MANUFACTURING SYSTEMS

COLLEGE OF ENGINEERING

Graduate Faculty:


Chang, Feng-Chang, Associate Professor and Director of Engineering Outreach, Ph.D., Ohio State University, 1985; 1991.

Crosby, Garth, Assistant Professor, Ph.D., Florida International University, 2007, 2008.

DeRuntz, Bruce, Associate Professor, Ph.D., Southern Illinois University Carbondale, 2005; 1998.

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

Marusarz, Ronald K., Associate Professor, Emeritus, Ph.D., Southern Illinois University Carbondale, 1999.

Savage, Mandara, Associate Professor and Chair, Ph.D., Iowa State University, 1999; 1999.

Spezia, Carl J., Assistant Professor, Ph.D., Southern Illinois University Carbondale, 2002; 2005.

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

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 quality and management professionals who can plan, coordinate, design, implement, and control the quality function in manufacturing and service companies in order to increase productivity, optimize resources, decrease waste, and improve product quality. Course offerings and research are available in the areas of quality assurance, six sigma, lean manufacturing, project management and reliability. For students with baccalaureate degrees in technology, engineering technology, or engineering, the program provides advanced education in quality and management systems. For individuals with technical degrees, the program provides an excellent continuing education opportunity.

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.

This program requires a nonrefundable $50.00 application fee that must be submitted with the application for admissions to graduate study in manufacturing systems. Applicants may pay this fee by credit card, personal check, cashier’s check, or money order made payable to a U.S. bank, if applying electronically. Applicants may request a paper application.

Program Requirements

The program in the thesis option requires a minimum of 30 semester hours of acceptable graduate credit and includes 15 semester hours of manufacturing systems core courses. Students will complete a master’s thesis, having six semester hours of thesis (MFGS 599) credit.

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

- MFGS 510-3 Quality Assurance
- MFGS 525-3 Six Sigma Black Belt II
- MFGS 530-3 Lean Manufacturing II
- MFGS 535-3 Service Quality
- MFGS 540-3 Reliability Analysis
- MFGS 550-3 Project Leadership

Students not meeting specific course requirements may be required to complete prerequisites from the following list of courses:

- IT 450-3 Project Management
- IT 465-3 Lean Manufacturing
- IT 470a-3 Six Sigma Green Belt
- IT 470b-3 Six Sigma Green Belt II
- IT 480-3 Six Sigma Black Belt

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 30 semester hours of acceptable graduate credit including the 15 semester hours of core courses is required. The student is expected to take at least 15 semester hours within the major department. Prerequisite courses listed above that are taken in order to meet specific course requirements can be used to fulfill the remaining nine semester hour requirement for the thesis option and to fulfill the 30 semester hour non-thesis degree requirement.

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. Restricted to enrollment in manufacturing systems program or consent of instructor.

510-3 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: Industrial Technology 470a and Industrial Technology 470b.

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 Six Sigma Black Belt II. The purpose of this course is to provide the student with knowledge of the most advance areas of the Six Sigma black belt training. Advanced fractional experiments, response surface methodology, robust design and process, design for Six Sigma and other advance six sigma principles and techniques are covered in this course. Prerequisite: Industrial Technology 470a, 470b, 480.

530-3 Lean Manufacturing II. This course will cover the principles and techniques of lean manufacturing. Major topics covered include value stream mapping, pull systems/Kabans, continuous improvement/Kaizen, lean sigma, lean simulation, and other modern lean manufacturing techniques and issues. Prerequisite: Industrial Technology 465.

535-3 Service Quality. This course examines how organizational leadership, strategic development and deployment of service management systems are used to achieve service quality. Ker service quality management concepts of costumer and market focus, employee focus, communication, and service delivery will be taught through the use of case studies, article reviews and team projects.

540-3 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: Industrial Technology 470B.

545-3 Project Management II. This course is an advanced study of the concepts in project management, building on the fundamentals established in prerequisite courses. Using MS Project, students will work individually and in teams to develop appropriate tools and documentation typically utilized to implement, control, and closeout projects. Computerized scheduling and cost control, quality systems, risks management, procurement, and project termination. Prerequisite: IT 450, or instructor consent.

550-3 Project Leadership. This course is designed to develop a graduate student’s human relationship skills for leading project teams. Through the use of case studies and practical applications, students will learn effective leadership, team development, motivational and organizational planning, and conflict resolution practices.

555-3 Human Safety and Risk Management. Understanding risk and safety issues inevitably involves many disciplines, as does their effective management. Through the combination of scientific evidence, practical examples, and case studies presented in this course, students will be equipped to identify, assess and develop strategies to mitigate occupational and environmental risk. Methods are used to effectively communicate and understand risk factors as presented by various agencies.

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

565-3 Management of Information Technology Resources. The use of information and communication technologies (ICT) dominates the world of business. There are ongoing fundamental changes in the way organizations execute their business processes and interact with each other. This course helps students understand the relationship between information systems and business performance. This will enable students to appreciate the importance of strategic implementation and proper manage of ICT resources.

570-3 Energy Management and Conservation. This course covers the principles and policies of energy management and auditing. It covers development, implementation and economic analysis, using simple pay back and life-cycle cost models, of these programs and audits. It focuses on efficient operation of electric motors, lighting, boilers, furnaces, and facilities climate control. It surveys current energy policy with emphasis on LEED design and certification. Prerequisites: MATH 150 or IT 307, PHYS 203A,B or equivalents.

580-1 to 4 Seminar. Collective and individual study of issues and problems related to manufacturing systems. Graded S/U. Restricted to 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. Special approval needed from the 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.