

Curriculum review continues to be an important task for the local advisory committee. Major curriculum issues are always brought before the advisory committee for its input.

Master syllabi were last reviewed and revised in 2003-2004.

- II. Program Learning Outcomes:** A description of what you intend for students to know (cognitive), think/feel (affective), or do (psychomotor), when they have completed your degree program. A suggested manageable number of outcomes should be in the range of five to ten. Describe Program Learning Outcomes review activities.*

Program Learning Outcomes were last reviewed and revised in 2003-2004.

An entry-level graduate with an Associate of Applied Science Degree in Mechanical Engineering Technology, Heating and Air Conditioning option, from Sinclair Community College will be able to:

Learning Outcomes	Related Courses
1. Use computer software to enhance technical communication.	MET 198, 242,244
2. Write computer programs and use computer software to solve problems.	MET 224, 242, 244
3. Accurately apply mathematical solutions to define mechanical systems; use dimensional analysis to help create and verify mathematical representations of mechanical systems.	MET 244
4. Select basic components of a heating and air conditioning system.	MET 244
5. Select proper control system components.	MET 228, 229
6. Troubleshoot and/or design systems for proper operation and human comfort.	MET 224, 229, 244
7. Apply the concepts of environmental safety as they relate to HVACR systems.	MET 224, 244

Learning Outcomes	Related Courses
8. Perform a bid estimate for a mechanical system.	CCT 216
9. Use computer software to design a complete HVACR system.	MET 244

III. **Assessment Method(s)**: A measurable indicator of success in attaining the stated learning outcome(s). The methodology should be both reliable and valid. Please describe in detail.

- a. Formative Assessment Method(s) and Description: a measurable indicator of student in-progress success in attaining the stated learning outcome(s).

Students are assessed through homework, tests and project assignments. There are courses which serve as end-of-sequence checks. This includes MET 240, Advanced HVAC Applications, which uses content from all 100-level courses and brings them together in a systems approach. MET 242, Computer Applications in HVAC, is a pre-requisite to the capstone course, and students use the computer instruction from MET 242 in the capstone. MET 242 is project-oriented and requires students to interact with the instructor and other students in the class during lab. The instructor uses a building downtown and has students complete the mechanical design for it.

The courses which emphasize controls are in sequence (EET 119, Basic Electrical Circuits and Controls; MET 228, Equipment Measurements and Control; MET 229, Controls for HVAC System).

The curriculum really is a combination of three sets of sequenced courses. The 100-level sequence must be completed before either of the two second-year sequences, but those second-year courses can run parallel to each other. Ideally, those two sequences would be offered sequentially, but that design is impossible with the enrollment restraints of a two-year program.

- b. Summative Assessment Method(s) and description: a measurable indicator of end-of-program success in attaining the stated program learning outcome(s).

HVAC majors are required to enroll in MET 244, HVAC Applications Project, a three-credit-hour course. Students are required to design an HVAC system by applying skills and knowledge acquired in previous HVAC courses. Control systems are not part of the 244 course. Instead, the project includes loads, psychrometric analysis, and the system layout and design. Students work in teams. They must submit a notebook which includes the draft of the system, computer calculations, assumptions made in designing the system, and the design itself. Guidelines and specific parameters are provided by the instructor.

To meet TAC/ABET accreditation requirements three additional summative assessment methodologies have been developed: (1) the department chairperson

conducts exit interviews of all graduate of the program, (2) a post graduate survey of students is conducted three-to five years after graduation, and (3) an employer survey will be conducted beginning in 2004. These additional assessment methodologies will offer more reliable assessment data through the process of triangulation.

IV. Results: A description of the actual results of overall student performance gathered from the summative assessment(s). (see III.b.)

A survey was administered to employers and graduates as part of the last ABET accreditation visit. Results were positive but the numbers responding to the survey were small. HVAC surveys aren't specific; they are consolidated with all MET surveys.

Student success in MET 244 is excellent. The majority of students who are in the HVAC program are currently employed. For those who wish to pursue further education, the agreement with University of Dayton (UD) and with Ferris State University are options. Students who have transferred to UD or Ferris State have done well in their respective programs.

V. Analysis/Actions: From analysis of your summative assessment results, do you plan to or have you made any adjustments to your program learning outcomes, methodologies, curriculum, etc.? If yes, describe. If no, explain.

In preparation for the TAC/ABET reaccreditation review in the fall of 2004 all syllabi were reviewed and revised. Program outcomes and specific course objectives have been identified on the Mechanical Engineering Technology Program Outcome Matrix. Specific competency statements with methods of assessment and acceptable mastery levels are in place. Three additional summative assessment methodologies have been developed:

VI. General Education: Are you using any tool(s) to assess any of the three primary general education outcomes* (communication, thinking, values/citizenship)? If so, describe.

- a. Where within the major do you assess written communication? Describe the assessment method(s) used. Describe assessment results if available.

Writing is reinforced throughout the program through the use of required written laboratory reports in every HVAC lab course (MET 106, 125, 135, 145, 224, 244). Research papers are also used as an option in some classes (MET 145).

- b. Where within the major do you assess oral communication? Describe the assessment method(s) used. Describe assessment results if available.

Oral communication skills are emphasized through the Communications course general education requirement. The department has changed the communications

requirement from COM 211 to COM 206 to better focus on interpersonal communication skills.

Students use oral skills in all HVAC courses for working in labs or on teams. In MET 198 students are required to develop and present oral presentations using Power Point.

- c. Where within the major do you assess thinking? Thinking might include inventing new problems, seeing relationships and/or implications, respecting other approaches, demonstrating clarity and/or integrity, or recognizing assumptions. Describe the assessment method(s) used. Describe assessment results if available.

All courses in the HVAC program require students to use thinking skills. Types of thinking used include problem solving, analytical, trouble shooting and sometimes creative.

- d. Where within the major do you assess values/citizenship/community? These activities might include behaviors, perspective, awareness, responsibility, teamwork, ethical/professional standards, service learning or community participation. Describe the assessment method(s) used. Describe assessment results if available.

Values/community/citizenship skills are reinforced through informal discussions in courses. In CCT 216, Construction Estimating, students examine the ethics and legal issues of estimating an HVAC installation. MET 244 addresses issues surrounding "code" requirements.

- * Note: The oral communication checklist and the written communication checklist developed by the General Education Committee were adopted for college-wide use during the 1997-98 academic year by Academic Council. Thinking Guidelines developed by the General Education Committee are being piloted by faculty during the 1998-99 academic year.