Graduate Programs in Industrial and Manufacturing Engineering

The Department of Industrial and Manufacturing (IME) prepares students to be life-long learners and global citizens with successful careers in design, research, improvement, and management of systems in manufacturing and service organizations.

IME Department offers three graduate degree programs and four certificate programs. The concentrations in the IME graduate programs are Operations Research, Systems, Production and Supply Chain Analytics, Quality and Reliability, Manufacturing Engineering and Human Systems Engineering.

Master of Science in industrial engineering (MSIE) degree enhances the skills of degreed engineers by providing advanced knowledge and skills that are needed to design, model, analyze and manage modern complex systems in order to increase the effectiveness of manufacturing and service sector organizations.

Master in Engineering Management (MEM) program educates engineering, science and business graduates with the skills and knowledge to increase the effectiveness of manufacturing and service sector organizations in planning, decision making, and complex problem solving to increase the effectiveness of manufacturing and service sector organizations.

The PhD in Industrial Engineering (PhDIE) program trains engineers to perform independent research and educates in advanced knowledge in the concentrations offered by IME program.

IME Department has certificate programs in Systems Engineering and Management, Lean Systems, Foundations of Six Sigma and Quality Improvement, and Enterprise Systems and Supply Chain Management (offered jointly with the Business College).

Admission Requirements

**MSIE or MEM program applicants must:**
1. Possess an undergraduate degree in engineering, science, business, or other related discipline;
2. Have satisfactorily completed MATH 243, Calculus II; IME 255, Engineering Economy or their equivalents;
3. Have a minimum GPA of 3.000, on a 4.000 scale, in the last 60 hours of undergraduate courses and in all graduate courses

IME department encourages the submission of GRE scores, two letters of recommendation, and a statement of purpose indicating applicant’s research interests and career goals.

**PhDIE program, applicants must:**
1. Have a 3.25 GPA or better in all graduate coursework
2. Have a master’s degree in engineering, physical science, or other related disciplines
3. Submit official GRE scores

Evidence of the ability to carry out independent research and communicating that in written English is required. In addition, submission of two letters of recommendation and a statement of purpose indicating applicant’s research interests and career goals is required.

**In addition, for all degree programs:**
Students with English as a second language must have a minimum score of 550 on the paper based TOEFL or 79 on the internet based TOEFL, or an overall band score of 6.5 on the IELTS exam.

Please note that some IME courses may require programming skills as a pre-requisite, and some IME courses may require Linear Algebra or Calculus III as a pre-requisite.

**MBA to MEM Program**
Graduates of the WSU Master of Business Administration (MBA) program may be allowed to use up to 12 Credit Hours from the WSU MBA courses as technical electives if they enroll in the MEM program.

**MEM to MBA Program**
Graduates of the WSU MEM program may be allowed to use up to 12 credit hours from the technical electives taken from the WSU MBA courses if they enroll in the MBA program.

**Curriculum and Research Concentrations**
The teaching and research concentrations in IME are clustered around the following six areas.

*Operations Research:* Modeling and analysis of complex systems in manufacturing and service systems; optimization theory and methods; multi-criteria decision making; modeling and analysis of;

*Systems:* Management of engineering enterprises; design and analysis complex systems; decision analysis; application of intelligent systems and simulation in manufacturing; and activity-based costing.

*Production and Supply Chain Analytics:* Design and control of manufacturing systems; facilities planning; supply chain management; scheduling; analytics applications

*Quality and Reliability:* Design of experiments; Total quality management; quality control; prognostics; risk management; data driven analysis; big data

*Manufacturing Engineering:* manufacturing processes; CAD/CAM/CIM systems; measurement/inspection; GD&T; forming; composites manufacturing; and free form surfaces manufacturing.

*Human Systems Engineering:* Emphases include industrial ergonomics; bio-mechanics; human-machine systems; occupational safety and other industrial hygiene issues; and ergonomics and human factors issues in aviation/space systems.
Facilities
The following facilities used in teaching and research are available for graduate students:

**Cessna Manufacturing Laboratory** supports all courses offered in the areas of manufacturing engineering, tool design, advanced and nontraditional machining, composite machining, and computer-aided manufacturing.

**Health Systems Engineering Laboratory** provides resources and expertise for the design, analysis, and improvement of healthcare systems, and supports teaching and research in healthcare analytics, operations, quality and risk management, and medical decision making.

**Reliability and Maintenance Engineering Laboratory** provides students with hands-on experiences in modeling accelerated life testing and degradation testing, optimal design of testing plans, robust reliability design, system reliability optimization, condition-based maintenance and engineering risk assessment.

**Human Performance and Design Laboratory** supports teaching and research in fields related to industrial ergonomics.

**CAD/Systems Laboratory** is a teaching lab that supports a number of courses including engineering graphics, systems simulation, and neural networks.

**Advanced Manufacturing Process Laboratory** focuses on research in machining, sheet metal forming, and supports manufacturing engineering courses.

**Laboratory for Sustainable Engineered Systems** promotes the advancement of knowledge, understanding, and education of environmentally sustainable engineered systems in healthcare and the environment, life cycle analysis, green manufacturing and production systems.

Faculty

**Esra Buyuktahakin**, PhD (University of Florida). Optimization, invasive species management, bioinformatics, power grid design, production planning, supply chain management, and logistics

**Laila Cure**, PhD (University of South Florida). Healthcare systems engineering, analytics, work systems design

**Deepak Gupta**, PhD (West Virginia University). Energy efficiency and sustainability, industrial productivity, manufacturing system optimization, supply chain management

**Michael Jorgensen**, PhD (Ohio State University). Occupational biomechanics, industrial ergonomics, musculoskeletal injury risk assessment and interventions, segmental and whole body vibration

**Krishna K. Krishnan**, PhD (Virginia Tech). Manufacturing systems, facilities planning, material handling design, CAD/CAM Systems, design for manufacturability, virtual reality applications in manufacturing

**Viswanathan Madhavan**, PhD (Purdue University). Manufacturing process in the areas of traditional and non-traditional machining, cutter technology, forming process, and tools and jigs design

**Don E. Malzahn**, PhD (Oklahoma State University). Decision analysis, project management, human factors and engineering management

**Wilfredo Moscoso-Kingsley**, PhD (Purdue University). Manufacturing methods in the areas of severe plastic deformation for microstructural development and advanced machining

**Abu S. M. Masud**, PhD (Kansas State University), PE (Kansas). Operations research, multi criteria decision making, decision analysis and support systems, forecasting, and QFD

**Ehsan Salari**, PhD (University of Florida), Operations Research, Data Analytics, and Healthcare Systems Engineering

**Janet Twomey**, PhD (University of Pittsburgh). Intelligent data processing systems (neural networks, knowledge-based engineering, simulation, information systems, and statistics) applied to manufacturing and service systems

**Pingfeng Wang**, PhD (University of Maryland). Reliability Analysis and Risk Management, Probabilistic Analysis and Design, Maintainability, Prognostics and Health Management

**Gamal Weheba**, PhD (University of Central Florida). Quality and reliability engineering, statistical process control, economics of quality, precision measurements, and rapid prototyping

**M. Bayram Yildirim**, PhD (University of Florida). Applied optimization, Energy Efficient Manufacturing, Smart Grids, Optimization Applications in Scheduling and Healthcare, Logistics and Supply Chain Management, Pricing on Congestible Networks

**Affiliated Biomedical Engineering Faculty**

**Kim Cluff** (Biomedical imaging and instrumentation design),

**Nils Hakansson** (Biomechanics and assistive technology design),

**Anil Mahapatro** (bio-devices and biomaterials)

For More Information

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