

The master syllabi were last reviewed and revised in 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 in 2003-2004. The Manufacturing option outcomes were revised in 2004 to align with TAC/ABET requirements.

An entry-level graduate with an Associate of Applied Science Degree in Industrial Engineering Technology from Sinclair Community College will be able to:

Learning Outcomes	Related Courses
1. Demonstrate technical engineering skills appropriate to program requirements.	IET 101, 115, 111, 135; IET electives; DRT 106; QET 101, 201; EGR 115
2. Analyze engineering problems (general and technical) and make appropriate decisions.	IET 101, 111, 115, 135; EGR 206
3. Demonstrate science and mathematical skills required for occupational needs.	MAT 131, 132, 133; PHY 131, 132
4. Demonstrate the principles of industrial engineering technology through application of the computer.	IET 198; DRT 198; MET 198
5. Use sound business practices in relation to people management.	IET 126; PSY 229
6. Identify new changes in career field and build personal skills to maintain state-of-the-art competencies.	IET 125, 130, 202, 205, 207
7. Demonstrate applied and theoretical techniques in the areas of process engineering and facilities layout.	IET 101, 130, 201, 202, 205, 207, 216

Learning Outcomes	Related Courses
8. Demonstrate appropriate technical communication skills (written, verbal, and drawing).	ENG 111, 121, 122; DRT 196, 198; MET 198; COM 211

An entry-level graduate with an Associate of Applied Science Degree in Industrial Engineering Technology, Manufacturing Engineering Technology Option, from Sinclair Community College will be able to:

Learning Outcomes	Related Courses
1. Demonstrate science and mathematical skills required for occupational needs.	MAT 131, 132, 133, PHY 131, CHE 131
2. Demonstrate the principles of computer applications in technology.	MET 198, DRT 198, EGR 128, INT 113
3. Demonstrate appropriate technical communication skills (written, verbal and drawing).	ENG 121, 122; DRT 196, 198; COM 211
4. Use sound business practices in relation to people management.	IET 101, 125, 126, 278
5. Demonstrate technical engineering skills appropriate to program requirements.	IET 101, 205; INT 113; QET 132
6. Demonstrate applied and theoretical techniques in the areas of machining, plastics and automation.	IET 205; PLA 106; INT 109, 113; EGR 128
7. Demonstrate applied and theoretical techniques in the areas of production management.	IET 101, IET 125, IET 130
8. Analyze engineering problems and make appropriate decisions.	All IET courses

Learning Outcomes	Related Courses
9. Display attributes of professionalism, including recognition of the need for and ability to engage in lifelong learning.	IET 125, IET 126, IET 278

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).

Formative assessment is completed on a course-by-course basis. Courses use tests and projects to assess student learning. The IET classes are limited in size to allow for hands-on coursework. Courses follow the modular curriculum format developed through the NSF grant. Each course uses teamwork and simulation exercises to create a learning environment within the context of manufacturing. Students work in teams to solve problems like configuring a workstation for assembly.

Each spring quarter focus groups are conducted with the Tech Prep students at the end of the third quarter of their program. Students are encouraged to discuss what they like about the IET program, offer suggestions for change, and discuss their future plans. Summary documents are created based upon the focus group sessions. Beginning in 2004 the department will also invite other students in the IET program to these focus group sessions.

IET 101 (Work Methods Analysis and Improvement) is the introductory course. Tech Prep provides a type of formative assessment between high school and the SCC program. IET 277 (Tech Prep Project) is a type of formative assessment and is used as a substitution for the IET 198 (Computer Programming Applications in Engineering Technology) series.

The department emphasizes alignment of the curriculum to the “real world.” For instance in IET 207, students write a memo to a supervisor plus prepare professional documentation detailing the plans for a project idea.

The IET program faculty are using the Engineering Division’s course and faculty evaluation form as a formative assessment tool. This new tool includes section on the instructor as well as specific questions about the course, facilities and equipment, and the students. This tool offers faculty better feedback in terms of begin able to improve their courses.

- a. **Summative Assessment Method(s) and Description:** a measurable indicator of end-of-program success in attaining the stated program learning outcomes(s).

Students are enrolled in IET 278 as the capstone course. The capstone uses student teams working on real industrial projects that are set up in cooperation between Sinclair and local industries. Capstones are real work place projects, usually either a product or process improvement, developed for local companies. IET 278 students make presentations and recommendations to a company similar to a consultant.

The IET department uses a variety of other summative assessment methodologies. (1) The department chairperson conducts exit interviews with all IET graduates. (2) Every other year Manufacturing students take a professional certification exam offered by the Society of Manufacturing Engineers (SME). The department receives detailed feedback on the performance of students in individual topic areas of the exam. (3) IET graduates are monitored for success after they transfer to the University of Dayton. (4) The department conducts a survey of graduates of the program regarding their level of achievement in the Engineering Divisions' core competency areas.

The TAC/ABET accreditation on-site visit took place in fall 2005. During this review, both the IET and the Manufacturing programs received the highest rating possible.

The department was also involved in the pilot review process in spring 2005. During this in-house review, the department found further evidence of a need to merge the IET and QET programs and is in the process of making those changes.

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

The IET 278 Manufacturing Capstone course places students in small teams to work on real industry projects. Students present their project results to Sinclair faculty as well as their industry sponsors. Industry sponsors have been very receptive to the students' work, and in many cases the proposals are implemented.

There have been good results with the UD transfer program. Sinclair's IET graduates have been monitored for success at U.D. and they do well. The University of Dayton gives an annual award to their top Manufacturing Engineering student. Four of the last five awards have been given to Sinclair graduates.

Students who are completing the capstone project (described above) are gaining experience in the political and social aspects of the work environment that will help them better prepare for work in IET jobs.

Students are very successful on the professional certification exam offered by the Society of Manufacturing Engineers (SME). This examination is usually taken upon the completion of a baccalaureate degree.

Survey results indicate IET graduates believe they have achieved competency in all of the Engineering Division's core competency areas.

As a result of the 2005 review, the department will be taking steps toward merging the IET and QET programs. A pilot is slated for fall 2006 with the merger completed by fall 2007.

- 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.

Course integration is improving student skills. Greater numbers of IET students go through the entire sequence. The department has reviewed course sequencing and common course content. One application of this approach is the use of a varied common product (the “robotic gripper” scenario, wagons) throughout all courses. The common theme helps students to link individual courses to the “big picture” of the IET degree program outcomes.

The department annually reviews and revises the standard course notebooks with all instructional presentations on PowerPoint so that part-time faculty can follow the same course content exactly. Over 50% of the faculty are part-timers, so there is a great need for curriculum coherence. The program outcomes are valid and have been validated by industry and the advisory committee. The key now is to continue to work on the internal issues of course consistency. Every course and every instructor is evaluated on an ongoing basis by the department.

- 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.

Written and oral communication skills are stressed and some department faculty are using the general education checklists for assessment in these areas. The ABET accreditation process impacts the general education requirements.

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

Written communication skills are stressed in most IET courses. Some department faculty use the general education checklist

- 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 stressed in most IET courses. Some department faculty use the general education checklist.

- 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.

Projects required in the technical courses emphasize the use of problem solving skills. This reinforces critical thinking throughout the curriculum.

Teamwork modules are used to simulate the factory floor. These teams develop and practice team problem solving skills.

- 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.

The department assists students to learn professional behaviors such as being on time, meeting deadlines, and coming prepared. These are tied to course assessment. Course content also addresses the ethics, responsibility and liability of modes of failure. The department has established student chapters of the Society of Manufacturing Engineers and the Society of Plastics Engineers.

- * 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.