UNIVERSITY OF CENTRAL FLORIDA

Faculty Qualifications: Discipine Description

Industrial Engineering and Management Systems

ACTIVE TEACHING DISCIPLINES		
CIP Code	**Description**	**NCES Definition** For more information on the NCES CIP taxonomy, see http://nces.ed.gov/ipeds/cipcode/Default.aspx?y=55
14.0101	Engineering, General	A program that generally prepares individuals to apply mathematical and scientific principles to solve a wide variety of practical problems in industry, social organization, public works, and commerce. Includes instruction in undifferentiated and individualized programs in engineering.
14.3501	Industrial Engineering	A program that prepares individuals to apply scientific and mathematical principles to the design, improvement, and installation of integrated systems of people, material, information, and energy. Includes instruction in applied mathematics, physical sciences, the social sciences, engineering analysis, systems design, computer applications, and forecasting and evaluation methodology.

The qualifications described below represent commonly accepted good practices for teaching in the discipline(s) included in this unit. **[1]**

General description of unit, including programs and course offerings [2]

The Department of Industrial Engineering and Management Systems (IEMS) offers the following programs:

- Industrial Engineering, BSIE
- Industrial Engineering, MSIE
- Industrial Engineering, MS with concentrations in:
  - Human Systems Engineering / Ergonomics
  - Quality and Production Systems
  - Management Systems
  - Simulation, Optimization and Modeling
  - Systems Engineering
- Engineering Management, MSEM
- Industrial Engineering, PhD
- Industrial Engineering Graduate Certificate Programs:

- Applied Operations Research
- Design for Usability
- Project Engineering
- Quality Assurance

Education and research in industrial engineering (IE) reflects the very broad nature of the field, which encompasses modeling and simulation, ergonomics and human factors, and engineering management. The Industrial Engineering approach is characterized by a systematic evaluation of alternatives using quantitative analysis and computer simulations. The faculty in the Industrial Engineering and Management Systems Department prepares graduates of its programs to deal with decisions regarding the utilization of people, materials, machines, and automation.

Industrial engineers are also skilled in Engineering Economic Analysis and Information Management since they are generally considered to be the natural interface between the technical specialist and management.

Industrial Engineering focuses on the design and improvement of systems, products, and processes. A total systems approach is used to optimize the various aspects of operations in both manufacturing and service industries. Industrial engineers use many analytical approaches to improve productivity, safety, and quality of working life while reducing operating costs.

The BSIE Industrial Engineering program is accredited by the Engineering Accreditation Commission (EAC) of ABET. The program teaches basic IE methodology and features a systems engineering focus with an emphasis in discrete simulation.

The Industrial Engineering, MSIE degree requires either an undergraduate degree in Industrial Engineering or another engineering discipline. Students who do not hold an undergraduate degree in Engineering can enroll in only the specialty MS tracks, while students holding a Baccalaureate degree in Engineering may elect to enroll in the general MSIE program or MS specialty tracks.

The Master of Science in Industrial Engineering (MSIE) degree focuses on the design and improvement of systems, products, and processes. A total systems approach is used to optimize the various aspects of operations in both manufacturing and service industries. Industrial engineers use many analytical approaches to improve productivity, safety, and quality of working life while reducing operating costs. The MSIE curriculum builds on an undergraduate engineering degree to develop a stronger systems focus and analytical capability.

The Industrial Engineering, MS degree requires an undergraduate degree in Engineering or a closely related discipline. The MS program is designed to produce highly skilled industrial engineers, engineering managers, technical professionals, and leaders for the global economy.

The IEMS Department also offers the Professional Engineering Management Program, a cohort based intensive program, mainly for company-sponsored employees. The Professional Engineering Management (PEM) track in the Engineering Management MSEM program focuses

on effective decision-making and successful project delivery in engineering and technological organizations. The program is tailored to the needs of the experienced, working professional.

The Doctor of Philosophy in Industrial Engineering is primarily intended for a student with a master's degree in Industrial Engineering or a closely related discipline. The PhD program is designed to produce highly skilled researchers with both broad knowledge of industrial engineering and in-depth knowledge of specialty fields for careers in academia, industry, and government. The program allows a candidate to thoroughly study some aspect of industrial engineering, such as engineering management, systems operations and modeling, quality systems engineering, interactive simulation and training systems, systems engineering, and human systems engineering/ergonomics.

Courses that require advanced expertise in quantification and measurement are appropriately taught by faculty with a PhD degree in Industrial Engineering or Statistics. Courses that require advanced expertise in relating human interaction with machines are appropriately taught by a faculty with a PhD in Industrial Engineering or Psychology. Courses that require advanced expertise in engineering management are appropriately taught by faculty with graduate degrees in Industrial Engineering or Management. Several undergraduate engineering core courses are taught by Industrial Engineering faculty as service courses to other engineering majors.

The IEMS department benefits from close ties with units at UCF including the interdisciplinary Modeling and Simulation program, the College of Business Administration, and the Institute for Simulation and Training.

Qualifying degree majors/specializations for each discipline taught in the unit [3]

Typically, doctoral degree(s) are expected for graduate-level teaching and master's degree are expected for undergraduate-level teaching. A terminal degree in the teaching discipline qualifies a person to teach throughout the broad scope of the teaching discipline at the undergraduate and graduate levels. **[4]**

- Industrial Engineering

Broadly related discipline(s) for each discipline taught in the department

Specialization qualifies a person to teach throughout the broad scope of teaching discipline (approximately five or more courses on distinct topics)

- Manufacturing Engineering
- Systems Engineering
- Operations Research
- Engineering Management
- Human Factors/Ergonomics
- Modeling & Simulation

- Psychology (cognition)

Selectively related discipline(s) for each discipline taught in the department

Specialization does not qualify a person to teach distinct topics throughout the broad scope of the teaching discipline but does qualify to teach a more restrictive set of courses in the discipline (approximately four or fewer courses on distinct topics)

- Computer Engineering
- Systems Management
- Statistics
- Computer Science
- Mechanical Engineering (qualifies faculty to teach discipline-related courses; e.g., thermodynamics)
- Electrical Engineering (qualifies faculty to teach discipline-related; e.g., principles of electrical engineering)

Justification for use of faculty with 'other' teaching qualifications and additional faculty teaching qualifications information [5] [6]

There are some industrial engineering courses that are best taught by instructors with one or more of the following:

- extensive professional and/or management experience
- professional Engineering license

---

[1] The unit chair/director, in consultation with unit faculty, has responsibility for identifying and articulating commonly accepted good practices in each teaching discipline taught in the unit and for providing appropriate justification as needed. In the case of an emerging discipline for which common collegiate practice has not yet been established, a compelling case must be provided as necessary to substantiate the claims made.

[2] Please provide a general description of the unit course and program offerings at the undergraduate and graduate levels (e.g., degree and certificate programs, minors, departmental contribution to interdisciplinary core courses). This section may also be used to provide other pertinent information about the unit and the discipline(s) it represents (e.g., discipline accreditation, faculty research emphases).

[3] List those degrees for each discipline taught in the unit that are regarded by the respective disciplinary community as terminal degrees in the discipline and thus, qualify a faculty member to teach throughout the broad scope of that discipline at both the undergraduate and graduate levels. In most fields, a terminal degree is the commonly accepted highest degree in the given field of study. In such instances, the terminal degree is usually considered to be the academic (or research) doctorate (e.g., Doctor of Philosophy). However, some academic fields have, through custom, recognized terminal degrees that are not doctorates (e.g., Master of Fine Arts, Master of Social Work). Note that terminal degrees from other disciplines may be appropriate for teaching in the discipline as well, but such credentials should be listed as broadly or selectively related degrees, as appropriate.

[4] A non-terminal master's degree in the teaching discipline qualifies a person to teach throughout the broad scope of the teaching discipline at the undergraduate level, not at the graduate level.

[5] Please use this section to provide justification that helps to make the case for special circumstances that apply to your unit including the use of faculty qualified to teach by 'other' qualifications and other special situations. Typically the statements provided in this section should be of a general nature, and not address specific individuals. (Justification for specific individuals is typically handled separately during the teaching certification process.) As appropriate, please cite to appropriate authorities to justify departmental practices (e.g., discipline accreditation guidelines, state regulations).

[6] When a faculty member cannot be qualified to teach on the basis of academic credentials (degree(s) and course work) alone, qualifications other than academic credentials (or combined with credentials) may be appropriate for teaching particular courses. Consideration of other teaching qualifications either in conjunction with or in lieu of academic credentials must be made on a case-by-case basis. Such cases should be exceptional and the evidence of other demonstrated competencies and achievements provided must be compelling. It should also show substantial and significant evidence of professional progress as related to the faculty member's teaching assignment.