DEPARTMENT REPORT
OF
PROGRAM LEARNING OUTCOMES ASSESSMENT

Department: Automation and Control Technology

Program (Degree): Automation and Control Technology

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

Chairperson: Surinder Jain Date: May 11, 2005

Person(s) Interviewed: Surinder Jain

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 Automation and Control Technology (ACT) program focuses on application and control of electromechanical systems. Areas of study include a concentration on electronics, computers, programming, industrial controls, work cells, and all areas of automated manufacturing applications typically used in local industry.

On the advice of the ACT department advisory committee, a complete curriculum review process was implemented during the 2004-2005 academic year. The goal of this research is to implement an organized effort to meet local industry needs, receive feedback from employers, and examine current trends in technology. Approximately fifty local industries are currently being surveyed to determine employer needs. A representative from each of the identified local industries is being interviewed as a part of this research project. The surveys and interviews are planned to be completed by summer, 2005. Initial data indicates 80% of program curriculum is quite current. Faculty are currently beginning the planning process for changing and updating the remaining 20% of the ACT curriculum. This includes a continued departmental focus on integrated work cells and training on equipment to prepare students for 21st century jobs.

A new articulation agreement is in place with Miami University at Middletown (MUM). The department continues to explore articulation with Central State's Manufacturing Engineering Department. Articulation opportunities for graduates continue with Wright State University and Franklin University (including Franklin's online degree program).

Master syllabi will be reviewed in 2005 following the analysis of survey and interview data from local industries.

II. <u>Program Learning Outcomes</u>: 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 will be reviewed and revised as necessary in 2005 following the analysis of survey and interview data from local industries.

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

Learning Outcomes	**Related Courses**
1. Conduct simple mechanical repairs on typical electromechanical systems, from replacing, wiring, fluid power valving, piping, electromechanical devices, and other items that were original to the equipment, to installing new system modifications, then returning the system to operational specifications.	EGR 100, 217, 250
2. Diagnose electronic system problems using appropriate test instrumentation, schematics, technical reference manuals and determine if fault is electrical, electronic, software, or mechanical in nature. Recommend appropriate repair process and initiate repair.	EER 126, 128, 136, 139, 166
3. Utilize various computer software packages found in industry: CAD, robot programming languages, C programming, computer operating systems, word processing as necessary to perform repair/ modification/design tasks and document repair action.	EGR 128, 248, 252, 261; IET 198

Learning Outcomes	Related Courses
4. Repair electrical and electronic systems, from devices, subsystems, wiring/cabling to circuit board level, and return to correct operation after testing.	EGR 251, 254, 278
5. Integrate electronic control equipment into typical small CIM environment so that overall system performs to specification. Equipment includes: discrete devices, PLC's, sensors, robot application programming, communication hardware/software, computer related hardware.	EET 281; EGR 215, 252, 254, 255, 261, 278; EGR Elective
6. Integrate into work cell the appropriate Fanuc robot for the application. Select necessary end-of-arm tooling, and develop/edit motion control program for the application, using available software features and/or options.	EGR 128, 248, 252 254, 256; EGR Electives

III. **<u>Assessment Method(s)</u>:** 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 Methods(s) and Description: a measurable indicator of student in-progress success in attaining the stated learning outcome(s).

The department continues to utilize hands-on assessment through student involvement in laboratory work and practice applications. EGR 128, Robotics in CIM Systems, is the most popular course in the curriculum. It has been developed into a general introduction to robotics. This course is a pre-requisite for all other courses. Students are exposed to different robot operation systems, software, and other basic information.

The department uses projects in multiple courses. As students progress to the 200-level courses, the projects become more involved. A robotics work cell is used in the students' capstone project to showcase a variety of skills learned in the curriculum. Students are being challenged by use of more open-ended problems. Additional emphasis is being placed on problem-solving skills leading the department to look at a systems approach to problem solving.

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

EGR 278 is the capstone course for this program. It is a project-based course that permits students to showcase their strengths and demonstrate proficiency in the knowledge and skills acquired in the program. The department chairperson interviews students who have successfully completed EGR 278 to assess the department's performance in providing learning opportunities for the Engineering Division's Core Competencies.

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

EGR students demonstrated their high achievement at the 2003 Robotics International/Society of Manufacturing Engineer's (RI/SME) Robotic Technology and Engineering Challenge in Rochester, New York by winning a Gold Award.

The majority of students find employment in the Miami Valley region.

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.

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The department continues to work to maintain state-of-the-market technology in their laboratories with many changes required on a less-than-one-year cycle.

Department faculty are planning to embed assessment in key courses using the continuous improvement plan that will be developed following the analysis of the survey and interview data from local industry.

VI. **<u>General Education</u>:** 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.

To be effective in today's industrial climate students need the ability to express themselves by using both written and oral communication skills. Technical reports and projects are assessed as a part of the normal grading process in the program.

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

To be effective in today's industrial climate students need the ability to express themselves by using both written and oral communication skills. In appropriate classes, students' oral presentations are assessed as a part of the normal grading process in the program.

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.

Students use logical steps to solve problems and complete projects. Thinking skills are assessed by evaluating students' application of troubleshooting principles to diagnose problems and isolate system faults.

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.

Teamwork and group participation are required in many of the courses. The department encourages and sponsors student teams to compete in various professional society events such as the Society of Manufacturing Engineers' Robotics competition.