Metal textbook/workbook used for this course. Although it may not be within 5 years of the required published date, it is the most current book used when teaching this course.

8. Disciplines -

Sheet Metal

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Practice and demonstrate proficiency in skills required for Test Adjust and Balance Bureau Technician certification.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: From the textbook, review related sections in preparation for the certification exam.
- B. Sample writing assignment: Describe the belt length calculation formula.

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FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course.

In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 175B

Course Title: DDC Controls & Programs

Catalog Description:

Students will gain an overview of direct digital control systems used in HVAC systems. Students will program and produce control documentation for a packaged rooftop HVAC system.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern

The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air TAB

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that can contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
- course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
- pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

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Apprenticeship

APSM 175B DDC CONTROLS & PROGRAMS

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APSM 175B

DDC CONTROLS & PROGRAMS

Summer
2018

40 hours total: 24 hours lecture, 16 hours laboratory.

2 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active

Grading: Letter Grade with P/NP option

Degree Status: Applicable

Credit Status: Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count:

30

Load Factor:

.060

FOAP Code:

115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

Stand Alone
Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the test and balance sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance certification. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Test & Air Balance.

1. Description -

Students will gain an overview of direct digital control systems used in HVAC systems. Students will program and produce control documentation for a packaged rooftop HVAC system.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Describe the control loop process
- B. Describe the basic logic functions
- C. Describe analog and digital functions
- D. Identify components used in DDC functions
- E. Describe minimum requirements of a DDC system for HVAC
- F. Write a written program logic for basic HVAC functions
- G. Write a DDC control sequence of operation for basic HVAC functions
- H. Draw a graphic schematic of a HVAC control system
- I. Write a DDC block program for HVAC control function

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal test and balance tools and sample system components
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Describe the control loop process
 1. Describe the key elements and functions in a control loop (Lec and Lab)
- B. Describe the basic logic functions
 1. Describe the basic logic functions: OR, AND, IF/THEN
- C. Describe analog and digital functions
 1. Describe the attributes of analog and digital inputs for HVAC control systems (Lec and Lab)
 2. Describe the attributes of analog and digital outputs for HVAC control systems (Lec and Lab)
- D. Identify components used in DDC functions
 1. Identify the main components in a DDC HVAC control system (Lec and Lab)
 2. Describe the function of the main components in a DDC HVAC control system (Lec and Lab)
- E. Describe minimum requirements of a DDC system for HVAC
 1. Describe minimum functional requirements of a DDC system for HVAC control (Lec and Lab)
- F. Write a written program logic for basic HVAC functions
 1. Compose a written program logic for fan runtime control (Lec and Lab)
 2. Compose a written program logic for discharge temperature control (Lec and Lab)
 3. Compose a written program logic for fan static pressure control (Lec and Lab)
- G. Write a DDC control sequence of operation for basic HVAC functions
 1. Compose a written DDC control sequence of operation for fan runtime control (Lec and Lab)
 2. Compose a written DDC control sequence of operation for discharge temperature control (Lec and Lab)
 3. Compose a written DDC control sequence of operation for fan static pressure control (Lec and Lab)
- H. Draw a graphic schematic of a HVAC control system
 1. Compose a DDC graphic schematic of operation for fan runtime control (Lec and Lab)
 2. Compose a DDC graphic schematic of operation for discharge temperature control (Lec and Lab)

- Lab)
3. Compose a DDC graphic schematic of operation for fan static pressure control (Lec and Lab)
- I. Write a DDC block program for HVAC control function
1. Describe the block program functions in a DDC program (Lec and Lab)
 2. Compose a DDC block program for fan runtime control (Lec and Lab)
 3. Compose a DDC block program for discharge temperature control (Lec and Lab)
 4. Compose a DDC block program for fan static pressure control (Lec and Lab)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Comprehensive final project
- D. Demonstration of assigned skills to acceptable level per instructor

7. Representative Text(s) -

International Training Institute for the Sheet Metal and Air Conditioning Industry. Testing, Adjusting & Balancing of Environment Systems. Alexandria, VA: International Training Institute, 2003.

International Training Institute for the Sheet Metal and Air Conditioning Industry. Direct Digital Controls. Alexandria, VA: International Training Institute, 2003.

NOTE: These are the standard Sheet Metal textbooks/workbooks used for this course. Although one or more may not be within 5 years of the required published date, they are the most current books used when teaching this course.

8. Disciplines -

Sheet Metal

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Compose a DDC block program for discharge temperature control.
- B. Apply DDC programs composed by students to actual equipment performance.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: From the textbook, assigned sections on DDC controls.
- B. Sample writing assignment: Compose a written program logic for fan static pressure control.

Ensure you're using the current version of this form by downloading a fresh copy from [the CCC webpage!](#)

FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course.

In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 175C

Course Title: Fire Life Safety Level 2

Catalog Description:

Students will become familiar with the building codes that govern fire life safety systems. Upon completion, students will be able to test a fire life safety system and achieve ICB FLS Level 2 certification.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air TAB

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that can contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
- course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
- pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

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Apprenticeship

APSM 175C FIRE LIFE SAFETY LEVEL 2

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APSM 175C

FIRE LIFE SAFETY LEVEL 2

Summer
2018

40 hours total: 32 hours lecture, 8 hours laboratory.

2.5 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active

Grading: Letter Grade with P/NP option

Degree Status: Applicable

Credit Status: Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count:

30

Load Factor:

.060

FOAP Code:

115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

Stand Alone
Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the test and balance sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance certification. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Test & Air Balance.

1. Description -

Students will become familiar with the building codes that govern fire life safety systems. Upon completion, students will be able to test a fire life safety system and achieve ICB FLS Level 2 certification.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Describe the objectives of smoke control and smoke management systems
- B. Identify the building codes that govern fire life safety
- C. Describe procedures and standards used in fire damper testing
- D. Describe building types and occupancy classifications
- E. Describe the objectives and differences in smoke control and smoke management systems
- F. Describe active and passive methods in smoke control and smoke management
- G. Describe the properties and toxic components in smoke
- H. Describe the features in smoke control systems
 - I. Identify the components of a smoke control system
 - J. Describe a sequence of operation in a smoke control system
 - K. Describe the testing and commissioning process of a smoke control system
 - L. Describe the procedures and equipment used in testing smoke control systems

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal test and balance tools and sample system components
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Describe the objectives of smoke control and smoke management systems
 1. Describe the three main objectives of smoke control and smoke management systems (Lec)
- B. Identify the building codes that govern fire life safety (Lec and Lab)
- C. Describe procedures and standards used in fire damper testing
 1. Describe five organizations that contribute to codes used in fire life safety (Lec)
 2. Describe three organizations that develop standards used in fire life safety (Lec)
 3. Describe the UL standards and labeling requirements for fire dampers (Lec)
- D. Describe building types and occupancy classifications
 1. Describe the IBC building type classifications (Lec)
 2. Describe the IBC building occupancy classifications (Lec)
- E. Describe the objectives and differences in smoke control and smoke management systems
 1. Describe the functional objectives of smoke control and smoke management systems (Lec)
 2. Describe the dedicated and non-dedicated smoke control and smoke management systems (Lec)
- F. Describe active and passive methods in smoke control and smoke management
 1. Describe four active smoke control methods (Lec)
 2. Describe two passive smoke control methods (Lec)
- G. Describe the properties and toxic components in smoke
 1. Describe the three phases of fire growth (Lec)
 2. Describe the toxic components of smoke (Lec)
- H. Describe the features in smoke control systems
 1. Describe fire and smoke barriers in a building (Lec)

2. Describe smoke pressurization systems (Lec)
3. Describe natural conditions impacting smoke pressurization (Lec)
- I. Identify the components of a smoke control system
 1. Identify common components required in a smoke control system (Lec and Lab)
- J. Describe a sequence of operation in a smoke control system
 1. Compose a sequence of operation for a smoke control system (Lec and Lab)
- K. Describe the acceptance testing and commissioning process for smoke control systems (Lec)
- L. Describe the procedures and equipment used in testing smoke control systems
 1. Identify equipment and its use in testing of smoke control systems (Lec and Lab)

5. **Repeatability** - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Comprehensive written certification examination
- D. Demonstration of assigned skills to acceptable level per instructor

7. Representative Text(s) -

International Training Institute for the Sheet Metal and Air Conditioning Industry. Testing, Adjusting & Balancing of Environment Systems. Alexandria, VA: International Training Institute, 2003.
International Training Institute for the Sheet Metal and Air Conditioning Industry. HVAC Fire Life Safety Level 2 Technician, Student Reference Manual. Alexandria, VA: International Training Institute, 2011.

NOTE: These are the standard Sheet Metal textbooks/workbooks used for this course. Although one or more may not be within 5 years of the required published date, they are the most current books used when teaching this course.

8. Disciplines -

Sheet Metal

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Perform an inspection and operational test of a fire-smoke damper system.

11. **Honors Description** - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: From the textbook, assigned sections on Fire Life Safety Level 2.
- B. Sample writing assignment: Describe the acceptance testing and commissioning process for smoke control systems.
- C. Complete technician certification online testing.

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FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course.

In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 176A

Course Title: Plans & Specifications, Codes & Standards

Catalog Description:

Students will explain the organization of construction documentation specifications and plans used in the TAB HVAC industry. Students will prepare a TAB bid estimate, per standards used in the TAB industry.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air TAB

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

NOTE: *If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that can contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
- course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
- pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

Need/Justification -

This course is needed in the test and balance sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance certification. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Test & Air Balance.

1. Description -

Students will explain the organization of construction documentation specifications and plans used in the TAB HVAC industry. Students will prepare a TAB bid estimate, per standards used in the TAB industry.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Describe the legalities of plans and specifications, codes and standards
- B. Describe flexible and inflexible specifications
- C. Describe the purpose of an RFI and properly prepare an RFI and change order
- D. Explain the organization of construction specifications
- E. Define the HVAC and TAB related sections in a building specification
- F. Describe and prepare a "take off" list for a sample TAB project
- G. Describe and prepare a "submittal" for a sample TAB project
- H. Describe the building codes that impact TAB
 - I. List the ASHRAE standards that have direct impact to TAB
 - J. List the SMACNA standards that have direct impact to TAB
 - K. List the industry standards and certifications that have direct impact to TAB

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal test and balance tools and sample system components
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Describe the legal importance of plans and specifications, codes and standards
 1. Describe the terms: plans, specifications, codes, standards (Lec)
 2. Describe the legal importance of plans, specifications, codes, standards (Lec)
- B. Describe flexible and inflexible specifications
 1. Define the difference of flexible and inflexible specifications (Lec)
 2. Identify examples of flexible and inflexible specifications from sample specifications (Lec)
- C. Describe the purpose of an RFI and properly prepare an RFI and change order
 1. Define an RFI and its purpose (Lec)
 2. Prepare a sample RFI and associated change order (Lec and Lab)
- D. Explain the organization of construction specifications
 1. Describe the layout format of building specifications (Lec)
 2. Define the importance and demonstrate an example of documenting revisions (Lec and Lab)
- E. Define the HVAC and TAB related sections in a building specification
 1. Define the specification sections that relate to HVAC and TAB (Lec)
- F. Describe and prepare a "take off" list for a sample TAB project
 1. Describe the process to create a job take off (Lec)
 2. Prepare a sample TAB job take off from sample plans and specifications (Lec and Lab)
- G. Describe and prepare a "submittal" for a sample TAB project
 1. Describe the process to create or obtain submittals (Lec)
 2. Prepare a sample TAB submittal from sample plans and specifications (Lec and Lab)
- H. Describe the building codes that impact TAB
 1. Describe the building, mechanical, green, fire and life safety codes that impact TAB work (Lec)

- I. List the ASHRAE standards that have direct impact to TAB
 - 1. Define the ASHRAE standards that impact TAB work (Lec)
 - 2. Describe the importance and impact of the ASHRAE 62 ventilation standards (Lec)
 - 3. Describe the importance and impact of the ASHRAE 111 TAB standards (Lec)
- J. List the SMACNA standards that have direct impact to TAB
 - 1. Describe the SMACNA standards that impact TAB work (Lec)
- K. List the industry standards and certifications that have direct impact to TAB
 - 1. Compare and contrast the three main certifying agencies for the TAB industry (Lec)
 - 2. Describe other specialty certifications offered by TABB, AABC and NEBB (Lec)
 - 3. Describe other industry certifications, such as NSF49, NAFA, EPA 608 (Lec)
 - 4. Describe CDC, OSHA, ISO and FS209E and other government standards (Lec)

5. **Repeatability** - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Comprehensive written final examination
- D. Comprehensive final project

7. Representative Text(s) -

International Training Institute for the Sheet Metal and Air Conditioning Industry. Testing, Adjusting & Balancing of Environment Systems. Alexandria, VA: International Training Institute, 2003.

International Training Institute for the Sheet Metal and Air Conditioning Industry. HVAC. Alexandria, VA: International Training Institute, 2005.

American Society of Heating, Refrigeration and Air Conditioning Engineers. ANSI/ASHRAE Standard 62.1-2016 Ventilation for Acceptable Indoor Air Quality. Atlanta, GA: ASHRAE, 2016.

NOTE: These are the standard Sheet Metal textbooks/workbooks used for this course. Although one or more may not be within 5 years of the required published date, they are the most current books used when teaching this course.

8. Disciplines -

Sheet Metal

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Locate TAB related data in the plans and specifications for a building.
- B. Compare data from existing components with plans and specifications design data.

11. **Honors Description** - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: From the textbook, assigned sections on ASHRAE Standard 62.1.
- B. Sample writing assignment: Describe the importance and impact of ASHRAE 62 ventilation standards on HVAC systems TAB requirements.

Ensure you're using the current version of this form by downloading a fresh copy from [the CCC webpage!](#)

FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course.

In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 176B

Course Title: Basic Refrigeration & Brazing/ Soldering

Catalog Description:

Students will describe the location and function of components used in HVAC refrigeration systems. Students will demonstrate proper brazing and soldering techniques.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air TAB

- o What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that can contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
 - course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
 - pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17
Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17
Date of Approval by Division Curriculum Committee: 06/12/17
College Curriculum Co-Chairperson: _____ **Date:** _____

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Apprenticeship

APSM 176B BASIC REFRIGERATION & BRAZING/SOLDERING

[Edit Course Outline](#)

APSM 176B

BASIC REFRIGERATION & BRAZING/SOLDERING

Summer
2018

40 hours total: 32 hours lecture, 8 hours laboratory.

2.5 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active

Grading: Letter Grade with P/NP option

Degree Status: Applicable

Credit Status: Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count:

30

Load Factor:

.060

FOAP Code:

115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

**Stand Alone
Designation:** no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the test and balance sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance certification. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Test & Air Balance.

1. Description -

Students will describe the location and function of components used in HVAC refrigeration systems. Students will demonstrate proper brazing and soldering techniques.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Define sensible, latent and total heat
- B. Define evaporation and condensation and identify where it occurs in a refrigeration system
- C. Define enthalpy, superheat and sub-cool in a refrigeration cycle
- D. Discuss CFCs and their effect on the environment
- E. Identify the components in a refrigeration system and their purpose in a refrigeration system
- F. Define types of metering devices in a refrigeration system
- G. Describe the control functions in a refrigeration system
- H. Describe how a heat pump functions
 - I. Describe how a chiller functions
- J. Properly connect manifold gauges to a refrigeration system to measure refrigerant pressure
- K. Determine proper refrigerant and charge required for a refrigerant system
- L. Evacuate and recover refrigerant from a refrigeration system
- M. Describe the techniques for flaring, soldering, swaging and brazing copper tubing

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal test and balance tools and sample system components
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Define sensible, latent and total heat (Lec)
- B. Define evaporation and condensation and identify where it occurs in a refrigeration system
 1. Define evaporation and condensation (Lec)
 2. Identify where evaporation and condensation occur in a refrigeration system (Lec and Lab)
- C. Define enthalpy, superheat and sub-cool in a refrigeration cycle (Lec and Lab)
- D. Discuss CFCs and their effect on the environment
 1. Describe the effects that CFCs have on the Ozone layer (Lec)
 2. Describe the efforts through legislation to control the impact of CFCs (Lec)
- E. Identify the components in a refrigeration system and their purpose in a refrigeration system
 1. Identify the components in a refrigeration system (Lec)
 2. Define the function of the components in a refrigeration system (Lec)
- F. Define types of metering devices in a refrigeration system
 1. Identify metering devices in a typical HVAC refrigeration system (Lec)
 2. Identify the various types of metering devices in refrigeration systems (Lec)
- G. Describe the control functions in a refrigeration system
 1. Describe the control sequence of operation for a refrigeration system (Lec)
 2. Describe short cycling and hot gas bypass controls in a refrigeration system (Lec)
- H. Describe how a heat pump functions
 1. Identify the reversing valve in a heat pump system (Lab)
 2. Describe the operation of a heat pump in cooling and heating modes (Lec)

- I. Describe how a chiller functions
 - 1. Describe the function and operation of a chiller in a refrigeration system (Lec)
- J. Properly connect manifold gauges to a refrigeration system to measure refrigerant pressure
 - 1. Identify service valves and manifold gauges used in servicing refrigeration systems (Lab)
 - 2. Properly connect a manifold gauge set to a refrigeration system (Lab)
- K. Determine proper refrigerant and charge required for a refrigerant system
 - 1. Determine the refrigerant in a system and its required charge pressures (Lec)
- L. Evacuate and recover refrigerant from a refrigeration system (Lab)
 - 1. Properly perform a refrigerant evacuation and recovery from an HVAC system (Lab)
- M. Describe the techniques for flaring, soldering, swaging and brazing copper tubing
 - 1. Perform flaring, swaging, soldering and brazing of copper tubing to industry standards (Lab)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Comprehensive written final examination
- D. Comprehensive final project
- E. Demonstration of assigned skills to acceptable level per instructor

7. Representative Text(s) -

International Training Institute for the Sheet Metal and Air Conditioning Industry. HVAC. Alexandria, VA: International Training Institute, 2005.

NOTE: This is the standard Sheet Metal textbook/workbook used for this course. Although it may not be within 5 years of the required published date, it is the most current book used when teaching this course.

8. Disciplines -

Sheet Metal

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Properly connect a manifold gauge set to a refrigeration system
- B. Properly perform a refrigerant evacuation and recovery from an HVAC system

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: From the textbook, assigned sections on the refrigeration cycle and the components of a refrigeration system.
 - B. Sample writing assignment: Describe the control sequence of operation for a refrigeration system.
 - C. Complete EPA 608 Refrigeration Handling certification written testing.
-

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FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course.

In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 176C

Course Title: Clean Rooms & HEPA Filter Testing

Catalog Description:

Students will describe the purpose of a cleanroom and the function of HEPA and ULPA filters. Students will perform HEPA filter challenge and cleanroom performance testing to industry standards.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air TAB

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that can contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
- course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
- pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

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Apprenticeship

APSM 176C CLEAN ROOMS & HEPA FILTER TESTING

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APSM 176C

CLEAN ROOMS & HEPA FILTER TESTING

Summer
2018

40 hours total: 28 hours lecture, 12 hours laboratory.

2 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active

Grading: Letter Grade with P/NP option

Degree Status: Applicable

Credit Status: Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count:

30

Load Factor:

.060

FOAP Code:

115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

Stand Alone
Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the test and balance sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance certification. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Test & Air Balance.

1. Description -

Students will describe the purpose of a cleanroom and the function of HEPA and ULPA filters. Students will perform HEPA filter challenge and cleanroom performance testing to industry standards.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Describe the history of clean room development
- B. Describe the function and design components to make a "clean room"
- C. Define HEPA and ULPA filters
- D. Describe clean room classifications
- E. Describe equipment needed to perform clean room performance testing
- F. Properly perform a clean room performance test to industry standards
- G. Describe equipment needed to perform HEPA filter challenge testing
- H. Properly perform a HEPA filter challenge to industry standards

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal test and balance tools and sample system components
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Describe the history of clean room development
 1. Define the purpose and uses of clean rooms and clean environments (Lec)
 2. Describe the components required in a clean room (Lec)
 3. Discuss the history of clean room development from the Manhattan Project to Silicon Valley (Lec)
- B. Describe the function and design components to make a "clean room" (Lec)
- C. Define HEPA and ULPA filters
 1. Describe what is measured by HEPA and ULPA filter specifications (Lec)
- D. Describe clean room classifications
 1. Describe the Federal Standard 209E clean room classifications (Lec)
 2. Describe the ISO 14644 clean room classifications (Lec)
- E. Describe what is measured in clean room performance testing
 1. Identify testing equipment needed to perform clean room performance testing (Lec and Lab)
 2. Demonstrate the use of a laser particle counter (Lec and Lab)
- F. Properly perform a clean room performance test to industry standards
 1. Perform a clean room performance test to FS209E standards (Lab)
 2. Perform a clean room performance test to ISO14644 standards (Lab)
- G. Describe equipment needed to perform HEPA filter challenge testing
 1. Identify the testing equipment needed to perform a HEPA filter challenge (Lec and Lab)
 2. Describe the operation of an aerosol generator (Lec and Lab)
 3. Describe the operation of a photometer (Lec and Lab)
- H. Properly perform a HEPA filter challenge to industry standards
 1. Perform an upstream filter integrity challenge (Lab)
 2. Perform an downstream filter integrity challenge (Lab)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Comprehensive written final examination
- D. Demonstration of assigned skills to acceptable level per instructor

7. Representative Text(s) -

United States General Services Agency. Federal Standard 209E Airborne Particulate Cleanliness Classes in Cleanrooms and Clean Zones. General Services Agency, 1992.

International Organization for Standardization (ISO) Standards. International Standards for Cleanrooms and associated controlled environments. ISO 14644-1 Part 1: Classification of air cleanliness; and ISO 14644-2 Part 2: Specifications for testing and monitoring to prove continued compliance with ISO 14644-1. Mount Prospect, IL: Environmental Sciences and Technology (IEST), 2015.

NOTE: These are the standard Sheet Metal textbooks/workbooks used for this course. Although one or more may not be within 5 years of the required published date, they are the most current books used when teaching this course.

8. Disciplines -

Sheet Metal

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Demonstrate the use of a laser particle counter.
- B. Perform a clean room performance test to ISO14644 standards.
- C. Perform a downstream filter integrity challenge.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: From the textbook, assigned sections regarding clean rooms.
- B. Sample writing assignment: Define HEPA and ULPA filter specifications.

Ensure you're using the current version of this form by downloading a fresh copy from [the CCC webpage!](#)

FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course.

In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 177A

Course Title: Title 24 Mechanical Acceptance Testing

Catalog Description:

Students will explain the requirements of the California Title 24 energy code. Students will perform all Title 24 Mechanical Acceptance tests required in non-residential mechanical systems. Students will achieve NEMIC Mechanical Acceptance Test Technician certification.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air TAB

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that can contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
- course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
- pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

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Apprenticeship

APSM 177A TITLE 24 MECHANICAL ACCEPTANCE TESTING

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APSM 177A

TITLE 24 MECHANICAL ACCEPTANCE TESTING

Summer
2018

40 hours total: 32 hours lecture, 8 hours laboratory.

2.5 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active

Grading: Letter Grade with P/NP option

Degree Status: Applicable

Credit Status: Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count:
30

Load Factor:
.060

FOAP Code:
115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

**Stand Alone
Designation:** no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the test and balance sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance certification. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Test & Air Balance.

1. Description -

Students will explain the requirements of the California Title 24 energy code. Students will perform all Title 24 Mechanical Acceptance tests required in non-residential mechanical systems. Students will achieve NEMIC Mechanical Acceptance Test Technician certification.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Describe the history of California's Title 24 Energy code
- B. Describe the requirements of the Mechanical Acceptance Test Technician certification
- C. Describe the difference between Title 24, Part 1, and Title 24, Part 6
- D. Describe the use and purpose of the Title 24 Non Residential Compliance Manual
- E. Describe the use and purpose of the Title 24 NA7 Appendix
- F. Describe the use and purpose of the Mechanical Compliance forms
- G. Describe the use and purpose of the Mechanical Acceptance forms
- H. Successfully complete the NEMIC MATT Certification Test

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal test and balance tools and sample system components
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Describe the history of California's Title 24 Energy code (Lec)
- B. Describe the requirements of the Mechanical Acceptance Test Technician Certification
 1. Define the regulation that requires Certified Mechanical Acceptance Testing (Lec)
 2. Describe the certification process (Lec)
 3. Define document author, certified technician, responsible person, certified employer, certified provider (Lec)
- C. Describe the difference between Title 24, Part 1, and Title 24, Part 6
 1. Describe the Title 24 Administrative Code (Lec)
 2. Describe the Title 24 Energy Code (Lec)
- D. Describe the use and purpose of the Title 24 Non Residential Compliance Manual
 1. Find reference in the manual for a given test situation (Lec and Lab)
- E. Describe the use and purpose of the Title 24 NA7 Appendix (Lec)
- F. Describe the use and purpose of the Mechanical Compliance forms (Lec)
- G. Describe the use and purpose of the Mechanical Acceptance forms (Lec)
 1. Describe the MCH-01-E form and its importance to acceptance testing (Lec and Lab)
 2. Describe the MCH-03-E form and its importance to acceptance testing (Lec and Lab)
 3. Describe the testing requirements to complete forms MCH-02-A through MCH-18-A (Lec and Lab)
 4. Perform acceptance testing on lab HVAC equipment (Lec and Lab)
 5. Properly complete a Mechanical Certificate of Acceptance test form (Lec and Lab)
- H. Successfully complete the NEMIC MATT Certification Test (Lec and Lab)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Comprehensive certification examination
- D. Demonstration of assigned skills to acceptable level per instructor

7. Representative Text(s) -

International Training Institute for the Sheet Metal and Air Conditioning Industry. Functional Performance Testing of HVAC Systems. Alexandria, VA: International Training Institute, 2015.

8. Disciplines -

Sheet Metal

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Perform acceptance testing on lab HVAC equipment.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: Read instructions for Mechanical Certificate of Acceptance test forms 1-18.
- B. Sample writing assignment: Properly complete a Mechanical Certificate of Acceptance test form.

Ensure you're using the current version of this form by downloading a fresh copy from [the CCC webpage!](#)

FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

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In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 177B

Course Title: Advanced DDC Controls/Commissioning of HVAC Systems

Catalog Description:

Students will install, program and calibrate direct digital control components on HVAC systems. Students will describe the SMACNA commissioning process and prepare sample functional performance tests.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air TAB

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that can contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
- course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
- pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

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Apprenticeship

APSM 177B ADVANCED DDC CONTROLS/COMMISSIONING OF HVAC SYSTEMS

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APSM 177B	ADVANCED DDC CONTROLS/COMMISSIONING OF HVAC SYSTEMS	Summer 2018
40 hours total: 24 hours lecture, 16 hours laboratory.		2 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active	Grading: Letter Grade with P/NP option
Degree Status: Applicable	Credit Status: Credit
Degree or Certificate Requirement: Stand Alone Course	
Foothill GE Status: Non-GE	

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count:	Load Factor:	FOAP Code:
30	.060	115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

Stand Alone Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the test and balance sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance certification. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Test & Air Balance.

1. Description -

Students will install, program and calibrate direct digital control components on HVAC systems. Students will describe the SMACNA commissioning process and prepare sample functional performance tests.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Describe an HVAC control loop and identify the required components
- B. Properly assemble the components for an HVAC control loop
- C. Write a sample HVAC control loop program and successfully demonstrate its use on a simulator board
- D. Properly calibrate a DDC VAV controller and ΔP sensor
- E. Describe the HVAC commissioning roles and responsibilities
- F. Describe the three levels of commissioning according to SMACNA
- G. Describe the use and purpose of commissioning forms and commissioning log
- H. Write a sample functional performance test
- I. Discuss available industry resources

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal test and balance tools and sample system components
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Describe an HVAC control loop and identify the required components
 1. Describe the required components in an HVAC control loop (Lec)
 2. Identify the function of each component in an HVAC control loop (Lec)
- B. Properly assemble the components for an HVAC control loop
 1. Properly assemble and wire the required devices to complete a functioning control loop (Lab)
- C. Write a sample HVAC control loop program and successfully demonstrate its use on a simulator board
 1. Write a control program for the assembled control loop (Lec and Lab)
 2. Upload the control program for the assembled control loop and demonstrate its proper functioning (Lec and Lab)
- D. Properly calibrate a DDC VAV controller and ΔP sensor
 1. Properly calibrate the airflow sensor on a DDC VAV controller (Lec and Lab)
 2. Properly calibrate the ΔP sensor on a DDC HVAC system (Lec and Lab)
- E. Describe the HVAC commissioning roles and responsibilities
 1. Describe the role and responsibilities of the commissioning authority, design professional, commissioning agent and field technician (Lec)
 2. Describe the purpose of HVAC commissioning (Lec)
- F. Describe the three levels of commissioning according to SMACNA
 1. Describe and differentiate Level 1 through Level 3 commissioning per SMACNA (Lec)
- G. Describe the use and purpose of commissioning forms and commissioning log
 1. Describe and complete a sample commissioning test form for an HVAC system (Lec and Lab)
 2. Create and complete a commissioning log for a sample project (Lec and Lab)
- H. Write a sample functional performance test
 1. Write a sample functional performance test procedure for a roof top AC unit (Lec and Lab)
 2. Complete a functional performance test using the completed test procedure (Lec and Lab)

I. Discuss available industry resources

1. Discuss other available industry organizations and resources for commissioning and retro commissioning (Lec)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Demonstration of assigned skills to acceptable level per instructor
- D. Comprehensive final project

7. Representative Text(s) -

Sheet Metal and Air Conditioning Contractors National Association, Inc. HVAC Systems Commissioning Manual, 2nd ed. Chantilly, VA: SMACNA, 2013.

8. Disciplines -

Sheet Metal

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Properly assemble and wire the required devices to complete a functioning control loop.
- B. Properly calibrate the airflow sensor on a DDC VAV controller.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: From the textbook, units on HVAC commissioning.
- B. Sample writing assignments:
 1. Describe and complete a sample commissioning test form for an HVAC system.
 2. Write a sample functional performance test procedure for a roof top AC unit.

Ensure you're using the current version of this form by downloading a fresh copy from [the CCC webpage!](#)

FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course.

In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 177C

Course Title: Energy Auditing

Catalog Description:

Students will demonstrate the skills and knowledge to prepare and conduct a building energy audit to industry standards. Students will achieve the ICB Energy Audit Technician certification.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air TAB

- o What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that can contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
- course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
- pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

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Apprenticeship

APSM 177C ENERGY AUDITING

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APSM 177C

ENERGY AUDITING

Summer
2018

40 hours total: 32 hours lecture, 8 hours laboratory.

2.5 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active

Grading: Letter Grade with P/NP option

Degree Status: Applicable

Credit Status: Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count:

30

Load Factor:

.060

FOAP Code:

115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

Stand Alone
Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the test and balance sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance certification. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Test & Air Balance.

1. Description -

Students will demonstrate the skills and knowledge to prepare and conduct a building energy audit to industry standards. Students will achieve the ICB Energy Audit Technician certification.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Describe any energy and environmental impacts of conducting an energy audit
- B. Define the process to conduct an energy audit
- C. Discuss data that is required to gather for an energy audit
- D. Discuss and identify the tools and equipment used to conduct an energy audit
- E. Describe the three levels of audits under the ASHRAE 105 Standard
- F. Describe and calculate an Energy Use Index
- G. Describe and calculate an Energy Cost Index
- H. Describe additional methods of building performance expressions and comparisons
- I. Write a sample RFP and energy audit report using ASHRAE 105 standard forms

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal test and balance tools and sample system components
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Describe any energy and environmental impacts of conducting an energy audit
 1. Discuss reasons for conducting an energy audit (Lec)
 2. Describe the impact that energy audits can have on the energy infrastructure and economy (Lec)
 3. Describe the impact that energy audits can have on the environment and the economy (Lec)
- B. Define the process to conduct an energy audit
 1. Define the five steps in an energy audit: scope, walk through, preparation, audit, reporting (Lec and Lab)
- C. Discuss data that is required to gather for an energy audit
 1. Describe the building characteristics that are gathered in an energy audit (Lec and Lab)
 2. Describe the HVAC system information that is gathered in an energy audit (Lec and Lab)
 3. Describe the energy use information that is gathered in an energy audit (Lec and Lab)
- D. Discuss and identify the tools and equipment used to conduct an energy audit
 1. Discuss and identify the common tools and equipment that may be used to conduct building energy audits (Lec and Lab)
- E. Describe the three levels of audits under the ASHRAE 105 Standard
 1. Describe the ASHRAE 105 standard and addenda "a" and "b" (Lec)
 2. Describe the requirements of the three levels detailed in ASHRAE Standard 105 (Lec)
- F. Describe and calculate an Energy Use Index
 1. Describe the Energy Use Index for a building (Lec and Lab)
 2. Calculate the Energy Use Index for a building (Lec and Lab)
- G. Describe and calculate an Energy Cost Index
 1. Describe the Energy Cost Index for a building (Lec and Lab)
 2. Calculate the Energy Cost Index for a building (Lec and Lab)
- H. Describe additional methods of building performance expressions and comparisons

1. Describe additional methods to express building performance per the ASHRAE 105 Standard (Lec and Lab)
 2. Describe methods to compare building performance per the ASHRAE 105 Standard (Lec and Lab)
- I. Write a sample RFP and energy audit report using ASHRAE 105 standard forms
1. Prepare a sample request for proposal for an energy audit (Lec and Lab)
 2. Prepare a sample energy audit report (Lec and Lab)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Comprehensive written final examination
- D. International Certification Board (ICB) Energy Audit Technician certification
- E. Demonstration of assigned skills to acceptable level per instructor

7. Representative Text(s) -

International Training Institute for the Sheet Metal and Air Conditioning Industry. Energy Audit Manual. Alexandria, VA: International Training Institute, 2010.

American Society of Heating, Refrigeration and Air Conditioning Engineers. ANSI/ASHRAE Standard 105-2007 Standard Methods of Measuring, Expressing and Comparing Building Energy Performance. Atlanta, GA: ASHRAE, 2007.

NOTE: These are the standard Sheet Metal textbooks/workbooks used for this course. Although one or more may not be within 5 years of the required published date, they are the most current books used when teaching this course.

8. Disciplines -

Sheet Metal

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. List and gather the HVAC system used in an energy audit, using measuring equipment and other resources.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: From the textbook, sections regarding preparation of an energy audit.
 - B. Sample writing assignments:
 1. Describe and calculate an Energy Use Index.
 2. Prepare a sample request for proposal for an energy audit.
 3. Prepare a sample energy audit report.
-

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FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

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In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

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Course #: APSM 178A

Course Title: Indoor Air Quality

Catalog Description:

Students will explain basic factors of air quality, demonstrate the use of indoor air quality test instruments and perform various tests to prepare a sample IAQ report.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air TAB

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that can contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
 - course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
 - pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17
Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17
Date of Approval by Division Curriculum Committee: 06/12/17
College Curriculum Co-Chairperson: _____ **Date:** _____

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Apprenticeship

APSM 178A INDOOR AIR QUALITY

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APSM 178A

INDOOR AIR QUALITY

Summer
2018

40 hours total: 28 hours lecture, 12 hours laboratory.

2 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active

Grading: Letter Grade with P/NP option

Degree Status: Applicable

Credit Status: Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count:

30

Load Factor:

.060

FOAP Code:

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Distance Learning: no

Stand Alone
Designation: no

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Content Review Date:

Former ID:

Need/Justification -

This course is needed in the test and balance sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance certification. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Test & Air Balance.

1. Description -

Students will explain basic factors of air quality, demonstrate the use of indoor air quality test instruments and perform various tests to prepare a sample IAQ report.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Describe the history and evolution of building indoor air quality (IAQ) issues
- B. Describe the instruments used in IAQ audits
- C. Describe the strategies used in performing IAQ audits
- D. Identify common IAQ issues in buildings
- E. Demonstrate the use of instruments to perform IAQ readings
- F. Prepare a sample IAQ report

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal test and balance tools and sample system components
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Describe the history and evolution of building indoor air quality (IAQ) issues
 1. Describe the evolution and need for increased building envelope integrity (Lec)
 2. Describe the impact of build envelope integrity to indoor air quality issues (Lec)
- B. Describe the instruments used in IAQ audits
 1. Describe the standard air balance instruments that can be used in IAQ studies (Lec and Lab)
 2. Describe specialized IAQ instruments used in IAQ studies (Lec and Lab)
- C. Describe the strategies used in performing IAQ audits
 1. Describe strategies to perform a basic IAQ audit (Lec)
 2. Describe strategies to perform an intermediate IAQ audit (Lec)
 3. Describe strategies to perform a comprehensive IAQ audit (Lec)
- D. Identify common IAQ issues in buildings
 1. Identify the most common sources of building IAQ issues (Lec and Lab)
 2. Describe possible solutions for IAQ issues (Lec and Lab)
 3. Describe various resources to find chemical exposure limits for building occupants (Lec and Lab)
- E. Demonstrate the use of instruments to perform IAQ readings
 1. Demonstrate the use of an air data multi meter and thermometer to determine outside air percentage (Lab)
 2. Demonstrate the use of a CO2 meter (Lab)
 3. Demonstrate the use of a VOC meter (Lab)
 4. Demonstrate the use of a sampling tube pump (Lab)
- F. Prepare a sample IAQ report
 1. Prepare a sample request for proposal for an IAQ audit (Lec and Lab)
 2. Prepare a sample IAQ audit report (Lec and Lab)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Demonstration of assigned skills to acceptable level per instructor
- D. Comprehensive final project

7. Representative Text(s) -

International Training Institute for the Sheet Metal and Air Conditioning Industry. HVAC. Alexandria, VA: International Training Institute, 2005.

Sheet Metal and Air Conditioning Contractors National Association. Indoor Air Quality: A Systems Approach. 3rd ed. Chantilly, VA: SMACNA, 1998.

American Society of Heating, Refrigeration and Air Conditioning Engineers. ANSI/ASHRAE Standard 62.1-2016 Ventilation for Acceptable Indoor Air Quality. Atlanta, GA: ASHRAE, 2016.

NOTE: These are the standard Sheet Metal textbooks/workbooks used for this course. Although one or more may not be within 5 years of the required published date, they are the most current books used when teaching this course.

8. Disciplines -

Sheet Metal

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Demonstrate the use of an air data multi meter and thermometer to determine outside air percentage.
- B. Demonstrate the use of a VOC meter.
- C. Demonstrate the use of a sampling tube pump.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignments: From the textbooks, readings on ITI Indoor Air Quality (IAQ); readings on SMACNA.
- B. Sample writing assignment: Prepare a sample IAQ audit report.

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FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

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In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

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Course #: APSM 178B

Course Title: Green Construction & LEED Certification for HVAC

Catalog Description:

Students will gain an overview of "Green Construction" principles and techniques used in the HVAC industry. Students will identify various methods of energy conservation and generation in high performance buildings.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air TAB

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that can contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
- course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
- pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

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Apprenticeship

APSM 178B GREEN CONSTRUCTION & LEED CERTIFICATION FOR HVAC

[Edit Course Outline](#)

APSM 178B

GREEN CONSTRUCTION & LEED CERTIFICATION FOR HVAC

Summer
2018

40 hours total: 32 hours lecture, 8 hours laboratory.

2.5 Units

Status -

Course Status: Active

Grading: Letter Grade with P/NP option

Degree Status: Applicable

Credit Status: Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count:

30

Load Factor:

.060

FOAP Code:

115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

**Stand Alone
Designation:** no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the test and balance sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance certification. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Test & Air Balance.

1. Description -

Students will gain an overview of “Green Construction” principles and techniques used in the HVAC industry. Students will identify various methods of energy conservation and generation in high performance buildings.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Define sustainability and the triple bottom line
- B. Describe the role of green building in relation to environmental needs
- C. Describe the impact of green building on the jobsite
- D. Describe the responsibilities of contractors in green building
- E. Discuss California Green Building Code
- F. Discuss energy conservation in high performance buildings
- G. Define and calculate Energy Use Index for building
- H. Discuss energy efficiency programs available for buildings
- I. Discuss energy generation and conservation technologies

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal test and balance tools and sample system components
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Define sustainability and the triple bottom line
 1. Describe the principles of building sustainability (Lec)
 2. Describe the concept of a triple bottom line in building sustainability (Lec)
- B. Describe the role of green building in relation to environmental needs
 1. Describe the environmental issues impacted by building sustainability (Lec)
 2. Describe the human issues impacted by building sustainability (Lec)
- C. Describe the impact of green building on the jobsite
 1. Describe the costs impacts associated with green building (Lec)
 2. Describe the environmental benefits associated with green building (Lec)
 3. Describe the economic benefits and opportunities associated with green building (Lec)
- D. Describe the responsibilities of contractors in green building
 1. Discuss the role of contractors in construction waste management (Lec and Lab)
 2. Discuss the role of contractors in construction indoor air quality (Lec and Lab)
 3. Describe construction activity pollution prevention (Lec and Lab)
 4. Describe need and benefit of commissioning and retro-commissioning (Lec and Lab)
 5. Discuss interaction of LEED and commissioning (Lec and Lab)
- E. Discuss California Green Building Code
 1. Describe the purpose of California’s Green Building Code (Lec)
 2. Identify sections of the California Green Building Code that impact the HVAC industry (Lec)
- F. Discuss energy conservation in high performance buildings
 1. Define a building performance benchmark (Lec and Lab)
 2. Discuss strategies to reduce building energy load (Lec and Lab)
 3. Discuss impacts and methods of using high performance mechanical systems (Lec and Lab)
- G. Define and calculate Energy Use Index for building
 1. Define the term Energy Use Index (Lec and Lab)
 2. Calculate an Energy Use Index to ASHRAE 105 standards (Lec and Lab)

- H. Discuss energy efficiency programs available for buildings
 - 1. Discuss programs that promote energy efficiency and sustainability in buildings (Lec and Lab)
- I. Discuss energy generation and conservation technologies
 - 1. Discuss methods of energy generation and conservation to achieve energy usage goals (Lec)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Comprehensive written final examination
- D. Comprehensive final project

7. Representative Text(s) -

International Training Institute for the Sheet Metal and Air Conditioning Industry. Green/LEED Construction for the Sheet Metal Industry. Alexandria, VA: International Training Institute, 2010.
American Society of Heating, Refrigeration and Air Conditioning Engineers. ANSI/ASHRAE Standard 105-2014 Standard Methods of Determining, Expressing and Comparing Building Energy Performance and Greenhouse Gas Emissions. Atlanta, GA: ASHRAE, 2014.

NOTE: These are the standard Sheet Metal textbooks/workbooks used for this course. Although one or more may not be within 5 years of the required published date, they are the most current books used when teaching this course.

8. Disciplines -

Sheet Metal

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Measure heat conductivity of construction material samples.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: From the textbook, section on LEED energy scoring and ratings.
- B. Sample writing assignment: Calculate an Energy Use Index to ASHRAE 105 standards.

Ensure you're using the current version of this form by downloading a fresh copy from [the CCC webpage!](#)

FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course.

In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 178C

Course Title: Foreman Training/Project Management for HVAC

Catalog Description:

Students will examine the roles and responsibilities of jobsite foremen and project managers. Students will prepare a sample job cost tracking worksheet.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern

The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air TAB

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that can contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
- course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
- pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

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Apprenticeship

APSM 178C FOREMAN TRAINING/PROJECT MANAGEMENT FOR HVAC

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APSM 178C

FOREMAN TRAINING/PROJECT MANAGEMENT FOR HVAC

Summer
2018

40 hours total: 32 hours lecture, 8 hours laboratory.

2.5 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active

Grading: Letter Grade with P/NP option

Degree Status: Applicable

Credit Status: Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count:
30

Load Factor:
.060

FOAP Code:
115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

Stand Alone Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the test and balance sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance certification. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Test & Air Balance.

1. Description -

Students will describe the role and responsibilities of jobsite foreman and project managers. Students will prepare a sample job cost tracking worksheet.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Define construction site organizational chart and role of a foreman
- B. Describe the responsibilities of a foreman
- C. Complete a foreman self-evaluation
- D. Describe the attributes of a foreman
- E. Discuss factors that motivate sheet metal workers
- F. Discuss personal and workplace goals
- G. Discuss workplace diversity and proper workplace behavior
- H. Define the role and attributes of the project manager
 - I. Discuss the types of construction documents a project manager needs to be familiar with
- J. Discuss job cost tracking
- K. Discuss jobsite project management
- L. Discuss legal considerations

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal test and balance tools and sample system components
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Define construction site organizational chart and role of a foreman
 - 1. Define a typical construction site organizational chart (Lec)
 - 2. Define the role of a foreman (Lec)
- B. Describe the responsibilities of a foreman
 - 1. Describe the responsibilities of a foreman and the reasons to become a foreman (Lec)
- C. Complete a foreman self-evaluation
 - 1. Describe characteristics needed to be an effective foreman (Lec and Lab)
 - 2. Perform a self-evaluation (Lec and Lab)
- D. Describe the attributes of a foreman
 - 1. Discuss the main attributes of successful foreman (Lec)
- E. Discuss factors that motivate sheet metal workers
 - 1. Discuss positive and negative motivators of workers (Lec)
- F. Discuss personal and workplace goals
 - 1. Discuss personal goals of a foreman (Lec)
 - 2. Discuss workplace goals of a team (Lec)
- G. Discuss workplace diversity and proper workplace behavior
 - 1. Discuss human relations and types of diversity in the workplace (Lec and Lab)
 - 2. Discuss proper workplace behavior and its issues and impacts (Lec and Lab)
- H. Define the role and attributes of the project manager
 - 1. Define the attributes and duties of the project manager (Lec)
- I. Discuss the types of construction documents a project manager needs to be familiar with

1. Discuss the various documents a project manager must be familiar with (Lec)
- J. Discuss job cost tracking
 1. Define profit, direct and indirect job costs (Lec and Lab)
 2. Discuss methods of tracking and controlling job costs (Lec and Lab)
- K. Discuss jobsite project management
 1. Discuss preparation, scheduling, documentation, quality control and production (Lec and Lab)
- L. Discuss legal considerations
 1. Discuss contract legal issues (Lec)
 2. Discuss workplace legal issues (Lec)
 3. Discuss project close out and warranty (Lec)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Application of concepts in assigned projects
- D. Comprehensive written final examination

7. Representative Text(s) -

International Training Institute for the Sheet Metal and Air Conditioning Industry. Foreman Training.

Alexandria, VA: International Training Institute, 2007.

International Training Institute for the Sheet Metal and Air Conditioning Industry. Project Management.

Alexandria, VA: International Training Institute, 2007.

NOTE: These are the standard Sheet Metal textbooks/workbooks used for this course. Although one or more may not be within 5 years of the required published date, they are the most current books used when teaching this course.

8. Disciplines -

Sheet Metal

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Gather information needed and prepare job assignments for crew members as a class project, per instructions.
- B. Monitor, record and act on crew assignments.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: From the textbook, chapters on foreman training.
- B. Sample writing assignment: List responsibilities and attributes of a typical successful foreperson.

Ensure you're using the current version of this form by downloading a fresh copy from [the CCC webpage!](#)

FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course.

In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 179A

Course Title: Building & Cascading Pressures/Air Change Testing

Catalog Description:

Students will perform and calculate air changes per hour in building spaces, adjust room and building pressure differentials and prepare associated required documentation, per industry standards.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air TAB

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that can contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
- course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
- pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

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Apprenticeship

APSM 179A BUILDING & CASCADING PRESSURES/AIR CHANGE TESTING

[Edit Course Outline](#)

APSM 179A BUILDING & CASCADING PRESSURES/AIR CHANGE TESTING Summer 2018
40 hours total: 24 hours lecture, 16 hours laboratory. 2 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active

Grading: Letter Grade with P/NP option

Degree Status: Applicable

Credit Status: Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count:
30

Load Factor:
.060

FOAP Code:
115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

Stand Alone Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the test and balance sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance certification. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Test & Air Balance.

1. Description -

Students will perform and calculate air changes per hour on building spaces, adjust room and building pressure differentials and prepare associated required documentation, per industry standards.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Define formula to determine air changes per hour (ACH)
- B. Describe resources that define ACH requirements
- C. Perform an air change per hour test and prepare a sample report
- D. Describe methods of determining pressure differentials using various instruments
- E. Identify components of airflow and room pressure drawings
- F. Define components that affect room/building pressure differentials
- G. Perform room pressure differential readings
- H. Adjust airflow values to achieve specified pressure differentials
- I. Document airflow pressure differential readings to industry standards

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal test and balance tools and sample system components
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Define formula to determine air changes per hour (ACH)
 1. Define the variables in the air change per hour formula (Lec)
- B. Describe resources that define ACH requirements
 1. Identify industry organizations that set ACH standards and requirements (Lec)
- C. Perform an air change per hour test and prepare a sample report
 1. Measure and calculate room volume (Lec and Lab)
 2. Measure supply, return and exhaust air flows in a room (Lec and Lab)
 3. Calculate ACH and document on report form (Lec and Lab)
- D. Describe methods of determining pressure differentials using various instruments
 1. Measure pressure differentials using liquid manometer, Magnehelic gauge, digital manometer, pressure direction indicator (Lec and Lab)
- E. Identify components of airflow and room pressure drawings
 1. Describe elements on an airflow schematic drawing (Lec and Lab)
 2. Define elements on a room pressure diagram (Lec and Lab)
- F. Define components that affect room/building pressure differentials
 1. Define the airflow components that affect building pressures (Lec and Lab)
 2. Define the airflow components that affect room pressures (Lec and Lab)
- G. Perform room pressure differential readings
 1. Perform initial room pressure readings and document values (Lec and Lab)
- H. Adjust airflow values to achieve specified pressure differentials
 1. Adjust return air, exhaust air and door sweeps to achieved required room pressure differentials (Lec and Lab)
- I. Document airflow pressure differential readings to industry standards
 1. Prepare a sample room pressure differential report to TABB standards (Lec and Lab)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Demonstration of assigned skills to acceptable level per instructor
- D. Comprehensive final project

7. Representative Text(s) -

Sheet Metal and Air Conditioning Contractors National Association. HVAC Systems Duct Design. 4th ed. Chantilly, VA: SMACNA, 2006.

International Training Institute for the Sheet Metal and Air Conditioning Industry. Testing, Adjusting & Balancing of Environment Systems. Alexandria, VA: International Training Institute, 2003.

NOTE: These are the standard Sheet Metal textbooks/workbooks used for this course. Although one or more may not be within 5 years of the required published date, they are the most current books used when teaching this course.

8. Disciplines -

Sheet Metal

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Perform initial room pressure readings and document values.
- B. Adjust return air, exhaust air and door sweeps to achieved required room pressure differentials.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: From the textbook, sections on SMACNA.
- B. Sample writing assignment: Define elements on a room pressure diagram.

Ensure you're using the current version of this form by downloading a fresh copy from [the CCC webpage!](#)

FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course.

In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 179B

Course Title: Sound & Vibration in HVAC Systems

Catalog Description:

Upon completion, students will measure room sound pressure readings to properly complete Noise Criterion (NC) and Room Criterion (RC) reports to industry standards. Students will properly conduct vibration testing on various HVAC equipment and document results to industry standards.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air TAB

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. **Primary:** offer academic and vocational instruction at the lower division level; and
2. **Primary:** to advance California's economic growth and global competitiveness through education, training, and services that can contribute to continuous work force improvement.
3. **Secondary:** provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the

industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
- course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
- pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

Submissions Course Outline Editor

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Apprenticeship

APSM 179B SOUND & VIBRATION IN HVAC SYSTEMS

[Edit Course Outline](#)

APSM 179B

SOUND & VIBRATION IN HVAC SYSTEMS

Summer
2018

40 hours total: 32 hours lecture, 8 hours laboratory.

2.5 Units

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active

Grading: Letter Grade with P/NP option

Degree Status: Applicable

Credit Status: Credit

Degree or Certificate Requirement: Stand Alone Course

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability:

Validation:

Division Dean Information -

Seat Count:

30

Load Factor:

.060

FOAP Code:

115000142215095640

Instruction Office Information -

FSA Code:

Distance Learning: no

Stand Alone
Designation: no

Program Title:

Program TOPs Code:

Program Unique Code:

Content Review Date:

Former ID:

Need/Justification -

This course is needed in the test and balance sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance certification. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Test & Air Balance.

1. Description -

Upon completion, students will measure room sound pressure readings to properly complete noise criterion (NC) and room criterion (RC) reports to industry standards. Students will properly conduct vibration testing on various HVAC equipment and document results to industry standards.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Discuss the role and duties of the sound and vibration technician
- B. Define amplitude, frequency, pure tone, octave band and decibel
- C. Define and discuss the importance of background noise
- D. Describe the physiological effects of sound
- E. Determine sound levels using a sound meter
- F. Describe and develop a noise criterion (NC) curve
- G. Describe and develop a room criterion (RC) curve
- H. Define a "free field" and a "diffuse field"
 - I. Define a "sound absorption coefficient" (SAC) and a "sabin"
- J. Identify noise and vibration transmission paths in a building
- K. Discuss types of equipment vibration isolators
- L. Perform a room NC and RC test
- M. Perform a vibration test on a utility fan

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal test and balance tools and sample system components
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Discuss the role and duties of the sound and vibration technician (Lec)
- B. Define amplitude, frequency, pure tone, octave band and decibel
 1. Define amplitude and frequency (Lec)
 2. Define pure tone, octave band and decibel (Lec)
- C. Define and discuss the importance of background noise
 1. Define background noise (Lec)
 2. Calculate the correction for background noise for sample readings (Lec and Lab)
- D. Describe the physiological effects of sound
 1. Discuss the physiological effects of sound and allowable exposure limits (Lec and Lab)
- E. Determine sound levels using a sound meter
 1. Perform a dbA and dbC reading using a type II sound meter (Lec and Lab)
 2. Perform octave band frequency readings using a type II sound meter (Lec and Lab)
- F. Describe and develop a noise criterion (NC) curve
 1. Identify the characteristics of an NC curve and plot sample readings (Lec and Lab)
- G. Describe and develop a room criterion (RC) curve
 1. Identify the characteristics of an RC curve and plot sample readings (Lec and Lab)
- H. Define a "free field" and a "diffuse field" (Lec and Lab)
- I. Define a "sound absorption coefficient" (SAC) and a "sabin" (Lec and Lab)
- J. Identify noise and vibration transmission paths in a building
 1. Discuss possible paths of transmission for sound and vibrations in a building (Lec and Lab)

2. Discuss methods of reducing sound and vibration transmissions in a building (Lec and Lab)
- K. Discuss types of equipment vibration isolators
 1. Discuss the types and use of equipment vibration isolators (Lec and Lab)
- L. Perform a room NC and RC test
 1. Perform and document a NC report (Lec and Lab)
 2. Perform and document a RC report (Lec and Lab)
- M. Perform a vibration test on a utility fan
 1. Perform a three axis vibration test on a utility fan (Lec and Lab)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Comprehensive written final examination
- D. Comprehensive final project
- E. Demonstration of assigned skills to acceptable level per instructor

7. Representative Text(s) -

International Training Institute for the Sheet Metal and Air Conditioning Industry. Sound and Vibration Technology. Alexandria, VA: International Training Institute, 2001.

NOTE: This is the standard Sheet Metal textbook/workbook used for this course. Although it may not be within 5 years of the required published date, it is the most current book used when teaching this course.

8. Disciplines -

Sheet Metal

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Perform a dbA and dbC reading using a type II sound meter.
- B. Perform octave band frequency readings using a type II sound meter.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: From the textbook, pages regarding the roles and duties of the sound and vibration technician.
- B. Sample writing assignments:
 1. Define background noise.
 2. Discuss methods of reducing sound and vibration transmissions in a building.

Ensure you're using the current version of this form by downloading a fresh copy from [the CCC webpage!](#)

FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course.

In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: APSM 179C

Course Title: Biological Safety Cabinets/Laboratory Fume Hoods

Catalog Description:

Students will identify various types of laboratory fume hoods and biological safety cabinets and describe the function of each style. Students will follow proper industry standards to test laboratory fume hoods and biological safety cabinets to required industry standards.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

Certificate of Achievement, Sheet Metal Air TAB

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

Fall 2018

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that can contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course is part of a comprehensive effort that will upgrade the HVAC program and align courses with changing instructional schedules, new labs, new equipment, current state energy policies, and to help our employers maintain a competitive advantage in the industry in California. The course enables our students to obtain and retain jobs in the industry.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

Sheet Metal related jobs are projected to rise 2.3% annually through 2024 (California EDD projections attached), both statewide and in the local San Jose and East Bay markets. One of the driving forces of this job growth is the need to update older buildings with more efficient heating and cooling systems (California EDD job projections p. 2). This course includes new course materials covering modern efficient heating and cooling systems as well as training for testing and servicing these systems.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
 - course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
 - pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- BFM This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- BFM The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Frank Cuneo **Date:** 06/08/17

Division Curriculum Representative: Bruce McLeod **Date:** 06/08/17

Date of Approval by Division Curriculum Committee: 06/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

Need/Justification -

This course is needed in the test and balance sector of the sheet metal heating, ventilating, and air conditioning (HVAC) industry for registered apprentices, and is critical to energy efficient system performance certification. This course will be a required core course for the forthcoming certificate of achievement in Sheet Metal Test & Air Balance.

1. Description -

Students will identify various types of laboratory fume hoods and biological safety cabinets and describe the function of each style. Students will follow proper industry standards to test laboratory fume hoods and biological safety cabinets to required industry standards.

Prerequisite: Per California Code of Regulations, this course is limited to students admitted to the Sheet Metal Apprenticeship Program.

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Discuss the purpose and differences of biological safety cabinets and laboratory fume hoods
- B. Discuss evolution of fume hoods
- C. Discuss the standards and codes pertaining to fume hoods and biological safety cabinets
- D. Identify the components of a laboratory fume hood
- E. Describe how a laboratory fume hood functions
- F. Describe different styles of fume hoods
- G. Identify the instruments and equipment used in the testing of fume hoods
- H. Define the procedures used in fume hood testing
 - I. Define the components of a biological safety cabinet
- J. Describe how a biological safety cabinet functions
- K. Identify the instruments and equipment used in the testing of biological safety cabinets

3. Special Facilities and/or Equipment -

- A. Laboratory with sheet metal test and balance tools and sample system components
- B. Personal protective equipment

4. Course Content (Body of knowledge) -

- A. Discuss the purpose and differences of biological safety cabinets and laboratory fume hoods
 - 1. Discuss the purpose of a laboratory fume hood (Lec)
 - 2. Discuss the purpose of biological safety cabinet (Lec)
 - 3. Discuss the differences of biological safety cabinets and laboratory fume hoods (Lec)
- B. Discuss evolution of fume hoods (Lec)
- C. Discuss the standards and codes pertaining to fume hoods and biological safety cabinets
 - 1. Discuss the standards and codes pertaining to laboratory fume hoods (Lec and Lab)
 - 2. Discuss the standards and codes pertaining to biological safety cabinets (Lec and Lab)
- D. Identify the components of a laboratory fume hood (Lec and Lab)
- E. Describe how a laboratory fume hood functions
 - 1. Describe the functions of laboratory fume hood components (Lec and Lab)
 - 2. Describe the sequence of operations of a fume hood as a system in various environments (Lec and Lab)
- F. Describe different styles of fume hoods
 - 1. Identify seven different styles of fume hoods (Lec and Lab)
- G. Identify the instruments and equipment used in the testing of fume hoods
 - 1. Demonstrate operation of fume hood test instruments (Lec and Lab)
- H. Define the procedures used in fume hood testing
 - 1. Discuss ASHRAE 110, OSHA, CDC and Cal OSHA testing requirements (Lec and Lab)
 - 2. Perform tests on laboratory fume hood (Lec and Lab)
- I. Define the components of a biological safety cabinet

1. Identify the components of a biological safety cabinet (Lec and Lab)
2. Identify various styles of biological safety cabinets (Lec and Lab)
- J. Describe how a biological safety cabinet functions
 1. Describe the function of a biological safety cabinet (Lec and Lab)
- K. Identify the instruments and equipment used in the testing of biological safety cabinets
 1. Identify the instruments and equipment used in the testing of biological safety cabinets (Lec and Lab)
 2. Discuss NSF 49, OSHA, CDC and Cal OSHA testing requirements (Lec and Lab)
 3. Perform tests on biological safety cabinets (Lec and Lab)

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Results of written quizzes and tests
- B. Responses in class discussions
- C. Comprehensive written final examination
- D. Demonstration of assigned skills to acceptable level per instructor

7. Representative Text(s) -

International Training Institute for the Sheet Metal and Air Conditioning Industry. Laboratory Fume Hood Performance Testing. Alexandria, VA: International Training Institute, 2012.

American Society of Heating, Refrigeration and Air Conditioning Engineers. ANSI/ASHRAE Standard 110-2016 Method of Testing Performance of Laboratory Fume Hoods. Atlanta, GA: ASHRAE, 2016.

NOTE: These are the standard Sheet Metal textbooks/workbooks used for this course. Although one or more may not be within 5 years of the required published date, they are the most current books used when teaching this course.

8. Disciplines -

Sheet Metal

9. Method of Instruction -

- A. Lecture
- B. Discussion
- C. Demonstration
- D. Lab assignments followed by discussion

10. Lab Content -

- A. Perform performance and safety tests on a laboratory fume hood, per standards.
- B. Perform tests on biological safety cabinets.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Sample reading assignment: From the textbook, standards regarding fume hood and biological safety cabinets, purpose, functions, and testing.
- B. Sample writing assignment: Discuss NSF 49, OSHA, CDC and Cal OSHA testing requirements for biological safety cabinets.

2014-2024 Occupational Employment Projections

Area	SOC Code*	Occupational Title	Estimated Employment 2014**	Projected Employment 2024	Numeric Change 2014-2024 [1]	Percent Change 2014-2024	Annual Average Percent Change	Average Annual Job Openings			2016 First Quarter Wages [5]		Education and Training Levels [7]		
								New Jobs [2]	Replacement Needs [3]	Total Jobs [4]	Median Hourly	Median Annual	Entry Level Education	Work Experience	On-the-Job Training
San Jose- Sunnyvale-Santa Clara	47-2211	Sheet Metal Workers	780	950	170	21.8%	2.2%	17	17	34	\$39.56	\$82,287	7	None	APP
Oakland-Hayward-Berkeley	47-2211	Sheet Metal Workers	1,200	1,480	280	23.3%	2.3%	29	26	55	\$26.68	\$55,485	7	None	APP
California totals	47-2211	Sheet Metal Workers	13,000	16,000	3,000	23.1%	2.3%	310	280	590	\$27.46	\$57,131	7	None	APP

(<http://www.edd.ca.gov>)

Summary Guide for

Sheet Metal Workers in California

May also be called: Field Installers; Heating, Ventilating, and Air Conditioning Sheet Metal Installers; Heating, Ventilating, and Air Conditioning Technicians; Sheet Metal Installers; Sheet Metal Layout Mechanics; Sheet Metal Mechanics

What Would I Do?

Sheet Metal Workers perform all operations necessary to make, install, and repair a wide variety of goods made from metal sheets. These products include heating, ventilating, and air-conditioning systems (HVAC); roofing, siding, and drains. They cut the flat material and shape it into a three-dimensional form using hand and power-driven tools, fabricating machines, or computerized metalworking equipment.

Sheet Metal Workers may work inside or outside, in a shop or at a job site. Most shops have adequate lighting, ventilation, and machinery safeguards, but may be unheated, oily, greasy, and noisy. At job sites, work may be done from high ladders and scaffolding or in confined areas. Sheet Metal Workers usually work a 40-hour week.

Will This Job Fit Me?

The job of Sheet Metal Worker may appeal to those who enjoy working independently outdoors performing physical activities. Sheet Metal Workers should also have mechanical and mathematical aptitude and good reading skills.

What Wages and Benefits Can I Expect?

The median wage in 2017 for Sheet Metal Workers in California is \$56,877 annually, or \$27.34 hourly. The median is the point at which half of the workers earn more and half earn less.

[Change to Hourly Wages \(javascript:switchwage\(\);\)](#)

Annual Wages for 2017	Low (25th percentile)	Median (50th percentile)	High (75th percentile)
California	\$39,562	\$56,877	\$77,586

Source: EDD/LMID [Occupational Employment Statistics Survey, 2017](#)
(<http://www.labormarketinfo.edd.ca.gov/data/wages.html>) Wages do not reflect self-employment.

[View Wages for All Areas](#)
([javascript:GenericOpen\('ALLOESWage.aspx','472211'\);](#))

Benefits generally include medical, dental, life, and vision insurance as well as vacation, sick leave, and retirement plans. Those who are self-employed are responsible for purchasing their own insurance and retirement plans.

What is the Job Outlook?

Ensure you're using the current version of this form by downloading a fresh copy from [the CCC webpage!](#)

FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course.

In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: NCEL 447

Course Title: ADVANCED VOCABULARY DEVELOPMENT FOR READING & WRITING

Catalog Description:

Expansion of academic vocabulary to meet the specific vocabulary needs for students in an academic setting. Multiple exposures to target words in meaningful contexts and rich information about each word.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

It is for a course that is being converted from credit to non-credit.

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course provides help for ESL students to increase their active and passive English vocabulary. This can benefit those students who will move on to a four-year college or for those who want improve their chances for employment.

***NOTE:** Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional*

content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

There is growing demand for basic, affordable ESLL courses in our service area. This course is part of a developing non-credit path to the ESLL credit program. This non-credit curriculum serves to prepare students for college level work in ESLL.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

- The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5
- This is a non-degree applicable credit course (specify which one, below)
- non-degree applicable basic skills course
- course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)
- pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

- This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

- The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Richard Morasci **Date:** 6-21-17

Division Curriculum Representative: Benjamin Armerding **Date:** 6/23/17

Date of Approval by Division Curriculum Committee: 6/23/2017

College Curriculum Co-Chairperson: _____ **Date:** _____

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Language Arts

NCEL 447 ADVANCED VOCABULARY DEVELOPMENT FOR READING & WRITING

[Edit Course Outline](#)

NCEL 447 ADVANCED VOCABULARY DEVELOPMENT FOR READING & WRITING Summer 2018
36 hours total. 0 Units

Repeatability -

Statement: Unlimited Repeatability.

Criteria: There is a variety of textbooks that can be used for this course, and each book will present a different vocabulary list for the students to learn.

Status -

Course Status: Active **Grading:** No Credit
Degree Status: Non-Applicable **Credit Status:** Non-Credit
Degree or Certificate Requirement: Stand Alone Course
Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:
Transferability: **Validation:** 12/11/09; 6/6/17

Division Dean Information -

Seat Count: 25 **Load Factor:** .045 **FOAP Code:** 114000123041493084

Instruction Office Information -

FSA Code: 1300 - ESL
Distance Learning: no
Stand Alone Designation: yes
Program Title:
Program TOPs Code:

Program Unique

Code:

Content Review

Date:

Former ID: Formerly: ESL 177, ESLL 247

Need/Justification -

This course allows students to increase and develop their English vocabulary. In reading, writing, and grammar classes there is usually not enough time devoted to an expansion of the active and passive vocabulary of ESL students. This course focuses not only on a vocabulary item but also words related to that item, different grammatical forms of that item, and affixes that the word might have. This course is also in response to students who have been asking for a vocabulary course so that they could systematically increase their vocabulary.

1. Description -

Expansion of academic vocabulary to meet the specific vocabulary needs for students in an academic setting. Multiple exposures to target words in meaningful contexts and rich information about each word.

Prerequisite: None

Co-requisite: None

Advisory: Intended for students whose native language is not English.

2. Course Objectives -

The student will be able to:

- A. Acquire new vocabulary from the Academic Word List.
- B. Retain newly acquired vocabulary from the Academic Word List.
- C. Use an English-English dictionary and thesaurus to expand understanding of vocabulary.

3. Special Facilities and/or Equipment -

None.

4. Course Content (Body of knowledge) -

- A. Acquire new vocabulary.
 - 1. Complete word family charts.
 - 2. Recognize roots and affixes.
 - 3. Recognize collocations.
 - 4. Use context clues to learn meaning.
- B. Retain newly-acquired vocabulary.
 - 1. Use vocabulary correctly in vocabulary exercises.
 - 2. Use new vocabulary correctly in sentences, paragraphs, short compositions, and short responses to comprehension questions.
- C. Use an English-English dictionary and thesaurus to expand understanding of vocabulary.
 - 1. Develop facility to access all linguistic information about targeted vocabulary in English-English dictionaries.
 - 2. Choose the correct meaning of a word with multiple meanings.
 - 3. Identify synonyms and antonyms.

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Activities such as matching, completion, true/false, multiple choice, or short definitions.
- B. Activities involving original sentences and/or short compositions utilizing new vocabulary.

7. Representative Text(s) -

Instructors must choose a textbook from the list below. If, however, a faculty member would prefer to use a textbook not on the list, he or she must contact a full-time faculty member who regularly teaches the course to explain how the adoption would serve to achieve the learning outcomes specified in the course outline of record.

Bull, Pat. Academic Word Power 3. New York: Houghton Mifflin, 2004.

Jones, Barbara. Academic Word Power 4. New York: Houghton Mifflin, 2004.

OR

The following four editions of the Inside Reading series may be rotated in sequence:

Burgmeier, Arline. Inside Reading: the Academic Word List in Context 1. New York: Oxford University Press, 2012.

Zwier, Lawrence. Inside Reading: the Academic Word List in Context 2. New York: Oxford University Press, 2012.

Rubin, Bruce. Inside Reading: the Academic Word List in Context 3. New York: Oxford University Press, 2012.

Richmond, Kent. Inside Reading: the Academic Word List in Context 4. New York: Oxford University Press, 2012.

Although these texts are older than the suggested "5 years or newer" standard, they remain seminal texts in this area of study.

8. Disciplines -

English as a Second Language

9. Method of Instruction -

Lecture.

10. Lab Content -

Not applicable.

11. Honors Description - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

A. Readings from the text and outside sources.

B. Writing sentences and paragraphs to practice using new vocabulary.

Ensure you're using the current version of this form by downloading a fresh copy from [the CCC webpage!](#)

FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course.

In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: THTR 46C

Course Title: THEATRE DEVELOPMENT WORKSHOP III

Catalog Description:

Delves into the full development of an organic, original production from inception to performance. Students will produce a full-length production consisting of several student-generated short plays. Focus on design, directing and production coordination of all artistic elements of the show. Student responsibilities may extend to additional areas of acting and other production support. The quarter culminates with several public performances.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. **Primary:** offer academic and vocational instruction at the lower division level; and
2. **Primary:** to advance California's economic growth and global competitiveness through education, training, and services that contribute to continuous work force improvement.
3. **Secondary:** provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

This course provides basic skills and techniques, and career preparation in writing, acting, designing and directing. In turn, it provides academic and vocational instruction in performance, design and leadership work for the stage, and advances California's economic growth and global competitiveness through education, training, and services that contribute to continuous work force improvement in not only theatrical venues, but a multitude of workplace environments.

NOTE: Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

The course is degree applicable and transferable to UC and CSU programs (ASSIST report attached).

Acting, writing, designing and directing jobs are abundantly available, locally as well as globally. Paid stage work ranges from stipend-based community theatres to weekly salaried equity contracts. All learned and practiced skills are an imperative foundation for television and film work, which provides an even greater amount of paid available work.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

JB The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5

JB This is a non-degree applicable credit course (specify which one, below)

JB non-degree applicable basic skills course

JB course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)

JB pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

JB This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

Ensure you're using the current version of this form by downloading a fresh copy from [the CCC webpage!](#)

JB The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Janis Bergmann **Date:** 6/8/17

Division Curriculum Representative: Mark Anderson **Date:** 6/12/17

Date of Approval by Division Curriculum Committee: 6/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

INDICATES NEW COURSES OR CHANGES FOR 16-17

Course	Title	IGETC Quarter Area	Units	UC Area
This agreement lists courses transferable for unit credit at all UC campuses. It is based on information from the 2015-16 catalog and is valid for the current academic year listed at the top of this agreement. Courses marked with "UC-" will satisfy the five areas of the 1998 transfer course requirements. (E = English, M = Math, H = Humanities, B = Behavioral and Social Sciences, S = Biological and Physical Sciences)				

IMPORTANT INFORMATION ABOUT UC'S TRANSFERABLE COURSE AGREEMENTS**Variable Topics Courses**

These courses are also called "Independent Studies", "Special Studies", "Special Topics", "Field Work", etc.. Credit for variable topics courses is given only after a review of the scope and content of the course by the enrolling UC campus. This usually occurs after transfer and may require recommendations from faculty. Information about internships may also be presented for review, but credit for internships rarely transfers to UC. UC does not grant credit for variable topics courses in Journalism, Photography, Health, Business Administration, Architecture, Administration of Justice (Criminology) or Library Departments because of credit restrictions in these areas.

Courses listed on the transcripts with an "S" suffix are the first half of the course; a "T" suffix indicates the second half of the course.

Honors Course Credit Limitation

Duplicate credit will not be awarded for both the honors and regular versions of a course. Credit will only be awarded to the first course completed with a grade of C or better.

Course Repeatability

An "ea" after the unit value of a course on this agreement is meant to indicate that the course may be repeated for credit under CCC campus policies. Since campus policies on repeatability vary, the "ea" indicator does not guarantee that UC will grant credit for every course that appears multiple times on a student's transcript.

==== Theatre Arts ====

THTR 1	Introduction to Theater	3A	4	UC-H
THTR 2A	History of Dramatic Literature-Classical to Shakespeare	3A	4	UC-H
THTR 2B	History of Dramatic Literature-Moliere to Modern	3A	4	UC-H

INDICATES NEW COURSES OR CHANGES FOR 16-17

Course	Title	IGETC Area	Quarter Units	UC Area
Theatre Arts (continued)				
THTR 2F	History of American Musical Theatre	3A	4	UC-H
	Same as: MUS 2F			
THTR 7	Introduction to Directing		4	
THTR 8	Multicultural Mosaic of Performing Arts in America	3A	4	UC-H
THTR 12A	Stage and Screen	3A	4	
THTR 20A	Acting I		4	
THTR 20B	Acting II		4	
THTR 20C	Acting III		4	
THTR 21A	Scenery and Properties Construction		4	
THTR 21B	Intermediate Scenery and Properties Construction		4	
THTR 21C	Fundamentals of Theatre Production		4 ea	
THTR 25	Introduction to Fashion and Costume Construction		4	
THTR 25B	Fashion & Costume Construction II		4	
THTR 25C	Fashion & Costume Construction III		4	
THTR 26	Introduction to Fashion History & Costume Design	3A	4	UC-H
THTR 27	Lighting Design & Technology		4	
THTR 31	Introduction to Theatre and Production Management		4	
THTR 32	CAD Drafting for the Theatre, Film and Television		4	
THTR 38D	Stage Combat		2	
THTR 40A	Basic Theatrical Make-Up		4	
THTR 40B	Theatrical Make-Up for Production		4	
# THTR 42	Introduction to Theatre Design		4	
	(Formerly "Introduction to Scene Design" prior to SU16)			
THTR 43A	Script Analysis		4	

INDICATES NEW COURSES OR CHANGES FOR 16-17

Course	Title	IGETC Area	Quarter Units	UC Area
Theatre Arts (continued)				
THTR 43C	Foundations in Classical Acting		6	
THTR 43E	Improvisation		4	
THTR 44A	Production Projects I		4	
THTR 45A	Technical Theatre in Production I		4	
THTR 45B	Technical Theatre in Production II		4	
THTR 45C	Technical Theatre in Production III		4	
THTR 45D	Technical Theatre in Production IV		4	
THTR 45E	Technical Theatre Management in Production		6	
THTR 45F	Technical Theatre Management in Production II		6	
THTR 46A	Theatre Development Workshop I		2	
THTR 46B	Theatre Development Workshop II		2	
THTR 46C	Theatre Development Workshop III		2	
THTR 46D	Theatre Development Workshop IV		2	
THTR 47A	Introduction to Musical Theatre Production		3	
THTR 47B	Intermediate Music Theatre Production Workshop		6	
THTR 47C	Advanced Music Theatre Production Workshop		6	
THTR 47D	Advanced Music Theatre Production Workshop - II		6	
THTR 48A	Vocal Production and Speech		4	
THTR 48B	Singing Technique for Musical Theatre		4	
THTR 48C	Musical Theatre Repertoire for Singers		4	
# THTR 48D	Musical Theatre Repertoire for Singers II		4	

Effective SU17

INDICATES NEW COURSES OR CHANGES FOR 16-17

Course	Title	IGETC Area	Quarter Units	UC Area
Theatre Arts (continued)				
THTR 49A	Performance Production I		6	
THTR 49B	Performance Production II		6	
THTR 49C	PerformanceProduction III		6	
THTR 49D	Performance Production IV		6	

END OF REPORT

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Fine Arts and Communication

THTR 46C THEATRE DEVELOPMENT WORKSHOP III

[Edit Course Outline](#)

THTR 46C

THEATRE DEVELOPMENT WORKSHOP III

Summer
2015

1 hour lecture, 3 hours laboratory.

2 Units

Total Contact Hours: 48

(Total of All Lecture and Lab hours X 12)

Total Student Learning Hours: 72

(Total of All Lecture, Lab and Out of Class hours X 12)

Lecture Hours: 1

Lab Hours: 3

Weekly Out of Class Hours: 2

Note: If Lab hours are specified, the *item 10. Lab Content* field must be completed.

Repeatability -

Statement:

Not Repeatable.

Status -

Course Status: Active

Grading: Letter Grade with P/NP option

Degree Status: Applicable

Credit Status: Credit

Degree or Certificate Requirement: AA Degree

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability: UC/CSU

Validation: 11/26/12; 10/01/13

Division Dean Information -

Seat Count:
35

Load Factor:
.059

FOAP Code:
114000143101100700

Instruction Office Information -

FSA Code: 1000 - DRAMA/THEATER ARTS

Distance Learning: no

Stand Alone Designation: no

Program Title: Theatre Arts

Program TOPs Code: 100700

Program Unique Code: 06047

Content Review Date: 0000-00-00

Former ID:

Need/Justification -

This course is a support course for the AA degree in Theatre Arts.

1. Description -

Delves into the full development of an organic, original production from inception to performance. Students will produce a full-length production consisting of several student-generated short plays. Focus on design, directing and production coordination of all artistic elements of the show. Student responsibilities may extend to additional areas of acting and other production support. The quarter culminates with several public performances.

Prerequisite: None

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. substantially develop skills applicable to the artistic development of original new works for theatrical production.
- B. practice advanced skills necessary to present a theatrical production for an audience.
- C. participate in and substantially improve skills in multiple areas of theatre production

3. Special Facilities and/or Equipment -

- A. A building with an unobstructed, flat floor approximately 30' x 40', as well as additional classroom spaces for rehearsals.
- B. Access to and use of simple furniture and set pieces, as well as minimal props and costume pieces.
- C. A studio theatre performance space with seating for approximately 100 people.
- D. Access to approximately 100 folding chairs and portable platforms for potential outdoor performances.

4. Course Content (Body of knowledge) -

- A. Participate in the development and direction of original scripts and required design elements for production.
 - 1. Contribute to the casting and organizational needs of the production.
 - 2. Effectively communicate identified relevant, topical, contemporary themes and issues through direction and design of visual elements.
- B. Fully realize and prepare a viable performance product for public audience as the culmination of the terms' process.
 - 1. Coordinate and manage sufficient and effective rehearsal time
 - 2. Coordinate prop, costume, set, and lighting needs for production
- C. In addition to directing and designing, each student of the class may work in multiple capacities on the production, including acting and other production support.
 - 1. Meet all deadlines for script analysis, designs, and rehearsal and performance needs.
 - 2. Manage multiple job capacities
 - 3. Substantially develop performance and production skills

5. Repeatability - Moved to header area.

6. Methods of Evaluation -

- A. Students' work will be evaluated on the basis of quality and consistency of contribution to the

ensemble process.

- B. Students' fulfillment of assigned roles necessary to complete the cooperative task of producing the performance.
- C. Students will be evaluated on strength of progressive growth and development during the term.
- D. Several public performances of the production will be presented. The quality of written work and performances will be discussed individually with the student and during group critiques and evaluations.

7. Representative Text(s) -

Scripts generated by the class.

8. Disciplines -

Theatre Arts

9. Method of Instruction -

Lecture, Discussion, Cooperative learning exercises, Oral presentations, Laboratory.

10. Lab Content -

- A. Cooperative development and rehearsal of student created plays.
- B. Student individual responsibility in contributing to the coordination of the entire program into performance ready entity.
- C. Scheduled technical rehearsals and public performance time.

11. **Honors Description** - No longer used. Integrated into main description section.

12. Types and/or Examples of Required Reading, Writing and Outside of Class Assignments -

- A. Development contributions to the writing of viable, performable short plays
- B. Group and individual reading of student written work

Course status: *Active*

Development status: Approved

Owner-Editor: bergmannjanis@foothill.edu

Edit History:

Comments:

Last updated: 2015-03-03 11:14:40

THTR 46C THEATRE DEVELOPMENT WORKSHOP III

[Edit Course Outline](#)

Current Course Outline Editor

[Return to Administration](#)

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FOOTHILL COLLEGE Stand-Alone Credit Course Approval Request

If a Foothill credit course is **NOT** part of a State approved associate's degree, certificate of achievement or the Foothill College GE Pattern, it is considered by the State to be a "Stand Alone Course." Per Title 5, local curriculum committees must review and approve proposed stand-alone courses to ensure that they are consistent with credit course standards (§55002), the community college mission and there is sufficient need and resources for the course.

In short, the State wants us to deliberate carefully before adding a course that does not help students complete a degree or certificate. If it doesn't help them complete a State approved program of study, why are we offering the course?

Stand Alone Course Approval Requests should be completed and forwarded to your Division Curriculum Committee to begin the approval process. To be compliant with State regulations, there must be a completed, approved Stand Alone Form on file in the Office of Instruction.

Course #: THTR 46D

Course Title: THEATRE DEVELOPMENT WORKSHOP IV

Catalog Description:

Presentation of the necessary leadership and organizational skills for the full development of an organic, original production from inception to performance. Advanced students will be charged to produce a full-length production consisting of several student-generated short plays. Student responsibilities will extend to the areas of group coordination and organization in writing, acting, directing, lighting design, costume design, scenery and properties design, sound design, stage management and technical responsibilities, make-up design and publicity. The quarter culminates with several public performances.

Are you requesting Stand Alone Approval for the course on a temporary or permanent basis?

- The course will be **permanently** Stand Alone; there are no plans to add it to a State approved degree or certificate of achievement, nor to the Foothill GE pattern
- The course will only be Stand Alone **temporarily**, and it will be incorporated into a new degree or certificate of achievement that is not yet State approved. In this case, identify the degree/certificate to which the course will be added:

- What is the specific timeline for program application/approval? (e.g., is your program application locally approved, or is it still in development and if so, what is your anticipated submission date?)

***NOTE:** If you have not submitted your program application to the State by the end of the current academic year, you must reapply for permanent Stand Alone approval.*

The Curriculum Committee must evaluate this application based on the following five criteria:

Criteria A. Appropriateness to Mission

California Education Code §66010.4 identifies the two primary missions for California Community Colleges, and one secondary mission that pertains to credit coursework:

1. Primary: offer academic and vocational instruction at the lower division level; and
2. Primary: to advance California's economic growth and global competitiveness through education, training, and services that contribute to continuous work force improvement.
3. Secondary: provision of remedial instruction for those in need of it and, in conjunction with the school districts, instruction in English as a second language, and support services which help students succeed at the postsecondary level.

Briefly explain how this course is consistent with one (or more) of these missions:

Provides academic and vocational instruction in organization and leadership skills in the theatrical workplace. In turn, it advances California's economic growth and global competitiveness through education, training, and services that contribute to continuous work force improvement in not only theatrical venues, but a multitude of workplace environments.

***NOTE:** Courses must address a valid transfer, occupational or basic skills purpose rather than primarily a vocational or recreational purpose. Courses must not provide only an activity or service without instructional content (e.g., assistive or therapeutic activity, use of college facilities or resources without specific instructional objectives, or assessment testing).*

Criteria B. Need

A course may only be granted Stand Alone Approval if there is demonstrable need for the course in the college service area.

If you identified your course as intending to meet the CCC mission of preparation for **transfer**, we must demonstrate that the course is transferable. **Please attach the ASSIST documentation** to this application. (Ask the Articulation Officer for assistance if necessary.)

The course is degree applicable and transferable to UC and CSU programs (ASSIST report attached).

Leadership rolls and jobs in theatre are available locally as well as globally. Paid stage work ranges from stipend-based community theatres to weekly salaried equity contracts. All learned and practiced skills are integral for many positions in television and film work, which provides an even greater amount of paid available work.

For courses that are **primarily occupational**, or that respond to economic development interests, need must be demonstrated within the service area of the college. Examples of the types of evidence of occupational need that may be submitted include:

- Statistical projections of growth in specific jobs by county (or labor market area) from the Employment Development Department's Labor Market Information system
- Employer surveys
- Industry studies
- Regional economic studies
- Letters from employers
- Minutes of industry advisory committee meetings
- Job advertisements, from newspapers or the Internet
- Newspaper or magazine articles on industry or employment trends
- Studies or data from licensing agencies or professional associations

Please attach appropriate evidence to this application form.

Criteria C. Curriculum Standards (please initial as appropriate)

JB ___ The outline of record for this course has been approved the Division Curriculum Committee and meets the requirements of Title 5

JB ___ This is a non-degree applicable credit course (specify which one, below)

JB ___ non-degree applicable basic skills course

JB ___ course to enable students to succeed in degree-applicable credit courses (e.g., college orientation and guidance courses, discipline-specific preparatory courses)

JB ___ pre-collegiate career technical preparation course to provide foundation skills for students preparing for entry into degree-applicable credit courses

Criteria D. Adequate Resources (please initial as appropriate)

JB ___ This course will be administered in the same manner as existing courses in terms of funding, faculty, facilities and equipment

Criteria E. Compliance (please initial as appropriate)

Ensure you're using the current version of this form by downloading a fresh copy from [the CCC webpage!](#)

JB The design of the course is not in conflict with any law particularly in regard to enrollment restrictions and licensing or accreditation standards

Faculty Requestor: Janis Bergmann **Date:** 6/8/17

Division Curriculum Representative: Mark Anderson **Date:** 6/12/17

Date of Approval by Division Curriculum Committee: 6/12/17

College Curriculum Co-Chairperson: _____ **Date:** _____

INDICATES NEW COURSES OR CHANGES FOR 16-17

Course	Title	IGETC Quarter Area	Units	UC Area
This agreement lists courses transferable for unit credit at all UC campuses. It is based on information from the 2015-16 catalog and is valid for the current academic year listed at the top of this agreement. Courses marked with "UC-" will satisfy the five areas of the 1998 transfer course requirements. (E = English, M = Math, H = Humanities, B = Behavioral and Social Sciences, S = Biological and Physical Sciences)				

IMPORTANT INFORMATION ABOUT UC'S TRANSFERABLE COURSE AGREEMENTS**Variable Topics Courses**

These courses are also called "Independent Studies", "Special Studies", "Special Topics", "Field Work", etc.. Credit for variable topics courses is given only after a review of the scope and content of the course by the enrolling UC campus. This usually occurs after transfer and may require recommendations from faculty. Information about internships may also be presented for review, but credit for internships rarely transfers to UC. UC does not grant credit for variable topics courses in Journalism, Photography, Health, Business Administration, Architecture, Administration of Justice (Criminology) or Library Departments because of credit restrictions in these areas.

Courses listed on the transcripts with an "S" suffix are the first half of the course; a "T" suffix indicates the second half of the course.

Honors Course Credit Limitation

Duplicate credit will not be awarded for both the honors and regular versions of a course. Credit will only be awarded to the first course completed with a grade of C or better.

Course Repeatability

An "ea" after the unit value of a course on this agreement is meant to indicate that the course may be repeated for credit under CCC campus policies. Since campus policies on repeatability vary, the "ea" indicator does not guarantee that UC will grant credit for every course that appears multiple times on a student's transcript.

==== Theatre Arts ====

THTR 1	Introduction to Theater	3A	4	UC-H
THTR 2A	History of Dramatic Literature-Classical to Shakespeare	3B	4	UC-H
THTR 2B	History of Dramatic Literature-Moliere to Modern	3B	4	UC-H

INDICATES NEW COURSES OR CHANGES FOR 16-17

Course	Title	IGETC Area	Quarter Units	UC Area
Theatre Arts (continued)				
THTR 2F	History of American Musical Theatre	3A	4	UC-H
	Same as: MUS 2F			
THTR 7	Introduction to Directing		4	
THTR 8	Multicultural Mosaic of Performing Arts in America	3A	4	UC-H
THTR 12A	Stage and Screen	3A	4	
THTR 20A	Acting I		4	
THTR 20B	Acting II		4	
THTR 20C	Acting III		4	
THTR 21A	Scenery and Properties Construction		4	
THTR 21B	Intermediate Scenery and Properties Construction		4	
THTR 21C	Fundamentals of Theatre Production		4 ea	
THTR 25	Introduction to Fashion and Costume Construction		4	
THTR 25B	Fashion & Costume Construction II		4	
THTR 25C	Fashion & Costume Construction III		4	
THTR 26	Introduction to Fashion History & Costume Design	3A	4	UC-H
THTR 27	Lighting Design & Technology		4	
THTR 31	Introduction to Theatre and Production Management		4	
THTR 32	CAD Drafting for the Theatre, Film and Television		4	
THTR 38D	Stage Combat		2	
THTR 40A	Basic Theatrical Make-Up		4	
THTR 40B	Theatrical Make-Up for Production		4	
# THTR 42	Introduction to Theatre Design		4	
	(Formerly "Introduction to Scene Design" prior to SU16)			
THTR 43A	Script Analysis		4	

INDICATES NEW COURSES OR CHANGES FOR 16-17

Course	Title	IGETC Area	Quarter Units	UC Area
Theatre Arts (continued)				
THTR 43C	Foundations in Classical Acting		6	
THTR 43E	Improvisation		4	
THTR 44A	Production Projects I		4	
THTR 45A	Technical Theatre in Production I		4	
THTR 45B	Technical Theatre in Production II		4	
THTR 45C	Technical Theatre in Production III		4	
THTR 45D	Technical Theatre in Production IV		4	
THTR 45E	Technical Theatre Management in Production		6	
THTR 45F	Technical Theatre Management in Production II		6	
THTR 46A	Theatre Development Workshop I		2	
THTR 46B	Theatre Development Workshop II		2	
THTR 46C	Theatre Development Workshop III		2	
THTR 46D	Theatre Development Workshop IV		2	
THTR 47A	Introduction to Musical Theatre Production		3	
THTR 47B	Intermediate Music Theatre Production Workshop		6	
THTR 47C	Advanced Music Theatre Production Workshop		6	
THTR 47D	Advanced Music Theatre Production Workshop - II		6	
THTR 48A	Vocal Production and Speech		4	
THTR 48B	Singing Technique for Musical Theatre		4	
THTR 48C	Musical Theatre Repertoire for Singers		4	
# THTR 48D	Musical Theatre Repertoire for Singers II		4	

Effective SU17

INDICATES NEW COURSES OR CHANGES FOR 16-17

Course	Title	IGETC Area	Quarter Units	UC Area
Theatre Arts (continued)				
THTR 49A	Performance Production I		6	
THTR 49B	Performance Production II		6	
THTR 49C	Performance Production III		6	
THTR 49D	Performance Production IV		6	

END OF REPORT

For authorized use only

Fine Arts and Communication

THTR 46D THEATRE DEVELOPMENT WORKSHOP IV

[Edit Course Outline](#)

THTR 46D

THEATRE DEVELOPMENT WORKSHOP IV

Summer
2015

1 hour lecture, 3 hours laboratory.

2 Units

Total Contact Hours: 48

(Total of All Lecture and Lab hours X 12)

Total Student Learning Hours: 72

(Total of All Lecture, Lab and Out of Class hours X 12)

Lecture Hours: 1 **Lab Hours:** 3 **Weekly Out of Class Hours:** 2

Note: If Lab hours are specified, the *item 10. Lab Content* field must be completed.

Repeatability -

Statement: Not Repeatable.

Status -

Course Status: Active

Grading: Letter Grade with P/NP option

Degree Status: Applicable

Credit Status: Credit

Degree or Certificate Requirement: AA Degree

Foothill GE Status: Non-GE

Articulation Office Information -

C.I.D. Notation:

Transferability: UC/CSU

Validation: 11/26/12; 10/01/13

Division Dean Information -

Seat Count:
35

Load Factor:
.059

FOAP Code:
114000143101100700

Instruction Office Information -

FSA Code: 1000 - DRAMA/THEATER ARTS

Distance Learning: no

Stand Alone Designation: no

Program Title: Theatre Arts

Program TOPs Code: 100700

Program Unique Code: 06047

Content Review Date: 0000-00-00

Former ID:

Need/Justification -

This course is a restricted support course for the AA degree in Theatre Arts.

1. Description -

Presentation of the necessary leadership and organizational skills for the full development of an organic, original production from inception to performance. Advanced students will be charged to produce a full-length production consisting of several student-generated short plays. Student responsibilities will extend to the areas of group coordination and organization in writing, acting, directing, lighting design, costume design, scenery and properties design, sound design, stage management and technical responsibilities, make-up design and publicity. The quarter culminates with several public performances.

Prerequisite: None

Co-requisite: None

Advisory: None

2. Course Objectives -

The student will be able to:

- A. Participate in a leadership role: either as student leader of the entire project, or student coordinator in a specified area, or director of a group piece.
- B. Master skills applicable to all aspects of theatre production.
- C. Practically apply knowledge and skills directly into the discipline of theatre production.
- D. Coordinate production elements in multiple areas of theatre craft

3. Special Facilities and/or Equipment -

- A. A building with an unobstructed, flat floor approximately 30' x 40', as well as additional classroom spaces for rehearsals.
- B. Access to and use of simple furniture and set pieces, as well as minimal props and costume pieces.
- C. A studio theatre performance space with seating for approximately 100 people.
- D. Access to approximately 100 folding chairs and portable platforms for potential outdoor performances.

4. Course Content (Body of knowledge) -

- A. Take on a leadership role in one or more capacities on the production, including:
 1. overall production coordination
 2. theme planning and playwriting
 3. directing
 4. publicity
 5. design
 6. technical operation and management
- B. Master skill sets in a broad range of theatre production elements.
 1. Creative
 2. Technical
 3. Production
- C. Guide and lead fellow students toward presenting a fully prepared, viable performance product for public audience as the culmination of the terms' process.
 1. Choose relevant, topical, contemporary themes upon which to build a production
 2. Coordinate rehearsal and performance schedules
 3. Meet all deadlines for script submission, rehearsal preparation and design coordination.
- D. Supervise and coordinate production elements, including playwriting, directing, acting, design and technical requirements.
 1. Supervise the success and completion of all deadlines for production
 2. Monitor consistency of performance throughout the production run
 3. Act as liason between production and audience

5. **Repeatability** - Moved to header area.

6. **Methods of Evaluation** -

- A. Students' performance will be evaluated on the basis of quality and consistency of contribution to their chosen leadership role and the ensemble process.
- B. Students' fulfillment of assigned roles necessary to complete the cooperative task of producing the performance.
- C. Students will be evaluated on strength of progressive growth and development of organizational skills during the term.
- D. Several public performances of the production will be presented. The quality of performances will be discussed individually with the student and during group critiques and evaluations.

7. **Representative Text(s)** -

Scripts generated by the class.

8. **Disciplines** -

Theatre Arts

9. **Method of Instruction** -

Lecture, Discussion, Cooperative learning exercises, Oral presentations, Laboratory.

10. **Lab Content** -

- A. Cooperative rehearsal and development of student created plays.
- B. Student responsibility coordinating entire program into performance ready entity.
- C. Scheduled technical rehearsals and public performance time.

11. **Honors Description** - No longer used. Integrated into main description section.

12. **Types and/or Examples of Required Reading, Writing and Outside of Class Assignments** -

- A. Reading, writing and development of viable, performable short plays
- B. Group and individual reading and evaluation of student written work

Course status: *Active*

Development status: Approved

Owner-Editor: bergmannjanis@foothill.edu

Edit History:

Comments:

Last updated: 2015-03-03 11:14:52

THTR 46D THEATRE DEVELOPMENT WORKSHOP IV

[Edit Course Outline](#)

Current Course Outline Editor

[Return to Administration](#)

Foothill College 2016/17 Non-Transcriptable Certificate

Division	Certificate Title	# Awarded
APPR	Refrigeration & Air Conditioning	9
	Residential Electrician	9
	Sound & Comm. Installer	50
	<u>Total Awarded:</u>	<u>68</u>
BH	Mammography	22
	Venipuncture	21
	Online Vet Assisting	9
	Coronal Polishing	14
	Pit & Fissure Seal	14
	X-Ray	14
	EMT	162
	<u>Total Awarded:</u>	<u>256</u>
BSS	Early Childhood Education	2
	Infant Toddler Development	1
	School-Age Child Care	1
	Inclusion & Chld Spc Needs	5
	Bookkeeping	10
	Financial Accounting	6
	Tax Accounting	3
	CPA Examination Preparation (Ca. Tax Education Council Cert)	144
	Enroll Agent Prep	3
	Payroll Prep	9
	Tax Specialist	2
	<u>Total Awarded:</u>	<u>186</u>

Foothill College 2016/17 Non-Transcriptable Certificate

FA

Communication Studies Cert Prof	57
Communication Studies Cert Spc	30
Garment Printing	1
GID Illustration Skills	5
Graphic Design Skills Certificate	1
Music Business	2
Electronic Music	2
Songwriting	1
Photo Criticism	1
Actor Training	9
<u>Total Awarded:</u>	<u>109</u>

PSME

Biomedical Devices	9
Nanocharacterization	1
Nanofabrication	1
Mobile Applications	1
<u>Total Awarded</u>	<u>12</u>

Total 2016/17 Certificates Awarded: **631**

FOOTHILL COLLEGE
Credit Program Narrative
Certificate of Achievement in Landscape Technician

Item 1. Program Goals and Objectives

The goal of the Certificate of Achievement in Landscape Technician is to provide instruction and field practice in the establishment and maintenance of landscapes, particularly landscapes in public areas. Students will receive instruction in identification of soil issues, safe equipment operation, plant problems, pruning, planting, fine gardening, plant fertilization and care and disposal of materials. The program will emphasize sustainable approaches to fine gardening where applicable. The program is consistent with the mission of community colleges in that is prepared to establish entry level career education to the following career choices:

- Grounds maintenance
- Parks maintenance
- Fine gardening
- Greens keeper

The primary program objective is for students to be able to safely, effectively and esthetically establish and maintain public landscapes. Specific program objectives are as follows:

- Develop good work place basic skills
- Identify horticultural problems and solutions
- Identify, install and care for landscape plant material
- Demonstrate knowledge of plant anatomy and physiology
- Identify soil characteristics
- Demonstrate how to adjust soil characteristics for optimum growth
- Arrange elements of the landscape
- Practice and achieve proficiency in the safe handling of various landscape maintenance equipment, including hand tools and power equipment.
- Practice methods for disposing of landscape waste
- Construct landscape elements
- Demonstrate an understanding of practices for implementing and maintaining landscapes

Program Learning Outcomes:

- Maintain, design or build public and private landscapes.
- Successfully perform basic horticultural skills.

Item 2. Catalog Description

The Certificate of Achievement in Landscape Technician is a low unit certificate to be conducted in partnership with academic organizations seeking credentials for students in a field-based program. The program is designed to provide enrollees engaged in a hands-on learning experience an opportunity to use their field experience combined with classroom instruction to obtain a certificate that will aid in their employment after completion of their school experience. Students may be enrolled in a variety of academic programs in order to qualify for participation in this certificate. Career options for this certificate include grounds and parks maintenance worker, fine gardener, greenskeeper, landscape design assistant, and landscape construction laborer.

Item 3. Program Requirements

Requirements	Crse #	Name	Units	Sequence
Core Courses (8 Units)	HORT 80A	Environmental Horticulture Fall Skills	2	Year 1, Fall
	HORT 80B	Environmental Horticulture Winter Skills	2	Year 1, Winter
	HORT 80C	Environmental Horticulture Spring Skills	2	Year 1, Spring
	HORT 80D	Environmental Horticulture Summer Skills	2	Year 2, Summer
Restricted Electives (select 10 Units)	HORT 10	Environmental Horticulture & the Urban Landscape	5	As scheduled (all courses)
	HORT 15	Orientation to Environmental Horticulture	4	
	HORT 21	Plant Materials I	3	
	HORT 22	Plant Materials II	3	
	HORT 23	Plant Materials: California Native Plants	2	

HORT 24	Plant Materials: Ground Covers & Vines	2	
HORT 25	Plant Materials: Bamboos & Palms	2	
HORT 26	Plant Materials: Perennials & Annuals	2	
HORT 30	Horticultural Practices: Soils	3	
HORT 31	Horticultural Practices: Plant Propagation	3	
HORT 40	Landscape Design: Graphic Communication	4	
HORT 43	The Timeless Garden	3	
HORT 45	Vectorworks for Landscape Designers	3	
HORT 52C	Horticulture Practices: Plant Installation & Maintenance	3	
HORT 52E	Horticultural Practices: Greenhouse & Nursery Management	3	
HORT 52G	Horticultural Practices: Turfgrass Management	3	
HORT 52H	Horticulture Practices: Integrated Pest Management	3	
HORT 54A	Landscape Construction: General Practices	4	
HORT 54B	Landscape Construction: Technical Practices	3	
HORT 54C	Landscape Construction: Irrigation Practices	3	
HORT 54D	Landscape Construction: Applied Practices	2	
HORT 54J	Horticultural Practices: Insect Identification	2	
HORT 54K	Horticultural Practices: Weed Identification	2	
HORT 55A	Green Industry Management: Business Practices	3	
HORT 60B	Landscape Design: Theory	3	
HORT 60C	Landscape Design: Irrigation	3	
HORT 60D	Landscape Design: Planting	3	
HORT 60F	Landscape Design: Process	3	
HORT 60G	Landscape Design: Intermediate Computer Applications	3	
HORT 60J	Sketchup for Landscape Designers	3	
HORT 90A	Container Plantings in the Landscape	1	
HORT 90C	Garden Ponds & Water Features	1	
HORT 90D	Herbs: Identification, Use & Folklore	1	
HORT 90E	Horticultural & Landscape Photography	1	
HORT 90F	Landscape Design: Basic Principles	1	
HORT 90G	Landscape Design Forum	1	
HORT 90H	Landscape Lighting	1	
HORT 90I	Landscape Sustainability Practices	1	
HORT 90K	Landscaping with Edibles	1	
HORT 90L	Plant Propagation: Basic Skills	1	
HORT 90M	Plant Nutrition & Fertilization	1	
HORT 90N	Plant Materials: Fall Color	1	
HORT 90P	Pruning: Basic Skills	1	
HORT 90Q	Residential Irrigation Systems	1	
HORT 90S	Sustainable Integrated Pest Management (IMP)	1	
HORT 90U	Landscape Design: Perspective Sketching	1	
HORT 90V	Sustainable Organic Gardening	1	
HORT 90X	Water Conservation in Landscape Design	1	
HORT 90Y	Cacti & Succulents	1	
HORT 90Z	Ornamental Grasses	1	
HORT 91A	Composting Theory & Techniques	1	
HORT 91C	Construction Cost Estimating	1	
SPAN 110	Elementary Spanish Conversation I	3	
VITI 90B	Vineyard Establishment	2	
VITI 90C	Vineyard Management	2	
VITI 90D	Vine Pruning	1	

TOTAL UNITS 18 units

Proposed Sequence:

Year 1, Fall = 4 units

Year 1, Winter = 6 units

Year 1, Spring = 6 units

Year 2, Summer = 2 units

TOTAL UNITS: 18 units

(Sequence of courses repeat every year, students may start and exit at any point)

Item 4. Master Planning

One of the primary goals of Foothill College (and the Foothill DeAnza District) is the development of programs that support Career Technology Education goals. That statement is confirmed by the following excerpt from the Foothill-DeAnza Strategic Plan 2017-2023:

Strategic Priority #4: Career goals Key mission statement terms relative to strategic priority #4: (Mission) Student Success (Fosters) Innovation (Meeting) Career goals (Who we serve) Diversity (Developing) Broadly educated community (Developing) Socially responsible community

Student success can mean many things. For many at the community college, success comes in the form of professional development to advance one's career, earning a Career Technology Education (CTE) certificate or degree, and/or completing an academic pathway that leads to a four-year degree in the professional field of their choice. Consequently, FHDA places a priority in understanding the professional needs of its community as well as support in achieving their professional goals.

Goals:

CG 4.1: Partner with business and industry within the region to prepare students for the workforce. CG 4.2: Increase employment rates for CTE participants.

The Certificate of Achievement in Landscape Technician is intended to address a specific need for employment within our region, landscape workers who have experience but also have an introductory level of formal education. Foothill College, along with other colleges in the service area, offers AS degrees and high-unit certificates (40 to 80 units). The existence of these programs serves both as an opportunity and a barrier. For those with the means and preparation, obtaining such a degree provides the chance to be promoted from labor positions to management positions. The barrier appears when the prospective student cannot afford the cost and time to attend up to two years of courses. Additional barriers are created when courses are offered, but offered during hours the student must work and at locations long distances from the student's home.

The most recent program review for Horticulture (2016-17) indicates a large and growing percentage of the Foothill College Horticulture students are of Latino/a descent. This demographic is also the primary group that suffers from time/money challenges to attend courses. Employment for this group continues to be good, as it is a dominant portion of the landscape industry employment. Latino/a students often enroll in the Horticulture program, only to drop out due to job opportunities or the need to work to support themselves and family. Creation of an intermediate level of academic achievement allows this groups of students the opportunity to obtain credentials without having to dedicate long periods of time to schooling and may also serve as a bridge to these students completing more advanced degrees.

Item 5. Enrollment and Completer Projections

It is anticipated that approximately 10 to 15 students will choose the Certificate of Achievement in Landscape Technician when established, with that number significantly higher if relationships with other organizations are established. There are current discussions being undertaken by Foothill College Apprenticeship division to establish a program for CTE based programs and schools in the south bay area. Students who are enrolled in a qualified sponsor organization may qualify to concurrently enroll in the Foothill College program. The program can be administered in cohorts of approximately 30 students, with enrollments being offered each year. Of this number, we anticipate between 25 and 28 of the enrollees will complete the program of study in the first year, with similar success numbers after 5 years of the program.

Course #	Course Title	Year 1		Year 2	
		Annual Sections	Annual Enrollment	Annual Sections	Annual Enrollment
HORT 80A	Environmental Horticulture Fall Skills	1	27	1	27
HORT 80B	Environmental Horticulture Winter Skills	1	26	1	27
HORT 80C	Environmental Horticulture Spring Skills	1	27	1	17
HORT 80D	Environmental Horticulture Summer Skills	1	33	1	20
Restricted Electives	Varies	25	450 total	25	450 total
Short Courses (1 unit)	Varies	8	175 total	10	225 total

Item 6. Place of Program in Curriculum/Similar Programs

Foothill College currently has a program in Environmental Horticulture & Design that offers a Certificate of Achievement (65 units) and an Associate in Science degree (90 units). There is no certificate with this title in the program or school curriculum. Reviewing the college curriculum shows:

- No active inventory records will require inactivation.
- The program does not replace any existing program.
- The closest related programs are the Certificated of Achievement and the AS in Environmental Horticulture and Design.

**Item 7. Similar Programs at Other Colleges in Service Area
(Full program descriptions and curriculum are in Appendix A)**

Within the Foothill College service area there are four other community colleges that offer Horticulture programs, each offering AS degrees and one or more certificates. The certificates offered at these four colleges range from 17 units to 41 units and provide a general focus on a range of Horticulture-related topics. While other certificates exist, this Certificate of Achievement in Landscape Technician is a compact, low-unit, lab and field based curriculum intended to provide balance of classroom learning with practical experience. Programs at other area colleges provide a general Horticultural background but are heavy in units (in most programs) and minimal in courses that put the student into field situations to obtain experience. This program has the advantage of being offered as designed to organizations interested in creating internship programs or apprenticeships. Another difference between this program and other colleges is the proximity to the bulk of the south bay population. The program is designed, in part, to serve local students who may not have the ability to travel 40 miles or longer distances to another school. Foothill College is also capable of offering the program at remote sites hosted by a partner interested in the program.

The schools, and their certificate program, closest to this Certificate of Achievement in Landscape Technician include:

City College of San Francisco (32 unit is landscape maintenance)

This certificate compares to the proposed Foothill certificate in that students are preparing for employment in the landscape maintenance field with a focus on landscape gardening. The curriculum is more extensive in coursework than the proposed Foothill curriculum and includes plant identification and business related courses. The Foothill program will be more lab focused on the maintenance of plant materials and shorter in duration, and more easily adapted to programs seeking apprenticeship relationships.

Merritt College, Oakland (41 unit certificate in landscape and parks maintenance)

This certificate compares to the proposed Foothill certificate in that students are being directed towards careers in parks and grounds. The program is very extensive in required coursework with courses in pest identification and management and arboriculture. The Foothill certificate is, again, shorter and more lab oriented with extensive field experience.

Cabrillo College, Aptos (17 unit certificate in general Horticultural skills)

The program at Cabrillo is the closest to the Foothill proposal in length (17 units vs. 18 units) and includes courses focused on crop production and pest management. The only course identified as providing field experience is a 1 unit work experience course. As with the other related programs, the Cabrillo course is heaviest in the classroom experience and minimal in field/lab experience. Cabrillo's certificate is also one that is generally focused rather than specifically targeting the maintenance aspect of the field.

Mt. Diablo College, Pleasant Hill (24.5 unit certificate in landscape construction and management)

Mt. Diablo's certificate provides some opportunity for lab/field work (up to 4 units), but is more focused on turf, plant id, and construction related courses. Mt. Diablo would also be a considerable distance (70 miles) for local students to commute to work on their certificate.

Research was also done in an attempt to find within the service area alternative programs, including those based on internships or apprenticeships, that might offer programs similar to the Foothill proposal. The only related program is a Landscape Technician program offered in San Ramon, CA, operated by a labor based organization. They currently do not display any agreements or show any history of landscape related contracts. The full list of apprenticeship programs is included in Appendix B.

Appendix A Landscape Certificate and Associate Degrees in the Bay Area

Environmental Horticulture **City College of San Francisco** **40 miles**
50 Phelan Avenue
San Francisco, CA 94112

(32 unit certificate in landscape maintenance, AS in landscape gardening and contracting)

The program of study for this certificate is designed to give students both broad and specialized training for entry level employment or to add to their capabilities in landscape maintenance.

Course Units

Required courses:

- O H 50 Introduction to Environmental Horticulture 3.00
 - O H 56 Horticultural Machines 3.00
 - O H 60 Business Practices 3.00
 - O H 63 Soils 3.00
 - O H 75 Pest Management 3.00
 - O H 76 Fall and Winter Plant Identification 4.00
 - O H 77 Spring and Summer Plant Identification 4.00
 - CMST 11 Basic Public Speaking 3.00
 - O H 53A Beginning Landscape Horticulture 3.00
 - O H 53B Advanced Landscape Horticulture 3.00
- Total: 32.00

Environmental Horticulture **Merritt College** **50 miles**
12500 Campus Drive
Oakland, CA 94619

(41 unit certificate in landscape and parks maintenance, AS in landscape and parks maintenance)

The Intermediate Landscape and Parks Maintenance certificate program trains students to work as grounds maintenance workers in a variety of settings, including public or private parks, golf courses, and commercial or residential gardens. The curriculum provides studies in basic horticulture, plant ID, and maintenance practices. These areas of emphasis can help a student gain employment in the field of landscape and parks maintenance with public works departments, landscape maintenance companies, golf courses, parks and recreation departments, or start their own landscape maintenance companies. A Certificate of Achievement will be awarded upon satisfactory completion of the certificate requirements specified below.

LH 1 OR LH 1E	Introduction to Landscape Horticulture (Day w/lab) OR Introduction to Landscape Horticulture (Eve)	3
LH 1E	Introduction to Landscape Horticulture (Eve)	3
LH 23	Plant Terminology	2.5
LH 26	Pruning	.5
Select one plant ID course from the following:		
LH 2 or 2E; 3 or 3E; 4 or 4E; 5A ,5B, 5EA or 5EB; 6A, 6B, 6EA, or 6EB; 7 or 7E; 40 or 40E		3
Select one course from the following:		
LH 8 or 8E	Turf Management with lab (Day) OR Turf Management (Eve)	3
OR		

LH 13 or 13E	Arboriculture with Lab (Day) or Arboriculture (Eve)	3
Select one course from the following:		
LH 10	Insects	3
LH 11	Plant Diseases and Their Control	3
LH 12	Weeds in the Urban Landscape	3
Select one course from the following:		
LH 16	Soil Management	3
LH 19	Plant Nutrition	3
Level A Total Required Units:		18
Level A Requirements:		18
Plus Level B Requirements:		
Dept/No.	Title	Units
LH 201	Landscape Maintenance Practices	3
Select one additional course from the following*:		
*Select course not previously taken.		
LH 8 or 8E	Turf Management with Lab (Day) OR Turf Management (Eve)	3
LH 13 or LH 13E	Arboriculture with Lab (Day) or Arboriculture (Eve)	3
Select one additional plant ID course from the following:		
*Select course not previously taken.		
LH 2 or 2E; 3 or 3E; 4 or 4E; 5A ,5B, 5EA or 5EB; 6A, 6B, 6EA, or 6EB; 7 or 7E; 40 or 40E		3
Select one additional course from the following:		
LH 10	Insects	3
LH 11	Plant Diseases & Their Control	3
LH 12	Weeds in the Urban Landscape	3
Select one additional course from the following:		
LH16	Soil Management	3
LH19	Plant Nutrition	3
Level B Total Required Units:		30

Environmental Horticulture Cabrillo College
6500 Soquel Drive
Aptos CA 95003

30 miles

(17 unit general horticulture skills certificate)

Required Courses Units

HORT 1A Basic Horticulture.....	4
HORT 1B Basic Horticulture: Crop Production.....	4
HORT 2 Soil Science and Management.....	4

HORT 150 Pest Management.....	4
HORT 199C Career Work Experience Education.....	1

Total Units 17

Environmental Horticulture Diablo Valley College 70 miles
321 Gold Club Road
Pleasant Hill, CA 94523

(24.5 unit certificate in landscape construction and management)

People working in the landscape field derive job satisfaction from enhancing the function and beauty of the environment while being physically active outdoors or helping support that activity in allied sales and service occupations. Landscape work involves construction and planting projects, irrigation system design and water management, and specialty fields such as turf management and tree care. This program provides an introductory base of plant knowledge and landscape skills, allowing students the option of entering a variety of jobs with the preparation for rapid advancement within their chosen occupations. The program emphasizes hands-on learning and most courses incorporate laboratory activities that apply knowledge and skills in realistic settings. The program is actively supported by the local horticulture industry. This program prepares students to enter the landscape construction and management industry. Students are prepared to take the California C-27 Landscape Contracting examination. Elements of the program will also assist students to prepare for the California Landscape Contractors Association's CLT examination and /or the California Association of Nurseryperson's certification examination

required courses: units

HORT-110 Introduction to Horticulture.....	4
HORT-120 Soil Science and Management.....	3
HORT-120L Soil Science and Management Laboratory.....	1
HORT-132 Pest Management.....	1
HORT-133 Landscape Construction.....	3
HORT-134 Landscape Irrigation.....	3
HORT-135 Landscape Estimating and Contract Documents.....	3
HORT-137L Pruning Laboratory.....	1
HORT-296 Internship in Occupational Work Experience Education in HORT.....	1-4

plus at least 3 units from:

HORT-113 Plant Materials and their Uses: Winter and Spring.....	3
HORT-114 Plant Materials and their Uses: Summer and Fall.....	3

plus at least 1.5 units from:

HORT-130 Turf Grass Management.....	1.5
HORT-146 Ornamental Grasses.....	1.5

total minimum required units 24.

Appendix B

Apprenticeship sponsors in the State of California:

Apprenticeship Name	Apprenticeship Sponsor	Distance
LANDSCAPE GARDENER	Terminal Island Adult School - San Pedro, CA 1299 S. Seaside Avenue SAN PEDRO CA 90731-7359 310-732-5469	N/A
LANDSCAPE GARDENER	Naval Consolidated Brig, Miramar 46141 Miramar Way SAN DIEGO CA 92145 858-577-7372	N/A
LANDSCAPE TECHNICIAN	NO. CA DISTRICT COUNCIL OF LABORERS JATC 1001 WESTSIDE DR SAN RAMON CA 94583-4099 925-556-0858	43 miles
LANDSCAPE TECHNICIAN	LABORERS SOUTHERN CA APPRENTICESHIP PROGRAM 1385 W SIERRA MADRE AVE AZUSA CA 91702-1651 626-610-1700	N/A
LANDSCAPE TECHNICIAN	SO CA Laborers Landscape and Irrigation Fitter JAC 1385 W. Sierra Madre Avenue AZUSA CA 91702 626-610-1700	N/A

Employment data



**Landscape Technician
(SOC 37-1012, 37-3011, and 37-3019)**

**Program Report
(Santa Clara and San Mateo Counties)**

July 2017

12345 El Monte Road
Los Altos Hills, California 94022
650.949.7777

Target Occupations‡

First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers (37-1012)

Landscaping and Groundskeeping Workers (37-3011)

Grounds Maintenance Workers, All Other (37-3019)

‡Based on EMSI crosswalk of the Classification of Instructional Programs (CIP) codes with Standard Occupational Classification (SOC) codes as published by the U.S. Department of Education.

In 2017, the number of Landscape Technician* jobs in the target occupations in Santa Clara and San Mateo Counties totaled 9,005. The Bureau of Labor Statistics (BLS) expects the total number of positions to increase by almost 3% over the next three years.

*Landscape Technician jobs are listed under Target Occupations

Occupation Summary for Target Occupations

9,005 Jobs (2016)¹ 16% below National average ²	2.8% % Change (2017-2020)³ Nation: 4.3%	\$15.99/hr Median Hourly Earnings Nation: \$12.96/hr
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¹Based on total number of jobs for target occupations in Santa Clara and San Mateo Counties.

²Represents occupation density as compared to national average (national average=1).

³Based on turnover and new jobs.

Target occupations are disaggregated to see which occupations are projected to see the highest number of annual openings (Landscaping and Groundskeeping Workers).

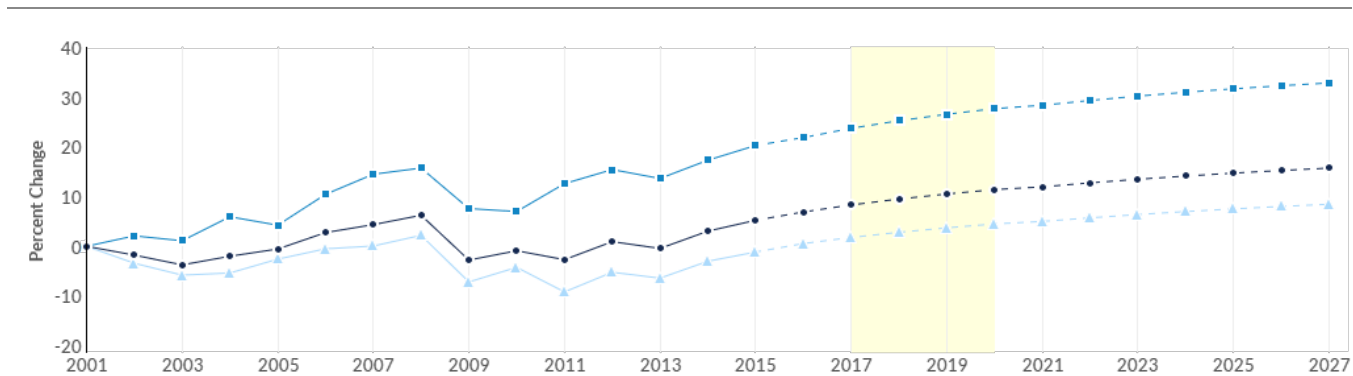
SOC	Description	Annual Openings	2017 - 2020 Openings	Regional Completions (2015)
37-1012	First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers	20	59	15
37-3011	Landscaping and Groundskeeping Workers	229	688	15
37-3019	Grounds Maintenance Workers, All Other	4	12	15
		253	758	

Growth in the target occupations show how each occupation is projected to increase in jobs over the next three years. A growth of about 3% is expected in the next three years for Landscape Technicians.

Growth for Targeted Occupations

	9,124 2017 Jobs	9,384 2020 Jobs	260 Change (2017-2020)	2.8% % Change (2017-2020)
Occupation	2017 Jobs	2020 Jobs	Change	% Change
First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers (37-1012)	696	719	23	3%
Landscaping and Groundskeeping Workers (37-3011)	8,299	8,531	232	3%
Grounds Maintenance Workers, All Other (37-3019)	130	134	4	3%

Regional Trends

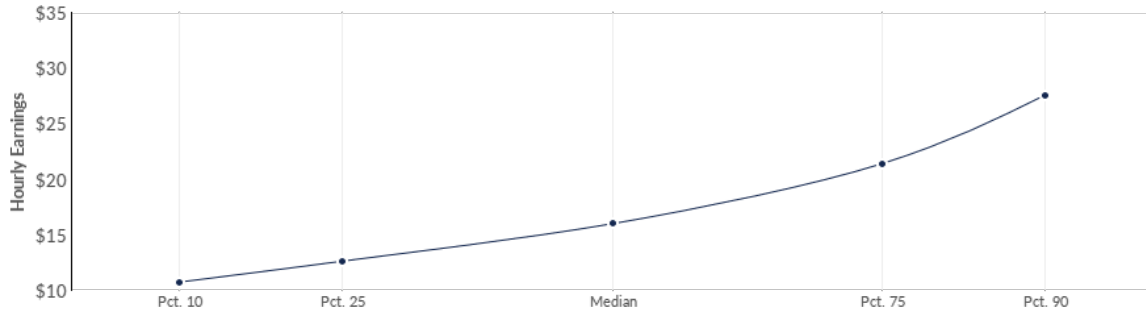


	Region	2017 Jobs	2020 Jobs	Change	% Change
□	Region	9,124	9,384	260	2.8%
■	San Mateo County, CA	3,105	3,204	99	3.2%
▨	Santa Clara County, CA	6,019	6,180	161	2.7%

The percentile earnings table shows the range the targeted occupations earn in the region. While the median earnings are \$15.99/hour, wages can range from below \$12/hour to above \$21/hour. Each of the target occupations' range in wages is also displayed.

Percentile Earnings

\$12.62/hr 25th Percentile Earnings	\$15.99/hr Median Earnings	\$21.41/hr 75th Percentile Earnings
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Occupation	25th Percentile Earnings	Median Earnings	75th Percentile Earnings
First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers (37-1012)	\$19.57	\$24.90	\$31.77
Landscaping and Groundskeeping Workers (37-3011)	\$12.02	\$15.24	\$20.49
Grounds Maintenance Workers, All Other (37-3019)	\$13.75	\$16.57	\$24.70








Target Occupations Demographics

The demographics among those employed in the targeted occupations in Santa Clara and San Mateo Counties for 2017 show that a majority of males (86%) and almost a quarter are between the ages of 45-54 (23%) and more than half are Hispanic or Latino (53%).








Occupation Gender Breakdown

Gender	2016 Jobs	2016 Percent
Males	7,712	85.6% 
Females	1,292	14.4% 





Occupation Age Breakdown

Age	2016 Jobs	2016 Percent
14-18	175	1.9% 
19-24	858	9.5% 
25-34	1,921	21.3% 
35-44	1,884	20.9% 
45-54	2,043	22.7% 
55-64	1,386	15.4% 
65+	738	8.2% 








Occupation Race/Ethnicity Breakdown

Race/Ethnicity	2016 Jobs	2016 Percent
Hispanic or Latino	4,758	52.8% 
White	3,046	33.8% 
Asian	578	6.4% 
Black or African American	441	4.9% 
Two or More Races	96	1.1% 
Native Hawaiian or Other Pacific Islander	54	0.6% 
American Indian or Alaska Native	30	0.3% 






National Educational Attainment for First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers (SOC 37-1012)

Education Level	2016 Percent
Less than high school diploma	20.2% 
High school diploma or equivalent	29.6% 
Some college, no degree	23.9% 
Associate's degree	9.0% 
Bachelor's degree	15.7% 
Master's degree	1.3% 
Doctoral or professional degree	0.3% 

National Educational Attainment for Landscaping and Groundskeeping Workers (SOC 37-3011)

Education Level	2016 Percent
Less than high school diploma	39.2% 
High school diploma or equivalent	34.2% 
Some college, no degree	15.2% 
Associate's degree	4.5% 
Bachelor's degree	5.7% 
Master's degree	0.9% 
Doctoral or professional degree	0.2% 

National Educational Attainment for Grounds Maintenance Workers, All Other (SOC 37-3019)

Education Level	2016 Percent
Less than high school diploma	39.2% 
High school diploma or equivalent	34.2% 
Some college, no degree	15.2% 
Associate's degree	4.5% 
Bachelor's degree	5.7% 
Master's degree	0.9% 

Industries Employing Targeted Occupations

A number of industries in Santa Clara and San Mateo Counties employ those trained in Landscape Technician and its related occupations. The following table represents a regional industry breakdown of the number of Landscape Technician positions employed, the percentage of Landscape Technician employed by industry and the Landscape Technician jobs represent within all jobs by each industry. While Landscaping Services employed 60% of all regional Landscape Technician positions in 2016, Landscape Technician occupations composed a majority of jobs in that industry (74%).

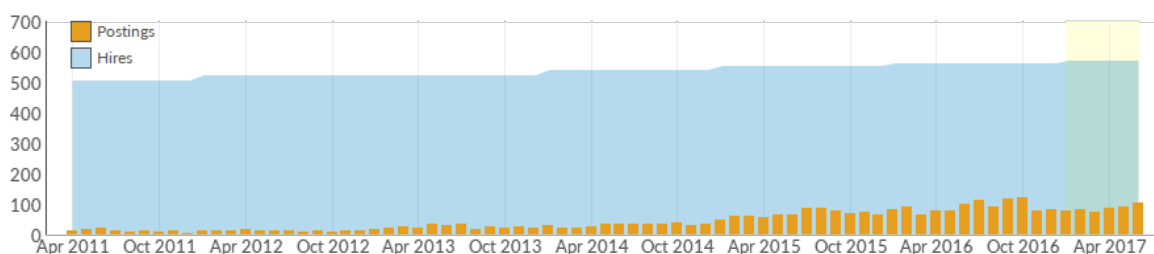
Industries Employing Targeted Occupations

Industry	Occupation Group Jobs in Industry (2016)	% of Occupation Group in Industry (2016)	% of Total Jobs in Industry (2016)
Landscaping Services	5,439	60.4%	73.7%
Local Government, Excluding Education and Hospitals	602	6.7%	1.5%
Colleges, Universities, and Professional Schools	327	3.6%	1.0%
Golf Courses and Country Clubs	289	3.2%	12.5%
All Other Amusement and Recreation Industries	153	1.7%	12.5%

In an average month, there were 87 unique (internet) job postings for Landscape Technician jobs, and 568 actually hired from January 2017 to June 2017. This means there was approximately 7 hires for every 1 unique (internet) job posting for occupations in Landscape Technician. In cases where there were hires but no job postings, it suggests that the internet may not be the primary way that job openings for these occupations are advertised.

Job Postings vs. Hires

87	568
Avg. Monthly Postings (Jan 2017 - Jun 2017)	Avg. Monthly Hires (Jan 2017 - Jun 2017)



Occupation	Avg Monthly Postings (Jan 2017 - Jun 2017)	Avg Monthly Hires (Jan 2017 - Jun 2017)
Landscaping and Groundskeeping Workers	76	517
First-Line Supervisors of Landscaping, Lawn Service, and Groundskeeping Workers	10	43
Grounds Maintenance Workers, All Other	0	8

The top five most relevant hard and soft skills employers list in Landscape Technician job posting descriptions are listed below. The “Postings with Skill” column is the total amount of (internet) job postings that mention the skills listed below. These numbers may be higher than the average monthly postings from above, because this number includes duplicated (internet) job postings. The “Relevance Scores” gauge relevance of the skill by indicating the frequency in which this skill is being mentioned in (internet) job postings for Landscape Technician compared to all other (internet) job postings.

Most Relevant Hard Skills

Skill	Relevance Score	Postings with Skill
Gardening	92.28	112
Irrigation (Agriculture)	79.36	245
Pruning	75.99	137
Edger	67.98	37
Landscaping	55.81	325

Most Relevant Soft Skills

Skill	Relevance Score	Postings with Skill
Depth Perception	0.74	46
Leadership	0.17	169
Ethics	0.13	36
Scheduling (Project Management)	0.04	196
Leading	0.03	34

Appendix - Data Sources and Calculations

Location Quotient

Location quotient (LQ) is a way of quantifying how concentrated a particular industry, cluster, occupation, or demographic group is in a region as compared to the nation. It can reveal what makes a particular region unique in comparison to the national average.

Occupation Data

Emsi occupation employment data are based on final Emsi industry data and final Emsi staffing patterns. Wage estimates are based on Occupational Employment Statistics (QCEW and Non-QCEW Employees classes of worker) and the American Community Survey (Self-Employed and Extended Proprietors). Occupational wage estimates also affected by county-level Emsi earnings by industry.

CareerBuilder/Emsi Job Postings

Job postings are collected from various sources and processed/enriched by Careerbuilder to provide information such as standardized company name, occupation, skills, and geography. Emsi performs additional filtering and processing to improve compatibility with Emsi data.

State Data Sources

This report uses state data from the following agencies: California Labor Market Information Department