

## MANUFACTURING SYSTEMS

<http://www.engr.siu.edu/staff1/tech/MFGS/Mfgs.html>

[techdept@engr.siu.edu](mailto:techdept@engr.siu.edu)  
[marusarz@engr.siu.edu](mailto:marusarz@engr.siu.edu)

### COLLEGE OF ENGINEERING

**Abrate, Serge**, Professor, Ph.D., Purdue University, 1983; 1995.

**Barbay, Joseph E., Jr.**, Associate Professor, *Emeritus*, Ph.D., University of Missouri-Columbia, 1971; 1970.

**Besterfield, Dale H.**, Professor, *Emeritus*, Ph.D., Southern Illinois University Carbondale, 1971; 1962.

**Butson, Gary J.**, Associate Professor, Ph.D., University of Illinois, 1981; 1992.

**Chang, Feng-Chang**, Associate Professor, Ph.D., Ohio State University, 1985; 1991.

**Ferketich, Robert R.**, Associate Professor, *Emeritus*, Ph.D., Southern Illinois University Carbondale, 1980; 1971.

**Lindsey, Jefferson F., III**, Professor, *Emeritus*, D. Engr., Lamar University, 1976; 1980.

**Marusarz, Ronald K.**, Associate Professor and *Chair*, Ph.D., Southern Illinois University Carbondale, 1999; 1982.

**McBride, Julie K.**, Associate Professor, Ph.D., Florida State University, 1995; 1995.

**Orr, James P.**, Associate Professor, *Emeritus*, Ph.D., Southern Illinois University Carbondale, 1983; 1979.

**Savage, Mandara**, Assistant Professor, Ph.D., Iowa State University, 1999; 1999.

**Szary, Marek**, Associate Professor, Ph.D., Wroclaw (Poland), 1977; 1984.

**Velasco, Tomas**, Associate Professor, Ph.D., University of Arkansas, 1991; 1993.

**Weston, Alan J.**, Associate Professor, Ph.D., Southern Illinois University Carbondale, 1991; 1991.

### Master of Science in Manufacturing Systems

Graduate work leading to a Master of Science degree in manufacturing systems is offered by the College of Engineering. The objective of the program is to develop manufacturing professionals who can design and implement modern manufacturing systems to increase productivity and improve product quality. Course offerings and research are available in manufacturing processes and control, quality control, and computer applications. The program provides advanced education for students with baccalaureate degrees in technology and also an excellent continuing education opportunity for individuals with technical degrees who wish to expand their education in the area of manufacturing systems.

#### Admission

Candidates for this program must be accepted by the Graduate School and the Department of Technology. Candidates should possess a bachelor's degree with a major in a technical area and have a GPA of no less than 3.0/4.0. A student whose undergraduate training is deficient may be required to take additional courses to compensate for deficiencies identified by the technology graduate program committee.

A non-refundable application fee of \$20.00 must be submitted with the application. Attach your check or money order, payable to Southern Illinois University, to the top of the application form. Do not send cash. Only checks or money orders payable to United States banks will be accepted.

#### Program Requirements

The program in the thesis option requires a minimum of 30 semester hours of acceptable graduate credit, 18 semester hours of which is in manufacturing systems.

Students will complete a master's thesis, having 6 semester hours of credit, and be required to pass a comprehensive examination covering all of the student's graduate work and thesis.

Within the 30 semester hour requirement, students must complete the following core courses or their equivalents:

MFGS 505 Research Methods

MFGS 510-3 Recent Advances in Quality Assurance

MFGS 520-3 Computer-Aided Manufacturing II

MFGS 540-3 Product Reliability Theory

MFGS 560-3 Automated Factory Technology

A program of study including the above required courses (15 semester hours), the master's thesis (6 semester hours), and the remaining 9 semester hours will be selected by the graduate adviser and the student.

If a student prefers the non-thesis option, a minimum of 36 semester hours of acceptable graduate credit including the 15 semester hours of core courses is required. The student is expected to take at least 21 semester hours within the major department including no more than 3 semester hours of MFGS 592 to be devoted to the preparation of a research paper. In addition, each candidate is required to pass a written comprehensive examination.

Each student will select a minimum of 3 technology graduate faculty members to serve as a graduate committee, subject to approval of the director of the graduate program. The committee will:

1. approve the student's program of study,
2. approve the student's research paper topic,
3. approve the completed research paper, and
4. administer and approve the written comprehensive examination.

**Additional Information**

Teaching or research assistantships and fellowships are available for qualified applicants. Additional information about programs, courses, assistantships, and fellowships may be obtained from the College of Engineering or from the chair of the department.

**Courses (MFGS)**

505-3 Research Methods. The objective of this course is to familiarize the students with the methods needed in research. Emphasis is placed on how these methods can be applied in the manufacturing systems area. Topics include development of research proposals, use of statistics in the analysis and communication of the results. Prerequisite: enrollment in manufacturing systems program or consent of instructor.

510-3 Recent Advances in Quality Assurance. Study of recent advances in quality planning, quality measurement, design assurance, process control, participatory management, supplier quality, customer relations and improvement concepts. Prerequisite: 505 and Industrial Technology 475.

520-3 Computer-Aided Manufacturing II. Advanced study of the use of computers in the manufacture of products. Emphasis is placed on CAD/CAM integration, CAM generated data and current CAM languages. Prerequisite: Industrial Technology 445.

525-3 Computer Integrated Manufacturing. Theory and practice of using the computer to integrate the functional manufacturing areas into an effective system. Use of applications software is emphasized. Prerequisite: Industrial Technology 445 and 475.

530-3 Mechanical Aspects of Robots. Advanced application of mechanics, mechanisms, hydraulics, pneumatics, strength of materials and machine design to robotics. Prerequisite: Industrial Technology 455.

535-3 Computer Control of Manufacturing Systems. Application of computer technology to the control of manufacturing equipment, processes and systems. Emphasis is placed on the hardware aspects from an overall systems viewpoint. Prerequisite: Industrial Technology 455.

540-3 Manufacturing Reliability Analysis. The objective of this course is to provide the student with an overview of the basic techniques applied in the field of reliability and failure data analysis in a manufacturing environment. Prerequisite: 505.

545-3 Electrical and Electronic Aspects of Robots. Analysis of servo motors, actuators, sensors and noise and feedback technique that drive robot manipulators. Prerequisite: Industrial Technology 455.

560-3 Automated Factory. Advanced study of the integration of robots, automated assemble, automated storage and retrieval systems, automated inspection and computer-controlled transfer systems. Economic justification and implementation are emphasized. Prerequisite: 520, Industrial Technology 455.

580-1 to 4 Seminar. Collective and individual study of issues and problems related to manufacturing systems. Graded S/U. Prerequisite: enrollment in the M.S. degree in manufacturing systems.

592-1 to 4 Special Investigations in Manufacturing Systems. Advanced topics in manufacturing systems. Topics are selected by mutual agreement of the student and the instructor. Prerequisite: consent of adviser.

599-1 to 6 Thesis.

601-1 per semester Continuing Enrollment. For those graduate students who have not finished their degree programs and who are in the process of working on their dissertation, thesis or research paper. The student must have completed a minimum of 24 hours of dissertation research, or the minimum thesis, or research hours before being eligible to register for this course. Concurrent enrollment in any other course is not permitted. Graded S/U or DEF only.