# DEPARTMENT REPORT
# OF
# PROGRAM LEARNING OUTCOMES ASSESSMENT

Department: Industrial Engineering Technology/Manufacturing Engineering Technology/Plastics & Composites Engineering Technology

Program (Degree): Industrial Engineering Technology

Type of Degree: X AAS ____ AA ____ AS ____ ATS ____ AIS

Chairperson: David Meyer Date: May 2, 2002

Person(s) Interviewed: David Meyer

I. **Program Curriculum:** A description of the basis for the program curriculum (i.e., how it is derived and validated). Include accreditation organizations, advisory committees or external groups that influence curriculum. Describe curriculum review activities including the review of course master syllabi.*

The IET curriculum is based on a DACUM that was completed in the past along with regular input from the Advisory Committee.

There has been a great shift in the program due to the Tech Prep students. The program allows for more influence on what is taught in the classroom through background knowledge of the students. IET is a four-year degree track which primarily feeds the program at the University of Dayton. There is a Sinclair/University of Dayton dual admission policy in place for students. Any changes in the program outcomes were the result of Tech Prep initiatives and the work of the advisory committee. Much of the change in the program has been content within courses and not new outcomes per se.

The local advisory committee has a representative from UD faculty, and SCC faculty sit on the advisory board at UD. Student input is also used.

The IET program received a six-year reaccredidation from the Accreditation Board for Engineering and Technologies (ABET) in spring, 1998. Planning for the 2004 ABET reaccredidation is in progress.

The master syllabi were last reviewed in 2001.

**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 review in 2001.

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 110, 130, 201, 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 |
| 8. Demonstrate appropriate technical communication skills (written, verbal, and drawing). | ENG 111, 121, 122; DRT 106, 198; MET 918; COM 211 |

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. Students in the IET 297 Six Sigma class actually reduce costs for select businesses.

The department is piloting the use of the *True Outcomes* software to document formative assessment. This program is competency based utilizing student self-assessment. The program also generates a juried portfolio of selected student works.

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.

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 a substitution capstone. IET 278 has a manufacturing emphasis making it not really appropriate for students in the Industrial Engineering Technology program. In IET 278, Sinclair students are working collaboratively with students from Wright State University (WSU) and Ohio State University (OSU) on the design of a robot. The collaborative project was created by the participating colleges in order to simulate a common work environment where engineers and industrial technicians must work together on projects as a team. The WSU and OSU students are responsible for the robot's design while the Sinclair students provide feedback on the manufacturing and industrial capability of the robot. Instructors from all colleges monitor the students and the project.

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

There have been good results with the UD transfer program. The SCC students who do well at Sinclair also do well at UD.

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.

**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 is continuing to work on the development of 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 common content. The 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, but the department is not using the 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, but the department is not using the checklist for assessment in this area.

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, but the department is not using the checklist for assessment in this area.

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 is exploring the feasibility of establishing 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.