# Graduate Council Curriculum Committee
**March 2, 2011**
**3:30 p.m., MH 243**

## Agenda

1. Welcome and call to order

2. Review of minutes from February 16 meeting

3. Theoretical and Applied Ethics Certificate, CAH – tabled on Feb. 2. Have not received revision.

4. Program revisions to Teacher Leadership MEd, CED

5. Revisions to the Miniature Engineering System track, Mechanical Engineering MS, CECS

6. Revisions to the Industrial Engineering PhD program, CECS

7. Revisions to the Industrial Engineering MSIE program, CECS

8. Revisions to the Industrial Engineering MS program and tracks, CECS
    - Engineering Management track
    - Human Engineering/Ergonomics –name change to Human Systems Engineering/Ergonomics track
    - Interactive Simulation and Training Systems track
    - Manufacturing Engineering track - inactivation
    - Operations Research track - inactivation
    - Professional Engineering Management track
    - Quality Engineering – name change to Quality Systems Engineering track
    - Simulation Modeling and Analysis – name change to Systems Operation and Modeling track
    - Systems Engineering track

9. Adjournment

**Members of the Graduate Council Curriculum Committee:**

Patricia Bishop, Ex officio, AA
Deborah Breiter, RCHM
Honghui Chen, CBA
Tosha Dupras, COS-Chair
Jane Gibson, COM
Naim Kapucu, COHPA
Anne Norris, CON
Joyce Nutta, CED
Max Poole, Liaison, CGS
Tison Pugh, CAH
Boris Zeldovich, COP
Terrie Sypolt, Libraries
Sergio Tafur, GSA
James Turkson, COM
Art Weeks, CECS

# Requirements

**12 Credit Hours Minimum**
**Required Courses—6 credit hours**

- **PHI 5627 Theoretical and Applied Ethics**
- **PHI 5665 Knowledge, Responsibility, and Society**

**Elective Courses—6 credit hours**
**Students may choose to specialize in some specific academic discipline or tailor their own areas of concentration. Choose elective courses* from the following list.**

- **ACG 6835 Seminar in Ethics & Professionalism in Accounting and Auditing**
- **BUL 6444 Law and Ethics**
- **CCJ 5105/CJE 5021 Foundations of Law Enforcement**
- **CJC 5020 Foundations of Corrections**
- **CCJ 5456 The Administration of Justice**
- **CCJ 6217/CJL 6568 Law and Social Control**
- **CCJ 6485 Issues in Justice Policy**
- **CCJ 6431 Leadership and Ethics in Criminal Justice**
- **CLP 6932 Ethical and Professional Issues in Mental Health Practice**
- **HUM 5803 Theories and Methods of the Humanities**
- **HUM 5802 Applied Contemporary Humanities**
- **MHS 6702 Ethical and Legal Issues**
- **MMC 6202 Legal and Ethical Issues for Communication**
- **MMC 6206/ADV 6209 Advertising and Society**
- **NGR 5746/NGR 5883 Cultural, Legal, Ethical, and Political Issues of Advanced Practice Nursing****
- **NGR 5930 Issues in Health Care for the Homeless****
- **PAD 5041 Ethics and Values in Public Administration**
- **PHM 5035 Environmental Philosophy**
- **POT 6007 Seminar in Political Theory**
- **SPS 6931 Ethical and Legal Issues in School Psychological Services**
- **WST 5347 Research Seminar in Gender Studies**

***All elective courses have been approved for inclusion by the chair or director of the relevant program. Students without appropriate prerequisites will need to obtain consent of te instructor to enroll.**
****NGR courses are restricted to graduate students in nursing.**

For more information on the Graduate Certificate Program in Theoretical and Applied Ethics, contact:


Dr. Nancy Stanlick, Graduate Coordinator

Department of Philosophy

Nancy.Stanlick@ucf.edu

407-823-2273


See also the UCF Graduate Catalog online at

http://www.graduate.ucf.edu

University of Central Florida

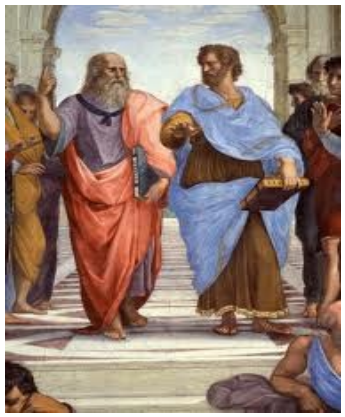
DEPARTMENT OF PHILOSOPHY


**Dr. Bruce B. Janz, Chair**
**Department of Philosophy**
**PSY 240**

**Phone: 407-823-2273**
**Web: http://philosophy.cah.ucf.edu**
**Department E-Mail: philosophy@ucf.edu**


**UNIVERSITY OF CENTRAL FLORIDA**
**DEPARTMENT OF PHILOSOPHY**

# Graduate Certificate in Theoretical and Applied Ethics




**407-823-2273**
**http://philosophy.cah.ucf.edu**

DEPARTMENT OF PHILOSOPHY

# About the Certificate Program

The Graduate Certificate in Theoretical and Applied Ethics is designed to provide a specialized investigation of ethical theory and issues from a philosophical as well as a subject-specific point of view. This interdisciplinary graduate certificate focuses on specific topics of ethical inquiry in philosophy, humanities, the arts, sciences, health care, business, education, academic and research ethics, criminal justice, public administration, public relations, journalism, politics, and other areas.


Faculty in the Department of Philosophy teach core and selected elective courses. Other courses focused on particular areas of inquiry are taught in the relevant departments and areas.

*Students may substitute courses in the design of individual areas of inquiry with approval of and in consultation with the graduate certificate program advisor.*

## Admission

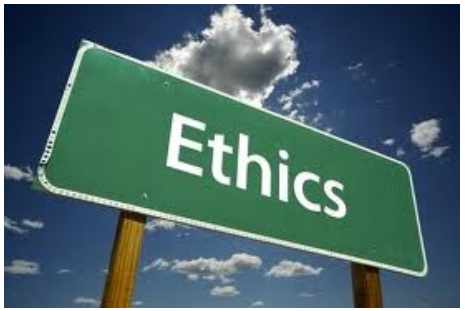
Admission is open to those with a bachelor's degree from a regionally accredited institution. An application to the graduate certificate program and official transcripts must be submitted. All application documentation is completed online. Relevant experience in theoretical and applied ethics through professional experience working with ethical issues will be evaluated by the coordinator together with the certificate committee composed of faculty from the participating departments. In addition, it is expected that applicants will have a GPA of 3.0. The certificate committee may grant exceptions where applications provide other indicators of preparedness.

## Application Due Dates

Fall: June 30

Spring: November 15

Summer: March 30




## Ethics Faculty

- Dr. Mason Cash, Ethics in Technology
- Dr. Jane Compson, Environmental, Animal, and Medical Ethics
- Dr. Harry Coverston, Ethics and Law
- Dr. Ronnie Hawkins, Environmental and Bioethics
- Dr. Donald Jones, Ethics in Science and Technology, Nano-Ethics
- Dr. Shelley M. Park, Feminist Ethics
- Dr. Nancy Stanlick, Theoretical and Applied Ethics, Academic and Research Ethics, Ethics of Interpersonal Relationships
- Dr. Michael Strawser, Theoretical Ethics, Continental Ethical Theory, Ethics of Interpersonal Relationships, Ethics in Teaching

DEPARTMENT OF PHILOSOPHY

**Dr. Bruce B. Janz, Chair**
**Department of Philosophy**
**PSY 240**

**stanlick@mail.ucf.edu**

| COURSE | Academic Year | STRM | Subject | Catalog Number | Number of Sections | Class Status | Description | Total Enrollment |
|---|---|---|---|---|---|---|---|---|
| ACG6835 | 2008-09 | 1350 | ACG | 6835 | 1 | A | SEM ETHICS & PROFESS IN ACC & | 28 |
| ACG6835 | 2009-10 | 1380 | ACG | 6835 | 1 | A | ETHICS & PROF IN ACCT & AUDIT | 43 |
| ACG6835 | 2010-11 | 1400 | ACG | 6835 | 1 | A | ETHICS & PROF IN ACCT & AUDIT | 37 |
| ACG6835 | 2010-11 | 1410 | ACG | 6835 | 1 | A | ETHICS & PROF IN ACCT & AUDIT | 33 |
| Total | | | | | 4 | | | 141 |
| | | | | | | | | |
| ADV6209 | 2009-10 | 1370 | ADV | 6209 | 1 | A | ADVERTISING AND SOCIETY | 18 |
| ADV6209 | 2010-11 | 1400 | ADV | 6209 | 1 | A | ADVERTISING AND SOCIETY | 18 |
| Total | | | | | 2 | | | 36 |
| | | | | | | | | |
| BUL6444 | 2008-09 | 1330 | BUL | 6444 | 1 | A | LAW AND ETHICS | 30 |
| BUL6444 | 2008-09 | 1340 | BUL | 6444 | 2 | A | LAW AND ETHICS | 137 |
| BUL6444 | 2009-10 | 1360 | BUL | 6444 | 1 | A | LAW AND ETHICS | 59 |
| BUL6444 | 2009-10 | 1370 | BUL | 6444 | 3 | A | LAW AND ETHICS | 150 |
| BUL6444 | 2009-10 | 1380 | BUL | 6444 | 1 | A | LAW AND ETHICS | 0 |
| BUL6444 | 2010-11 | 1390 | BUL | 6444 | 3 | A | LAW AND ETHICS | 82 |
| BUL6444 | 2010-11 | 1400 | BUL | 6444 | 2 | A | LAW AND ETHICS | 113 |
| BUL6444 | 2010-11 | 1410 | BUL | 6444 | 3 | A | LAW AND ETHICS | 85 |
| Total | | | | | 16 | | | 656 |
| | | | | | | | | |
| CCJ5105 | 2008-09 | 1330 | CCJ | 5105 | 1 | A | FOUNDATIONS OF LAW ENFORCEMENT | 25 |
| CCJ5105 | 2008-09 | 1350 | CCJ | 5105 | 1 | A | FOUNDATIONS OF LAW ENFORCEMENT | 18 |
| Total | | | | | 2 | | | 43 |
| | | | | | | | | |
| CCJ5456 | 2008-09 | 1330 | CCJ | 5456 | 2 | A | THE ADMINISTRATION OF JUSTICE | 38 |
| CCJ5456 | 2008-09 | 1340 | CCJ | 5456 | 2 | A | THE ADMINISTRATION OF JUSTICE | 44 |
| CCJ5456 | 2008-09 | 1350 | CCJ | 5456 | 2 | A | THE ADMINISTRATION OF JUSTICE | 24 |
| CCJ5456 | 2009-10 | 1360 | CCJ | 5456 | 1 | A | THE ADMINISTRATION OF JUSTICE | 30 |
| CCJ5456 | 2009-10 | 1370 | CCJ | 5456 | 2 | A | THE ADMINISTRATION OF JUSTICE | 46 |
| CCJ5456 | 2009-10 | 1380 | CCJ | 5456 | 2 | A | THE ADMINISTRATION OF JUSTICE | 12 |
| CCJ5456 | 2010-11 | 1390 | CCJ | 5456 | 1 | A | THE ADMINISTRATION OF JUSTICE | 28 |
| CCJ5456 | 2010-11 | 1400 | CCJ | 5456 | 2 | A | THE ADMINISTRATION OF JUSTICE | 48 |
| CCJ5456 | 2010-11 | 1410 | CCJ | 5456 | 2 | A | THE ADMINISTRATION OF JUSTICE | 57 |
| Total | | | | | 16 | | | 327 |
| | | | | | | | | |
| CCJ6217 | 2008-09 | 1350 | CCJ | 6217 | 1 | A | LAW AND SOCIAL CONTROL | 24 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Total | | | | | 1 | | | 24 |
| | | | | | | | | |
| CCJ6431 | 2008-09 | 1330 | CCJ | 6431 | 1 | A | LDRSHP & ETHICS IN CJ | 28 |
| CCJ6431 | 2008-09 | 1350 | CCJ | 6431 | 1 | A | LDRSHP & ETHICS IN CJ | 9 |
| Total | | | | | 2 | | | 37 |
| | | | | | | | | |
| CCJ6485 | 2008-09 | 1340 | CCJ | 6485 | 1 | A | ISSUES IN JUSTICE POLICY | 23 |
| CCJ6485 | 2008-09 | 1350 | CCJ | 6485 | 1 | A | ISSUES IN JUSTICE POLICY | 23 |
| CCJ6485 | 2009-10 | 1360 | CCJ | 6485 | 1 | A | ISSUES IN JUSTICE POLICY | 27 |
| CCJ6485 | 2009-10 | 1370 | CCJ | 6485 | 1 | A | ISSUES IN JUSTICE POLICY | 25 |
| CCJ6485 | 2010-11 | 1410 | CCJ | 6485 | 1 | A | ISSUES IN JUSTICE POLICY | 25 |
| Total | | | | | 5 | | | 123 |
| | | | | | | | | |
| CJC5020 | 2009-10 | 1380 | CJC | 5020 | 1 | A | FOUNDATIONS OF CORRECTIONS | 31 |
| CJC5020 | 2010-11 | 1400 | CJC | 5020 | 1 | A | FOUNDATIONS OF CORRECTIONS | 26 |
| CJC5020 | 2010-11 | 1410 | CJC | 5020 | 1 | A | FOUNDATIONS OF CORRECTIONS | 25 |
| Total | | | | | 3 | | | 82 |
| | | | | | | | | |
| CJE5021 | 2009-10 | 1370 | CJE | 5021 | 2 | A | FOUNDATIONS OF LAW ENFORCEMENT | 47 |
| CJE5021 | 2010-11 | 1400 | CJE | 5021 | 1 | A | FOUNDATIONS OF LAW ENFORCEMENT | 28 |
| CJE5021 | 2010-11 | 1410 | CJE | 5021 | 1 | A | FOUNDATIONS OF LAW ENFORCEMENT | 32 |
| Total | | | | | 4 | | | 107 |
| | | | | | | | | |
| CJL6568 | 2009-10 | 1360 | CJL | 6568 | 1 | A | LAW AND SOCIAL CONTROL | 27 |
| CJL6568 | 2009-10 | 1380 | CJL | 6568 | 1 | A | LAW AND SOCIAL CONTROL | 25 |
| CJL6568 | 2010-11 | 1390 | CJL | 6568 | 1 | A | LAW AND SOCIAL CONTROL | 30 |
| CJL6568 | 2010-11 | 1400 | CJL | 6568 | 1 | A | LAW AND SOCIAL CONTROL | 24 |
| CJL6568 | 2010-11 | 1410 | CJL | 6568 | 1 | A | LAW AND SOCIAL CONTROL | 27 |
| Total | | | | | 5 | | | 133 |
| | | | | | | | | |
| CLP6932 | 2008-09 | 1350 | CLP | 6932 | 1 | A | ETHIC & PROF ISS MNTL HLTH PRA | 8 |
| CLP6932 | 2009-10 | 1380 | CLP | 6932 | 1 | A | ETHIC & PROF ISS MNTL HLTH PRA | 15 |
| CLP6932 | 2010-11 | 1410 | CLP | 6932 | 1 | A | ETHIC & PROF ISS MNTL HLTH PRA | 15 |
| Total | | | | | 3 | | | 38 |
| | | | | | | | | |
| HUM5802 | 2009-10 | 1380 | HUM | 5802 | 1 | A | APPLIED CONTEMP HUMANITIES | 1 |
| Total | | | | | 1 | | | 1 |
| | | | | | | | | |
| HUM5803 | 2009-10 | 1370 | HUM | 5803 | 1 | A | THEORIES & METHODS HUMANITIES | 3 |
| Total | | | | | 1 | | | 3 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| MHS6702 | 2008-09 | 1330 | MHS | 6702 | 1 | A | ETHICAL & LEGAL ISSUES | 37 |
| MHS6702 | 2009-10 | 1360 | MHS | 6702 | 2 | A | ETHICAL & LEGAL ISSUES | 60 |
| MHS6702 | 2010-11 | 1390 | MHS | 6702 | 2 | A | ETHICAL & LEGAL ISSUES | 50 |
| MHS6702 | 2010-11 | 1400 | MHS | 6702 | 1 | A | ETHICAL & LEGAL ISSUES | 26 |
| Total | | | | | 6 | | | 173 |
| | | | | | | | | |
| MMC6202 | 2010-11 | 1400 | MMC | 6202 | 1 | A | LEGAL & ETHICAL ISSUES FOR COM | 13 |
| Total | | | | | 1 | | | 13 |
| | | | | | | | | |
| NGR5746 | 2008-09 | 1330 | NGR | 5746 | 1 | A | CULT LGL ETHIC & POL ISS APN | 40 |
| NGR5746 | 2008-09 | 1340 | NGR | 5746 | 1 | A | CULT LGL ETHIC & POL ISS APN | 26 |
| NGR5746 | 2008-09 | 1350 | NGR | 5746 | 1 | A | CULT LGL ETHIC & POL ISS APN | 29 |
| Total | | | | | 3 | | | 95 |
| | | | | | | | | |
| NGR5883 | 2009-10 | 1360 | NGR | 5883 | 1 | A | CULT LGL ETHIC & POL ISS APN | 37 |
| NGR5883 | 2009-10 | 1370 | NGR | 5883 | 1 | A | CULT LGL ETHIC & POL ISS APN | 28 |
| NGR5883 | 2009-10 | 1380 | NGR | 5883 | 1 | A | CULT LGL ETHIC & POL ISS APN | 23 |
| NGR5883 | 2010-11 | 1390 | NGR | 5883 | 1 | A | CULT LGL ETHIC & POL ISS APN | 74 |
| NGR5883 | 2010-11 | 1400 | NGR | 5883 | 1 | A | CULT LGL ETHIC & POL ISS APN | 12 |
| NGR5883 | 2010-11 | 1410 | NGR | 5883 | 1 | A | CULT LGL ETHIC & POL ISS APN | 12 |
| Total | | | | | 6 | | | 186 |
| | | | | | | | | |
| PAD5041 | 2008-09 | 1330 | PAD | 5041 | 1 | A | ETHICS & VALUES IN PUB ADMIN | 22 |
| Total | | | | | 1 | | | 22 |
| | | | | | | | | |
| **PHI 5627** | **Fall 09-10** | | **PHI** | **5627** | **1** | **A** | **Theoretical and Applied Ethics** | **11** |
| **PHI5627** | **Fall 08-09** | | **PHI** | **5627** | **1** | **A** | **Theoretical and Applied Ethics** | **8** |
| PHM5035 | 2008-09 | 1350 | PHM | 5035 | 1 | A | ENVIRONMENTAL PHILOSOPHY | 1 |
| PHM5035 | 2009-10 | 1380 | PHM | 5035 | 1 | A | ENVIRONMENTAL PHILOSOPHY | 2 |
| PHM5035 | 2010-11 | 1410 | PHM | 5035 | 1 | A | ENVIRONMENTAL PHILOSOPHY | 3 |
| Total | | | | | 3 | | | 25 |
| | | | | | | | | |
| POT6007 | 2008-09 | 1350 | POT | 6007 | 1 | A | SEMINAR IN POLITICAL THEORY | 13 |
| POT6007 | 2009-10 | 1380 | POT | 6007 | 1 | A | SEMINAR IN POLITICAL THEORY | 14 |
| POT6007 | 2010-11 | 1410 | POT | 6007 | 1 | A | SEMINAR IN POLITICAL THEORY | 10 |
| Total | | | | | 3 | | | 37 |
| | | | | | | | | |
| SPS6931 | 2008-09 | 1330 | SPS | 6931 | 1 | A | ETHIC & LEGAL ISS SCHL PSYCH S | 12 |
| SPS6931 | 2009-10 | 1360 | SPS | 6931 | 1 | A | ETHIC & LEGAL ISS SCHL PSYCH S | 14 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SPS6931 | 2010-11 | 1390 | SPS | 6931 | 1 | A | ETHIC & LEGAL ISS SCHL PSYCH S | 12 |
| Total | | | | | 3 | | | 38 |
| | | | | | | | | |
| WST5347 | 2010-11 | 1410 | WST | 5347 | 1 | A | RES SEMINAR IN GENDER STUDIES | 6 |
| Total | | | | | 1 | | | 6 |
| | | | | | | | | |
| Courses Not Offered during requested time period | | | | | | | | |
| HSC 5595 | | | | | | | | |
| | | | | | | | | |
| Note: only courses with 'A' Status Reported on | | | | | | | | |

UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

# Program Action Request Form

This form is to be used to revise, add, suspend, or inactivate degree programs, tracks, or certificate programs. A new form must be used for each program, track, or certificate.

**PLEASE NOTE**: The deadline for new tracks or certificates is **February 1 of each year**. Any proposal for new tracks or certificates received after this date will not be included in the next year's catalog. Revisions to existing programs, tracks, or certificates are **due by March 15**. Any proposals for revisions received after that date will not be included in the next year's catalog. Please include catalog copy (description, curriculum, contact information, application requirements, and application deadlines). For revisions – attach the catalog copy **showing changes (use Track Changes in Word)**.

**College/Unit(s) Submitting Proposal: College of Arts and Humanities / Philosophy**

**Proposed Effective Term/Year: Fall 2011**

**Unit(s) Housing Program: Philosophy**

**Name of program, track, and/or certificate: Theoretical and Applied Ethics Certificate**

**Description of program (this description will show up in the graduate catalog copy):**

The Graduate Certificate in Theoretical and Applied Ethics is designed to provide a specialized investigation of ethical theory and issues from a philosophical as well as a subject-specific point of view. This interdisciplinary graduate certificate focuses on specific topics of ethical inquiry in philosophy, humanities, the arts, sciences, health care, business, education, criminal justice, public administration, public relations, journalism, politics and other areas

**DELIVERY - Will program be delivered:** ☐ Face to face ☐ Completely online ☒ Mixed delivery

**Admissions deadlines**: (Please specify if you have a different deadline for the track than for the program?)

Domestic: Fall 2011 – June 30, Spring 2012 – November 15, Summer 2012 – March 30

**Application requirements:** (Please specify if you have different application requirements for the track than for the program? Will you admit directly to the track?)

A bachelor's degree from a regionally accredited institution and relevant experience with theoretical and applied ethics through course work at the undergraduate or graduate level or through professional experience.

**Program Director(s) and contact information:** (name, email, phone, campus address, program website address)

Nancy Stanlick, stanlick@mail.ucf.edu, 823-2273, PSY 0240, http://philosophy.cah.ucf.edu/graduate/index.php#ethicsCert

**Please check one: This action affects a:** ☐ Program ☐ Track ☒ Certificate

**Please check one: This action is a(n):**

☐ **Addition.** Please proceed to Part A.

☒ **Revision.** If a revision applies to multiple tracks, please list them here and then proceed to Part A:

Reactivation of Theoretical and Applied Ethics Certificate

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☐ **Inactivation**

☐ **Temporary Suspension of Admissions. Give Length of Suspension:**

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**Temporary suspension of admissions:** The program will be removed from the online application. A notation will be entered in the graduate catalog indicating the length of the suspension of admissions. Currently enrolled students will not experience any issues with continued enrollment.

**Inactivation:** Admissions will be suspended for new students and the program will be removed from the online application. Students active in the program are eligible to complete the program under the appropriate criteria and an appropriate teach-out plan is required. The program will be removed from the catalog as of the approved term.

**If you checked inactivation or you are temporarily suspending admissions, please go to Part B and complete it.**



UCF College of Graduate Studies – P.O. Box 160112, Orlando, FL 32816-0112
**Questions?** Contact Rhonda Nelson at rlnelson@mail.ucf.edu

UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

## Signature Page

**RECOMMENDATIONS**

| | | | |
|---|---|---|---|
| ☑ Yes ☐ No | **Department Chair:** | | **Date:** Jan 19/11 |
| ☑ Yes ☐ No | **College Curriculum Committee Chair:** | | **Date:** 1/19/11 |
| ☑ Yes ☐ No | **College Dean or Unit Head:** | | **Date:** 1/19/11 |
| ☐ Yes ☐ No | **Chair or GSC:** | | **Date:** |
| ☐ Yes ☐ No | **Dean, College of Graduate Studies:** | | **Date:** |

**APPROVAL**

**Provost and Vice President for Academic Affairs:** **Date:**

## Distribution: After approval is received from the Provost, distribution will be to:

Department(s); College; Registrar; Associate Registrar; Institutional Research; Academic Services; Faculty Senate; University Analysis and Planning Support; College of Graduate Studies



UCF College of Graduate Studies – P.O. Box 160112, Orlando, FL 32816-0112
**Questions?** Contact Rhonda Nelson at rlnelson@mail.ucf.edu

## Part A – For additions or revisions of programs, tracks or certificates

**Brief Statement of Program Change and rationale:** (Please indicate the change, the rationale for the change, how it affects the unit and faculty teaching in and students enrolled in the program, track or certificate. If there are changes to the credit hours of the program, required courses or other requirements, please state those changes. Remember to attach the catalog copy showing changes, using Track Changes in Word.)

With increased focus on and need for academic integrity in education, the Department of Philosophy and the College of Arts and Humanities request the reinstatement of the Graduate Certificate in Theoretical and Applied Ethics. With the rise in reports of instances of academic dishonesty in education, with research misconduct coming to the forefront of scientific investigations, and business leaders and employees engaged in questionable behavior in finance, accounting, management, banking, etc., it is important and and useful for us to reconfigure the certificate program in theoretical and applied ethics with primary and foundational focus on academic and research ethics. Since the quality and integrity of research in graduate and undergraduate education is essential to all programs, majors, and areas of inquiry, we can combine content in courses such as "Theoretical and Applied Ethics" and "Knowledge, Responsibility, and Society" as foundations with emphasis on academic and research ethics. There are no students currently enrolled in the program who will be affected by this change. Faculty in areas other than philosophy will not be affected by this change. In philosophy, course content will need to be tailored to academic and research ethics for Theoretical and Applied Ethics and Knowledge, Responsibility, and Society.

Faculty teaching the foundational courses in philosophy are Nancy Stanlick, Michael Strawser, and Harry Coverston with at least two others in the Department of Philosophy with relevant background who can also adapt their work to this content.

**Will students be moved from an existing program, track, or certificate into this new program, track, or certificate?**

☐ Yes ☒ No

If yes, state the name of the program or track where students are currently enrolled and provide a list of students if possible:

**Will students have the option to stay in their existing program, track, or certificate?** ☐ Yes ☐ No

### Name Change

**Are you changing the name of an existing program, track, or certificate?** ☐ Yes ☒ No

If yes, provide the new name of the program, track, or certificate:

Provide the name of the current program, track, or certificate:

**When is the name change effective?** Please note: A name change will apply to the record of all students who are currently enrolled, readmitted or newly admitted into this program as of the effective date of this change.

**Will students have the option to stay in their existing program, track, or certificate?** ☐ Yes ☐ No

**If you are requesting a CIP Code change for an existing program, track, or certificate, please provide:**

old CIP:

new CIP:

## If a name change is your only revision, stop here. Otherwise, complete the rest of Part A.

## Part A - Continued

**Specify the faculty who will participate in the program, track or certificate and their credentials to do so:** (List faculty and a brief paragraph of their credentials.)

Nancy A. Stanlick, Ph.D.; Michael Strawser, Ph.D.; Harry Coverston, Ph.D., JD – Stanlick and Strawser have teaching and research expertise in ethics, and both are also centrally involved in academic and research ethics both at UCF and in recognized research and teaching areas working with the UCF Office of Student Conduct and in publications. Harry Coverston has both a law degree and a degree in humanities and has previously expressed interest in teaching a course with this sort of content and can add a legal dimension to the implications of dishonesty in academic and professional contexts.

**Impact of changes on students:** Will current students be impacted by the addition or revision of a program, track or certificate? If so, how?

Current students will not be affected by the addition of this certificate.

**If applicable**, provide a written agreement (email is fine) from all involved units that they are in support of, will provide courses to, or will participate in the program, track, or certificate. Please attach the correspondence and also list the units here.

N/A

**If an addition**, provide a statement of who is likely to enroll and why. Please state if there is licensure or certification that depends upon this education, etc. Also, complete the following table.

We have undergraduate students in philosophy who have asked that the certificate program be re-instituted and, in addition, given the importance of an understanding and practice of integrity in education, research and practical/professional endeavors, this certificate program will appeal to students and professionals in education, business, healthcare, engineering, and the sciences. It

may also serve as part of the requirements of funding agencies for satisfaction of research integrity instruction.

| | Year 1 | Year 2 | Year 3 |
|---|---|---|---|
| Headcount | 10 | 12 | 15 |
| SCHs | 60 | 72 | 90 |

**If an addition**, indicate likely career or student outcomes upon completion: (What will students do? What will their job titles be?)

Student outcomes upon completion of a certificate program in theoretical and applied ethics with foundation in academic and research/professional ethics will be to provide them with instruction to situate them with a solid educational background in the history and theories of ethics, in addition to experience in application to practical cases, to serve on ethics boards in healthcare settings, to serve on advisory committees in education, to work in student services, and to be able to evaluate and critically analyze practical moral issues in research and the professions to offer advice and to help to set policies and procedures for the creation and maintenance of integrity in education, research, and the professions.

## Part A - Continued

**If an addition or there are substantial REVISIONS** to existing tracks or certificates, please complete the following table on financial support: (Specify all forms of support – assistantships, fellowships, and tuition remission.)

| | No. assistantship students | Source of funds | No. fellowship students (specify fellowship) | No. tuition remissions | Source of funds |
|---|---|---|---|---|---|
| Year 1 | 0 | | 0 | 0 | |
| Year 2 | 0 | | 0 | 0 | |
| Year 3 | 0 | | 0 | 0 | |

## Checklist of items to be provided:

☒ **Electronic graduate catalog copy for additions; track changes included if there are revisions. (required)**

☐ **Attach all appropriate course action requests that will be necessary to implement the changes. (required)**

☐ **Emails showing consultation with other units. (if applicable)**

☐ **If an addition, list of 1-3 students and 1-3 faculty for profiles in the graduate catalog (provide email address so Graduate Studies can contact them to write profiles and take photos). You may provide draft copy of profiles if you wish.**

☐ **If an addition, what disciplines does this program, track or certificate belong to? What other UCF graduate programs, tracks, or certificates are related to it? This information will be used to provide additional links for prospective students to search in the online graduate catalog.**

## Part B – For inactivations or suspensions of programs, tracks, or certificates

**Are students currently enrolled in the program?** ☐ Yes ☐ No

If yes, number of current students:

_____

**Please specify the intended time period of inactivation or suspension:**

_____

If program, track, or certificate is being inactivated or suspended, then attach a "teach out" plan for all current students specifying how they can finish the program or where students will be placed if moving to another program. The "teach out" plan should specify when courses will be offered to enable students to finish. Specify whether students will remain in the existing program to finish, and if so, when the completion date will be, whether students will be moved to another program, etc. Please provide a list of students where applicable.

Sample teach out plan: Enter the terms and courses that will be taught for each term throughout the last semester.

| Fall 2010 | Spring 2011 | Summer 2011 | Fall 2011 | Spring 2012 |
|---|---|---|---|---|
| | | | | |
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## Checklist of items to be provided:

☐ **Attach all appropriate course action requests that will be necessary to implement the changes. (required)**

☐ **Emails showing consultation with other units. (if applicable)**



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**Questions?** Contact Rhonda Nelson at rlnelson@mail.ucf.edu

# Ethics Certificate, Theoretical and Applied

x Hide preferences menu.

- ☑ Program Description
- ☑ Curriculum
- ☑ Admissions
- ☑ Application Deadlines
- ☑ Financials
- ☑ Contact Information

## Program Disciplines

This program belongs to the following disciplines:

- Philosophy
- Arts and Humanities

FEEDBACK

College : Arts and Humanities Degree : Certificate
Department : Philosophy Option : N/A
Program Websites : http://www.cah.ucf.edu/philosophy/grad.php

## PROGRAM DESCRIPTION

The Graduate Certificate in Theoretical and Applied Ethics is designed to provide a specialized investigation of ethical theory and issues from a philosophical as well as a subject-specific point of view. This interdisciplinary graduate certificate focuses on specific topics of ethical inquiry in philosophy, humanities, the arts, sciences, health care, business, education, criminal justice, public administration, public relations, journalism, politics and other areas.

Read More ▾▴

## CURRICULUM

Students may choose to specialize in some specific academic discipline or tailor their own areas of concentration.

All elective courses have been approved for inclusion by the chair or director of the relevant program. However, students without the appropriate prerequisites to courses will need to obtain the consent of the instructor to enroll.

### Total Hours Required—15 Credit Hours Minimum

**Required Courses—6 Credit Hours**

- PHI 5627 Theoretical and Applied Ethics (3 credit hours)
- PHI 5665 Knowledge, Responsibility and Society (3 credit hours)

**Elective Courses—9 Credit Hours**

- ACG 6835 ~~Seminar in~~ Ethics and Professionalism in Accounting and Auditing (3 credit hours)
- BUL 6444 Law and Ethics (~~1.5~~ 3 credit hours)
- ~~CCJ 5105~~ CJE 5021 Foundations of Law Enforcement (3 credit hours)
- CJC 5020 Foundations of Corrections (3 credit hours)
- CCJ 5456 The Administration of Justice (3 credit hours)
- ~~CCJ 6217~~ CJL 6568 Law and Social Control (3 credit hours)
- CCJ 6485 Issues in Justice Policy (3 credit hours)
- CCJ 6431 Leadership and Ethics in Criminal Justice (3 credit hours)
- CLP 6932 Ethical and Professional Issues in Mental Health Practice (3 credit hours)
- HSC 5595 AIDS: A Human Concern (3 credit hours)
- HUM 5803 Theories and Methods of the Humanities (3 credit hours)
- HUM 5802 Applied Contemporary Humanities (3 credit hours)
- MHS 6702 Ethical and Legal Issues (3 credit hours)
- MMC 6202 Legal and Ethical Issues for Communication (3 credit hours)
- ~~MMC 6606~~ ADV 6209 Advertising and Society (3 credit hours)
- NGR ~~5746~~ 5883 Cultural, Legal, Ethical, and Political Issues of Advanced Practice Nursing** (3 credit hours)
- ~~NGR 5930 Issues in Health Care for the Homeless** (3 credit hours)~~
- PAD 5041 Ethics and Values in Public Administration (3 credit hours)
- PHM 5035 Environmental Philosophy (3 credit hours)
- POT 6007 Seminar in Political Theory (3 credit hours)
- SPS 6931 Ethical and Legal Issues in School Psychological Services (3 credit hours)
- WST 5347 Research Seminar in Gender Studies (3 credit hours)

** NGR courses are restricted to graduate students in nursing.

**Comment [t1]:** Course name revised 2/10/09

**Comment [t2]:** Credits revised 2/8/07

**Comment [t3]:** Course renumbered 4/30/09

**Comment [t4]:** Course renumbered 4/30/09

**Comment [t5]:** Course renumbered 4/30/07

**Comment [t6]:** Course renumbered 4/30/09

**Comment [t7]:** Course was deleted May 2008

# Admissions

Admission is open to those with a bachelor's degree from a regionally accredited institution. An application to the graduate certificate program and official transcripts must be submitted. Applicants must apply online. All requested materials must be submitted by the established deadline(s).

Relevant experience with theoretical and applied ethics through course work at the undergraduate or graduate level or through professional experience working with ethical issues will be evaluated by the graduate program director together with the certificate committee comprised of faculty from the participating departments. Meeting minimum UCF admission criteria does not guarantee program admission. Final admission is based on evaluation of the applicant's abilities, past performance and the applicant's potential for completing the certificate.

### Application Deadlines

| Ethics Certificate, Theoretical and Applied | Fall Priority | Fall | Spring | Summer |
|---|---|---|---|---|
| Domestic Applicants | | Jun 30 | Nov 15 | Mar 30 |
| International Applicants | | | | |
| International Transfer Applicants | | | | |

## Contact Info

### Graduate Program

**Nancy Stanlick PhD**

Associate Professor

stanlick@mail.ucf.edu
Telephone: ~~407-523-5459~~ 407-823-2273
PSY ~~220~~ 240

UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

# Program Action Request Form

This form is to be used to revise, add, suspend, or inactivate degree programs, tracks, or certificate programs. A new form must be used for each program, track, or certificate.

**PLEASE NOTE:** The deadline for new tracks or certificates is **February 1 of each year**. Any proposal for new tracks or certificates received after this date will not be included in the next year's catalog. Revisions to existing programs, tracks, or certificates are **due by March 15**. Any proposals for revisions received after that date will not be included in the next year's catalog. Please include catalog copy (description, curriculum, contact information, application requirements, and application deadlines). For revisions – attach the catalog copy **showing changes (use Track Changes in Word)**.

**College/Unit(s) Submitting Proposal:** College of Education

**Proposed Effective Term/Year:** Summer 2011

**Unit(s) Housing Program:** School of Teaching, Learning, and Leadership

**Name of program, track, and/or certificate:** Teacher Leadership M.Ed.

**Description of program (this description will show up in the graduate catalog copy):**

The Master of Education (M.Ed.) program in Teacher Leadership is designed for educators who are professionally certified or eligible for a professional teaching certificate in the State of Florida who want to extend their influence beyond the walls of the classroom, to improve their knowledge and skills in the area of leadership, and who want to develop expertise in leading other educators in curriculum and instructional improvement across subject areas and grade levels. The Teacher Leadership program addresses teacher empowerment and leadership development in the expanded roles and responsibilities of teachers in schools including data-driven assessment for school improvement, professional learning communities, applying research to practice, improving instruction and student learning outcomes, and collaboration with families and community.

**DELIVERY - Will program be delivered:** ☐ Face to face ☐ Completely online **xx** Mixed delivery

**Admissions deadlines**: (Please specify if you have a different deadline for the track than for the program?)



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**Application requirements:** (Please specify if you have different application requirements for the track than for the program? Will you admit directly to the track?) Application requirements follow Graduate Studies guidelines. Applicants specify what track they will follow a time of application. Once admitted, they are admitted to the track.

**Program Director(s) and contact information:** (name, email, phone, campus address, program website address)

Carolyn Hopp, chopp@mail.ucf.edu; 407-823-0392, ED 315-G

Janet Andreasen, jandreas@mail.ucf.edu, 407-823-5430, ED 123Q

http://education.ucf.edu/teacherleadership

**Please check one: This action affects a** X Program ☐ Track ☐ Certificate

**Please check one: This action is a(n):**

☐ **Addition.** Please proceed to Part A.

X **Revision.** If a revision applies to multiple tracks, please list them here and then proceed to Part A:

All tracks are affected by program change; six new tracks are proposed

☐ **Inactivation**

☐ **Temporary Suspension of Admissions. Give Length of Suspension:**

**Temporary suspension of admissions:** The program will be removed from the online application. A notation will be entered in the graduate catalog indicating the length of the suspension of admissions. Currently enrolled students will not experience any issues with continued enrollment.

**Inactivation:** Admissions will be suspended for new students and the program will be removed from the online application. Students active in the program are eligible to complete the program under the appropriate criteria and an appropriate teach-out plan is required. The program will be removed from the catalog as of the approved term.

**If you checked inactivation or you are temporarily suspending admissions, please go to Part B and complete it.**

UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

## Signature Page

**RECOMMENDATIONS**

| | | | |
|---|---|---|---|
| ☐ Yes ☐ No | **Department Chair:** | **Date:** |
| ☐ Yes ☐ No | **College Curriculum Committee Chair:** | **Date:** |
| ☐ Yes ☐ No | **College Dean or Unit Head:** | **Date:** |
| ☐ Yes ☐ No | **Chair or GSC:** | **Date:** |
| ☐ Yes ☐ No | **Dean, College of Graduate Studies:** | **Date:** |

**APPROVAL**

**Provost and Vice President for Academic Affairs:** **Date:**

### Distribution: After approval is received from the Provost, distribution will be to:

Department(s); College; Registrar; Associate Registrar; Institutional Research; Academic Services; Faculty Senate; University Analysis and Planning Support; College of Graduate Studies



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UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

## Part A – For additions or revisions of programs, tracks or certificates

**Brief Statement of Program Change and rationale:** (Please indicate the change, the rationale for the change, how it affects the unit and faculty teaching in and students enrolled in the program, track or certificate. If there are changes to the credit hours of the program, required courses or other requirements, please state those changes. Remember to attach the catalog copy showing changes, using Track Changes in Word.)

Current M.Ed. programs in the following content areas will become tracks in the Teacher Leadership Program: Art Education, Educational Technology, English Language Arts Education, Math Education, Science Education, and Social Science Education. The Teacher Leadership program will be significantly enhanced with the addition of these tracks and will meet the needs of teachers in schools who seek to be content area leaders. Additionally, the core of the Teacher Leadership program was reduced to 15 hours from 18 in order for content areas to increase track hours if necessary to provide rigorous and quality content area and leadership courses.

**Will students be moved from an existing program, track, or certificate into this new program, track, or certificate?**

Yes ☒ No

**If yes, state the name of the program or track where students are currently enrolled and provide a list of students if possible:**

**Will students have the option to stay in their existing program, track, or certificate?** ☒ Yes ☐ No

### Name Change

**Are you changing the name of an existing program, track, or certificate?** ☐ Yes ☒ No

If yes, provide the new name of the program, track, or certificate:

Provide the name of the current program, track, or certificate: Teacher Leadership M.Ed.

**When is the name change effective?** Please note: A name change will apply to the record of all students who are currently enrolled, readmitted or newly admitted into this program as of the effective date of this change.

**Will students have the option to stay in their existing program, track, or certificate?** ☐ Yes ☐ No

**If you are requesting a CIP Code change for an existing program, track, or certificate, please provide:**

old CIP:

new CIP:

**If a name change is your only revision, stop here. Otherwise, complete the rest of Part A.**

## Part A - Continued

**Specify the faculty who will participate in the program, track or certificate and their credentials to do so:** (List faculty and a brief paragraph of their credentials.)

Current faculty in the MEd programs will participate in the tracks for this program; no new faculty are needed.

**Impact of changes on students:** Will current students be impacted by the addition or revision of a program, track or certificate? If so, how?

~no~

**If applicable**, provide a written agreement (email is fine) from all involved units that they are in support of, will provide courses to, or will participate in the program, track, or certificate. Please attach the correspondence and also list the units here.

(**attached)**

**If an addition**, provide a statement of who is likely to enroll and why. Please state if there is licensure or certification that depends upon this education, etc. Also, complete the following table.

For the additional tracks, students who would currently apply to the M.Ed programs in the content areas would apply to the track for the M.Ed Teacher Leadership Program (i.e. if they would have applied to the M.Ed Art Education, they will now apply to the M.Ed Teacher Leadership, Art Education track). Additionally, teachers in local schools will be recruited to participate in the program.

| | Year 1 | Year 2 | Year 3 |
|---|---|---|---|
| Headcount | 100 | 110 | 120 |
| SCHs | 600 | 660 | 720 |

**If an addition**, indicate likely career or student outcomes upon completion: (What will students do? What will their job titles be?)

Students are most commonly in the teaching field and teaching in local schools. Career options after completion of the program include remaining in the classroom and becoming a teacher leader in their school, department head or curriculum specialist.

## Part A - Continued

**If an addition or there are substantial REVISIONS** to existing tracks or certificates, please complete the following table on financial support: (Specify all forms of support – assistantships, fellowships, and tuition remission.)

| | No. assistantship students | Source of funds | No. fellowship students (specify fellowship) | No. tuition remissions | Source of funds |
|---|---|---|---|---|---|
| Year 1 | 0 | | 0 | 0 | |
| Year 2 | 0 | | 0 | 0 | |
| Year 3 | 0 | | 0 | 0 | |

## Checklist of items to be provided:

- ☐ **Electronic graduate catalog copy for additions; track changes included if there are revisions. (required)**
- ☐ **Attach all appropriate course action requests that will be necessary to implement the changes. (required)**
- ☐ **Emails showing consultation with other units. (if applicable)**
- ☐ **If an addition, list of 1-3 students and 1-3 faculty for profiles in the graduate catalog (provide email address so Graduate Studies can contact them to write profiles and take photos). You may provide draft copy of profiles if you wish.** ☐ **If an addition, what disciplines does this program, track or certificate belong to? What other UCF graduate programs, tracks, or certificates are related to it? This information will be used to provide additional links for prospective students to search in the online graduate catalog.**

**Comment [CWH1]:** Current student and faculty profiles for ME.d. programs in related tracks will be transferred over.

UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

## Part B – For inactivations or suspensions of programs, tracks, or certificates

**Are students currently enrolled in the program?** ☐ Yes ☐ No

If yes, number of current students:

**Please specify the intended time period of inactivation or suspension:**

If program, track, or certificate is being inactivated or suspended, then attach a "teach out" plan for all current students specifying how they can finish the program or where students will be placed if moving to another program. The "teach out" plan should specify when courses will be offered to enable students to finish. Specify whether students will remain in the existing program to finish, and if so, when the completion date will be, whether students will be moved to another program, etc. Please provide a list of students where applicable.

Sample teach out plan: Enter the terms and courses that will be taught for each term throughout the last semester.

| Fall 2010 | Spring 2011 | Summer 2011 | Fall 2011 | Spring 2012 |
|---|---|---|---|---|
| EDF 7041 | EDF 7041 | EDF 7041 | EDF 7041 | EDF 7041 |
| EDF 6442 | EDF 6442 | EDF 6442 | EDF 6442 | |
| EDF 7848 | EDF 7848 | EDF 7848 | | |
| EDF 6543 | EDF 6543 | | | |
| EDA 7503 | | | | |

## Checklist of items to be provided:

☐ **Attach all appropriate course action requests that will be necessary to implement the changes. (required)**

☐ **Emails showing consultation with other units. (if applicable)**



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# Related Programs – Teacher Leadership M.Ed.

Art Education track – Art Education MAT

Educational Technology track – Educational Technology Certificate

English Language Arts Education track – English Language Arts w/ESOL Endorsement MAT

Gifted Education track – Gifted Education Certificate

Global, International and Comparative Education track – Global, International, and Comparative Education Certificate

Mathematics Education track – Mathematics Education MAT, Middle School Mathematics Education MAT, K-8 Mathematics and Science Education Certificate, K-8 Mathematics and Science Education M.Ed.

Science Education track – Science Education, Biology MAT; Science Education, Chemistry MAT; Science Education, Physics MAT; Middle School Science Education MAT; K-8 Mathematics and Science Education Certificate, K-8 Mathematics and Science Education M.Ed.

Social Science Education track – Social Science Education MAT

Urban Education track – Urban Education Certificate

# PROGRAM DESCRIPTION

The Master of Education (MEd) program in Teacher Leadership is designed for educators who are certified or eligible for a professional teaching certificate in the State of Florida who want to extend their influence beyond the walls of the classroom, to improve their knowledge and skills in the area of leadership, and who want to develop expertise in leading other educators in curriculum and instructional improvement across subject areas and grade levels. The Teacher Leadership program addresses teacher empowerment and leadership development in the expanded roles and responsibilities of teachers in schools including data-driven assessment for school improvement, professional learning communities, applying research to practice, improving instruction and student learning outcomes, and collaboration with families and community.

# CURRICULUM

The Teacher Leadership MEd program requires a minimum of 33 credit hours beyond the bachelor's degree, including 15 credit hours of core courses, and a minimum of 18 credit hours in a chosen specialization.

### Total Credit Hours Required:

33 Credit Hours Minimum beyond the Bachelor's Degree

The MEd program requires a course-based action research study (i.e., application and analysis of the effectiveness of research-based best practices in the classroom). The research study and the capstone experiences (Research Report or Thesis) will focus on reviewing and analyzing contemporary research in the core areas of teacher leadership, curriculum theory, data-driven instructional decision making, action research and inquiry, analysis of classroom practice, and social and cultural competency in order to help candidates acquire knowledge, skills, and dispositions pertaining to research-based practices in these areas. Students also select a track in Art Education (K-12), Curriculum Leadership, Educational Technology, English/Language Arts Education (5-9 or 6-12), Gifted Education, Global, International, and Comparative Education, Mathematics Education (5-9 or 6-12), Science Education (6-12), Social Science Education (5-9 or 6-12), or Urban Education.

*** For teachers certified and interested in Middle School Science (5-9), the K-8 Mathematics and Science M.Ed. program may be of interest.

## Required Courses—33 Credit Hours Minimum

### Core—15 Credit Hours Minimum

All students must take the Teacher Leadership core, regardless of their chosen specialization.

- *EDG 6935 Introductory Seminar in Teacher Leadership (3 credit hours)
- EDG 6223 Curriculum Theory, Organization, and Policy (3 credit hours)

**Comment [CWH1]:** All course action requests relevant to this program have been approved by the College and are submitted to university committee for approval.

- EDF 6XXX Data-driven Decision Making for Instruction (3 credit hours)
- **EDF 6233 Introduction to Action Research and Analysis of Classroom Practice (3 credit hours)
- **EDF 6635 Action Research and Inquiry in Teacher Leadership (3 credit hours)
  OR **IDS 6971 Thesis (6 credit hours)

*Must be taken in first semester in the program.

**Capstone Research Project or Thesis are finalized during these courses at the end of the program.

**Tracks—18 Credit Hours Minimum**

**Art Education – 21 credit hours**

- ARE 6450 K-12 Instructional Materials (3 credit hours)
- ARE 6666 Arts Education Advocacy (3 credit hours)
- ARE 6748 Advanced Research Seminar in Art Education (3 credit hours)
- ARE 6747 Assessment Seminar (3 credit hours)
- ARE 6905 Research Trends in Art Education (3 credit hours)

Choose two electives:

- ARE 5251 Art for Exceptionalities
- ARE 5454 Studio Experiences in Art Education (repeatable 3 times)
- ARE 6195 Teaching Art Appreciation and Criticism
- ARE 6450 K-12 Instructional Materials
- ARE 6666 Arts Education Advocacy
- ARE 6748 Advanced Research Seminar in Art Education
- ARE 6747 Assessment Seminar
- ARE 6905 Research Trends in Art Education
- ART studio courses approved by adviser

**Curriculum Leadership (18 credit hours)**

Students take the following courses:

- ESE 6217 Curriculum Design (3 credit hours)
- ESE 6416 Curriculum Evaluation (3 credit hours)
- EDG 6224 Curriculum Policy Analysis (3 credit hours)
- EDF 6259 Learning Theories Applied to Leadership in Teaching Practice (3 credit hours)

Choose two elective courses with adviser approval:

- EDF 6517 Perspectives on Education (3 credit hours)
- EME 5050 Fundamentals of Technology for Educators or EME 6602 Integration of Technology into the Curriculum (3 credit hours)

- EDF 6886 Multicultural Education (3 credit hours)
- EDS 6123 Educational Supervisory Practices I or EDS 6130 Educational Supervisory Practices II or EDA 6502 Administration of Instructional Programs (3 credit hours)
- IDS 6516 Leadership Development for Math and Science Teachers (3 credit hours)
- RED 5147 Developmental Reading (3 credit hours)
- Other electives as approved by adviser and program coordinator (up to 6 credit hours)

**Educational Technology (18 credit hours)**

- EME 5050 Fundamentals of Technology for Educators (3 credit hours)
- EME 5053 Electronic Resources for Education (3 credit hours)
- EME 6405 Application Software for Educational Settings (3 credit hours)
- EME 6507 Multimedia in the Classroom (3 credit hours)
- EME 6602 Integrating Technology into the Curriculum (3 credit hours)

Select one of the following:

- EME 6055 Current Trends in Instructional Technology (3 credit hours)
- EME 6062 Research in Instructional Technology (3 credit hours)
- EME 6613 Instructional Systems Design (3 credit hours)
- EME 6417 Interactive Online and Virtual Teaching Environments (3 credit hours) **
- **The prerequisite for this course is EME 6507.
  EME 6458 Virtual Teaching and the Digital Educator (3 credit hours)**
  **The pre-requisite for this course is EME 6417.

**English/Language Arts Education (18 credit hours)**

- LAE 6637 Research in Teaching English (3 credit hours)
- LAE 6936 Seminar in Language Arts Education (3 credit hours)
- EDF 6259 Learning Theories Applied to Leadership in Teaching Practice (3 credit hours)
- Select 3 of the following courses:
    - LAE 5295 Writing Workshop I (3 credit hours)
    - LAE 5337 Literacy Strategies for Middle and Secondary Teaching (3 credit hours)
    - LAE 5495 Assessing Writing (3 credit hours)
    - LAE 6296 Writing Workshop II (3 credit hours)
    - LAE 6366 Studies in Adolescent Literature (3 credit hours)
    - LAE 6616 Trends in Language Arts Education (3 credit hours)

**Gifted Education (18 credit hours)**

- EDF 6259 Learning Theories Applied to Leadership in Teaching Practice (3 credit hours)
- EGI 6051 Understanding the Gifted/Talented Student (3 credit hours)

- EGI 6245 Program Planning and Methodology for Gifted/Talented Students (3 credit hours)
- EGI 6246 Education of Special Populations of Gifted Students (3 credit hours)
- SDS 6426 Guidance and Counseling of Gifted/Talented Individuals (3 credit hours)
- EGI 6305 Theory and Development of Creativity (3 credit hours)

**Global, International, and Comparative Education**

- EDF 6809: Introduction to Comparative and International Education (3 credit hours)
- SSE 5391: Global Education: Theory and Practice (3 credit hours)
- EDF 6XXX: Equitable Educational Opportunity and Life Chances: A Cross-National Analysis (3 credit hours)
- EDS 6XXX: Education and National Development (3 credit hours)
- EDF 6259 Learning Theories Applied to Leadership in Teaching Practice (3 credit hours)

Choose Two (2) of the following:

- EDG 6XXX: Exploring Global Educational Issues in Int'l. Contexts (3 credit hours)
- EEC 6606: International Perspectives on Early Childhood Development (3 credit hours)
- Other graduate courses with Program Coordinator's Approval

**Mathematics Education (18 credit hours)**

- MAE 6337 Teaching Algebra in Secondary Schools (3 credit hours)
- MAE 6338 Teaching Geometry in Secondary Schools (3 credit hours)
- EDF 6259 Learning Theories Applied to Leadership in Teaching Practice (3 credit hours)
- Select 3 of the following courses:
    - MAE 6517 Diagnosis/Remediation of Difficulties in Mathematics for the Classroom Teacher (3 credit hours)
    - MAE 6641 Problem Solving and Critical Thinking Skills (3 credit hours)
    - MAE 6656 Using Technology in the Instruction of K-12 Mathematics (3 credit hours)
    - MAE 6938 Teaching Advanced Mathematics (3 credit hours)
    - IDS 6516 Leadership Development for Mathematics and Science Teachers (3 credit hours)
    - IDS 6910 Research in Mathematics and Science Education (3 credit hours)
    - IDS 6937 Reflecting on Instruction of Mathematics and Sciences (3 credit hours)
    - IDS 6939 Reforming Curriculum in Mathematics and Science Education (3 credit hours)

**Science Education (18 credit hours)**

- Choose 3 of the following courses:
    - SCE 5836 Space Science for Educators (3 credit hours)
    - ISC 6146 Environmental Education for Educators (3 credit hours)
    - IDS 6516 Leadership Development for Mathematics and Science Teachers (3 credit hours)

    - IDS 6910 Research in Mathematics and Science Education (3 credit hours)
    - IDS 6937 Reflecting on Instruction of Mathematics and Science (3 credit hours)
    - IDS 6939 Reforming Curriculum in Mathematics and Science Education (3 credit hours)
- Graduate science content courses in the following areas (9 credit hours)
    - Biology Focus (choose three):
        - EVR 5930
        - HUN 5247
        - IDS 5127
        - Any graduate level course with prefixes BSC, HSC, MCB, PCB, or ZOO
    - Chemistry focus (choose three):
        - BCH 6740
        - HUN 5247
        - Any graduate level course with prefixes CHM or CHS
    - Physics focus (choose three):
        - Any graduate level course with prefixes AST, OSE, PHY, or PHZ

*** For teachers certified and interested in Middle School Science, the K-8 Mathematics and Science M.Ed. program may be of interest.

**Social Science Education (18 credit hours)**

- SSE Electives (12 credit hours)
- Social science electives in other programs and departments (6 credit hours), including, but not limited to, the following course prefixes: AFH, AMH, ASH, CPO, EUH, HIS, INR, LAH, or POS

**Urban Education (18 credit hours)**

Students take the following courses:

- EDF 6259 Learning Theories Applied to Leadership in Teaching Practice (3 credit hours)
- EDF 6725 Critical Issues in Urban Education (3 credit hours)
- EDF 6936 Seminar in Improving Teaching and Learning in Urban Settings (3 credit hours)
- EDG 6636 Social Contexts of the Urban Classroom (3 credit hours)

Choose two (2) elective courses with adviser approval:

- EEX 6342 Seminar, Critical Issues in Special Education (3 credit hours)
- EDF 6688 Public Policy and Urban Education (3 credit hours)
- EDF 6884 Education as a Cultural Process (3 credit hours)
- EGI 6426 Education of Special Populations of Gifted Students (3 credit hours)
- SYD 5795 Class, Race, and Gender in American Society (3 credit hours)
- EDF 6886 Multicultural Education (3 credit hours)

*** The Urban Certificate is 15 credit hours. The M.Ed. in Teacher Leadership, Urban Education track, requires 18 credit hours as indicated above.

# Application Requirements

For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

In addition to the general UCF graduate application requirements, applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended.
- Evidence of eligibility for a professional teaching certificate in Florida in related area to selected track.
- Goal statement.
- Applicants applying to this program who have attended a college/university outside the United States must provide a course-by-course credential evaluation with GPA calculation. Credential evaluations are accepted from World Education Services (WES) or Josef Silny and Associates, Inc. only.

### Application Deadlines

| Teacher Leadership MEd | Fall Priority | Fall | Spring | Summer |
|---|---|---|---|---|
| **Domestic Applicants** | Jan 15 | Jul 15 | Dec 1 | Apr 15 |
| **International Applicants** | Jan 15 | Jan 15 | Jul 1 | Nov 1 |
| **International Transfer Applicants** | Jan 15 | Mar 1 | Sep 1 | Dec 15 |

# FINANCIALS

Graduate students may receive financial assistance through fellowships, assistantships, tuition support, or loans. For more information, see Student Finances, which describes the types of financial assistance available at UCF and provides general guidance in planning your graduate finances. The Financial Information section of the Graduate Catalog is another key resource.

### Fellowships

Fellowships are awarded based on academic merit to highly qualified students. They are paid to students through the Office of Student Financial Assistance, based on instructions provided by the College of Graduate Studies. Fellowships are given to support a student's graduate study and do not have a work obligation. For more information, see Fellowships, which includes descriptions of UCF fellowships and what you should do to be considered for a fellowship.

UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

# Program Action Request Form

This form is to be used to revise, add, suspend, or inactivate degree programs, tracks, or certificate programs. A new form must be used for each program, track, or certificate.

**PLEASE NOTE:** The deadline for new tracks or certificates is **February 1 of each year**. Any proposal for new tracks or certificates received after this date will not be included in the next year's catalog. Revisions to existing programs, tracks, or certificates are **due by March 15**. Any proposals for revisions received after that date will not be included in the next year's catalog. Please include catalog copy (description, curriculum, contact information, application requirements, and application deadlines). For revisions – attach the catalog copy **showing changes (use Track Changes in Word)**.

**College/Unit(s) Submitting Proposal: College of Engineering and Computer Science**

**Proposed Effective Term/Year: 2011/2012**

**Unit(s) Housing Program: Department of Mechanical, Materials, and Aerospace Engineering**

**Name of program, track, and/or certificate: Masters in Mechanical Engineering, Miniature Engineering System Track**

**Description of program (this description will show up in the graduate catalog copy):**

The Master of Science in Mechanical Engineering is primarily intended for students with a bachelor's degree in Mechanical or Aerospace engineering or a closely related discipline obtained from a recognized accredited institution. The program offers Computer-Aided Mechanical Engineering, Mechanical Systems, Miniature Engineering Systems, Professional, Thermofluids and Accelerated BS to MS tracks.

International students may only take one course per semester in a totally online format while attending UCF on a F-1 visa. Courses in this program can be taken in mixed mode for international students at UCF or fully online for international students who are not on visas. If you have questions, please consult the International Service Center at www.intl.ucf.edu.

**DELIVERY - Will program be delivered:** ☐ Face to face ☐ Completely online ☐☒ Mixed delivery

**Admissions deadlines**: (Please specify if you have a different deadline for the track than for the program?)



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**Questions?** Contact Rhonda Nelson at rlnelson@mail.ucf.edu

**Application requirements:** (Please specify if you have different application requirements for the track than for the program? Will you admit directly to the track?)

The requirement of the MES track program is the same as the program

**Program Director(s) and contact information:** (name, email, phone, campus address, program website address)

Alain Kassab, kassab@mail.ucf.edu, ENGR 1, Room 313, (407)823-5778, www.mmae.ucf.edu/Academics/graduate.html

**Please check one: This action affects a:** ☐ Program ☐☒ Track ☐ Certificate

**Please check one: This action is a(n):**

☐ **Addition.** Please proceed to Part A.

☐☒ **Revision.** If a revision applies to multiple tracks, please list them here and then proceed to Part A:

☐ **Inactivation**

☐ **Temporary Suspension of Admissions. Give Length of Suspension:**

**Temporary suspension of admissions:** The program will be removed from the online application. A notation will be entered in the graduate catalog indicating the length of the suspension of admissions. Currently enrolled students will not experience any issues with continued enrollment.

**Inactivation:** Admissions will be suspended for new students and the program will be removed from the online application. Students active in the program are eligible to complete the program under the appropriate criteria and an appropriate teach-out plan is required. The program will be removed from the catalog as of the approved term.

## If you checked inactivation or you are temporarily suspending admissions, please go to Part B and complete it.

UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

## Signature Page

**RECOMMENDATIONS**

| | | | |
|---|---|---|---|
| ☐ Yes ☐ No | **Department Chair:** | **Date:** |
| ☐ Yes ☐ No | **College Curriculum Committee Chair:** | **Date:** |
| ☐ Yes ☐ No | **College Dean or Unit Head:** | **Date:** |
| ☐ Yes ☐ No | **Chair or GSC:** | **Date:** |
| ☐ Yes ☐ No | **Dean, College of Graduate Studies:** | **Date:** |

**APPROVAL**

**Provost and Vice President for Academic Affairs:** **Date:**

## Distribution: After approval is received from the Provost, distribution will be to:

Department(s); College; Registrar; Associate Registrar; Institutional Research; Academic Services; Faculty Senate; University Analysis and Planning Support; College of Graduate Studies



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UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

## Part A – For additions or revisions of programs, tracks or certificates

**Brief Statement of Program Change and rationale:** (Please indicate the change, the rationale for the change, how it affects the unit and faculty teaching in and students enrolled in the program, track or certificate. If there are changes to the credit hours of the program, required courses or other requirements, please state those changes. Remember to attach the catalog copy showing changes, using Track Changes in Word.)

This EML 5291 course will replace EEL 6326C which was used as a required course of the Miniature Engineering Systems (MES) track program of MMAE department. Since access to the clean room and course offering of EEL 6326C (currently changed to EEE 6326C) are not insured by the electrical engineering department and neither the MMAE department. As a result, a change of required course is important to all MES students. The laboratory education is covered partially by video based laboratory lectures offered by the EML 5290 Introduction to MEMS and Micromachining.

**Will students be moved from an existing program, track, or certificate into this new program, track, or certificate?**

☐ Yes ☐☒ No

If yes, state the name of the program or track where students are currently enrolled and provide a list of students if possible:

**Will students have the option to stay in their existing program, track, or certificate?** ☐ xYes ☐ No

### Name Change

**Are you changing the name of an existing program, track, or certificate?** ☐ Yes ☐☒ No

If yes, provide the new name of the program, track, or certificate:

Provide the name of the current program, track, or certificate:

**When is the name change effective?** Please note: A name change will apply to the record of all students who are currently enrolled, readmitted or newly admitted into this program as of the effective date of this change.

**Will students have the option to stay in their existing program, track, or certificate?** ☐ Yes ☐ No

**If you are requesting a CIP Code change for an existing program, track, or certificate, please provide:**

old CIP:

new CIP:

**If a name change is your only revision, stop here. Otherwise, complete the rest of Part A.**

## Part A - Continued

**Specify the faculty who will participate in the program, track or certificate and their credentials to do so:** (List faculty and a brief paragraph of their credentials.)

Dr. Quanfang Chen, Professor, microfabrication, smart materials and structures, sensors, mechanics in small scales, nanomaterials

Dr. Hyoung Jin Cho, Associate Professor, microfabrication, BioMEMS, sensors.

Dr. Jayanata Kapat, Professor, thermal fluids, scalling laws, energy

Dr. Louis Chow, Professor, Cooling of electronics, thermal fluids

Dr. Weiwei Deng, Assistant Professor, thermal fluids, micro injection, solar cells, drug delievery

Dr. Linan An, Associate Professor, polymer MEMS, polymer derived ceramics, high temperature sensors

**Impact of changes on students:** Will current students be impacted by the addition or revision of a program, track or certificate? If so, how?

Students will effectively complete online courses in a timely manner.

**If applicable**, provide a written agreement (email is fine) from all involved units that they are in support of, will provide courses to, or will participate in the program, track, or certificate. Please attach the correspondence and also list the units here.

**If an addition**, provide a statement of who is likely to enroll and why. Please state if there is licensure or certification that depends upon this education, etc. Also, complete the following table.

| | Year 1 | Year 2 | Year 3 |
|---|---|---|---|
| Headcount | | | |
| SCHs | | | |

**If an addition**, indicate likely career or student outcomes upon completion: (What will students do? What will their job titles be?)

## Part A - Continued

**If an addition or there are substantial REVISIONS** to existing tracks or certificates, please complete the following table on financial support: (Specify all forms of support – assistantships, fellowships, and tuition remission.)

| | No. assistantship students | Source of funds | No. fellowship students (specify fellowship) | No. tuition remissions | Source of funds |
|---|---|---|---|---|---|
| Year 1 | | | | | |
| Year 2 | | | | | |
| Year 3 | | | | | |

## Checklist of items to be provided:

✠☐ **Electronic graduate catalog copy for additions; track changes included if there are revisions. (required)**

☐ **Attach all appropriate course action requests that will be necessary to implement the changes. (required)**

☐ **Emails showing consultation with other units. (if applicable)**

☐ **If an addition, list of 1-3 students and 1-3 faculty for profiles in the graduate catalog (provide email address so Graduate Studies can contact them to write profiles and take photos). You may provide draft copy of profiles if you wish.**

☐ **If an addition, what disciplines does this program, track or certificate belong to? What other UCF graduate programs, tracks, or certificates are related to it? This information will be used to provide additional links for prospective students to search in the online graduate catalog.**



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UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

## Part B – For inactivations or suspensions of programs, tracks, or certificates

**Are students currently enrolled in the program?** ☐☒ Yes ☐ No

If yes, number of current students:

7 students are currently enrolled (based on Fall '10 enrollment).

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**Please specify the intended time period of inactivation or suspension:**

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If program, track, or certificate is being inactivated or suspended, then attach a "teach out" plan for all current students specifying how they can finish the program or where students will be placed if moving to another program. The "teach out" plan should specify when courses will be offered to enable students to finish. Specify whether students will remain in the existing program to finish, and if so, when the completion date will be, whether students will be moved to another program, etc. Please provide a list of students where applicable.

Sample teach out plan: Enter the terms and courses that will be taught for each term throughout the last semester.

| Fall 2010 | Spring 2011 | Summer 2011 | Fall 2011 | Spring 2012 |
|---|---|---|---|---|
| EDF 7041 | EDF 7041 | EDF 7041 | EDF 7041 | EDF 7041 |
| EDF 6442 | EDF 6442 | EDF 6442 | EDF 6442 | |
| EDF 7848 | EDF 7848 | EDF 7848 | | |
| EDF 6543 | EDF 6543 | | | |
| EDA 7503 | | | | |

## Checklist of items to be provided:

☐ **Attach all appropriate course action requests that will be necessary to implement the changes. (required)**

☐ **Emails showing consultation with other units. (if applicable)**



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Miniature Engineering Systems

**TRACK DESCRIPTION**

The Master of Science in Mechanical Engineering is primarily intended for students with a bachelor's degree in Mechanical or Aerospace engineering or a closely related discipline obtained from a recognized accredited institution. The program offers Computer-Aided Mechanical Engineering, Mechanical Systems, Miniature Engineering Systems, Professional, Thermofluids and Accelerated BS to MS tracks.

International students may only take one course per semester in a totally online format while attending UCF on a F-1 visa. Courses in this program can be taken in mixed mode for international students at UCF or fully online for international students who are not on visas. If you have questions, please consult the International Service Center at www.intl.ucf.edu.

**CURRICULUM**

**Total Credit Hours Required:**

30 Credit Hours Minimum beyond the Bachelor's Degree

All students must identify an adviser and file an official degree program of study prior to the completion of 9 credit hours of study. Students should consult with the MMAE Graduate Program Director for assistance in completing the program of study form. The program of study must have departmental approval and must include 24 hours of formal course work, exclusive of thesis and research. In addition, at least half of the credit hours must be from courses at the 6000 level. Substitutions to the program of study must meet with the approval of the adviser and the department.

A student with an undergraduate degree outside of the selected departmental discipline may be required to satisfy an articulation program and may have to take additional prerequisites. More information is available from the MMAE departmental website listed above.

**Required Courses—12 Credit Hours**

- EML 5060 Mathematical Methods in Mechanical, Materials and Aerospace Engineering (3 credit hours)
- EML 5290 Introduction to MEMS and Micromachining (3 credit hours)
- EML 6296 MEMS Mechanism and Design (3 credit hours)
- ~~EEL 6326C MEMS Fabrication Laboratory (3 credit hours) or EEL 5355C Fabrication of Solid State Devices (3 credit hours)~~
- EML 5291 MEMS Materials (3 credit hours)

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**Elective Courses—12 Credit Hours**

All students, both thesis and nonthesis, must take 12 credit hours of electives from the following list or from courses from other tracks. The electives should be chosen in consultation with the student's adviser.

- EEEL 6326C MEMS Fabrication Laboratory (3 credit hours) or EEEL 5355C56 Fabrication of Solid-State Devices (3 credit hours)
- 
- EML 5292 Fundamental Phenomena and Scaling Laws in Miniature Engineering Systems (3 credit hours)
- ~~EML 5291 MEMS Materials (3 credit hours)~~
- EML 6299 Advanced Topics on Miniaturization (3 credit hours)
- EML 6297 MEMS Characterization (3 credit hours)
- EML 6295 Sensors and Actuators for Micro Mechanical Systems (3 credit hours)
- EML 5211 Continuum Mechanics (3 credit hours)
- EML 5025C Engineering Design Practice (3 credit hours)
- ENG 5858C Prototyping and Product Realization (3 credit hours)
- EML 5271 Intermediate Dynamics (3 credit hours)
- EML 5152 Intermediate Heat Transfer (3 credit hours)
- EML 6712 Mechanics of Viscous Flow (3 credit hours)
- EML 6155 Convective Heat Transfer (3 credit hours)
- EML 5713 Intermediate Fluid Mechanics (3 credit hours)
- EML 6725 Computational Fluid Dynamics (3 credit hours)
- EML 6104 Classical Thermodynamics (3 credit hours)
- EML 5402 Turbomachinery (3 credit hours)
- EML 5532C Computer-Aided Design for Manufacture (3 credit hours)
- EAS 5407 Mechatronics (3 credit hours)
- EML 6157 Radiation Heat Transfer (3 credit hours)
- EML 6233 Fundamentals of Fatigue Analysis (3 credit hours)
- EML 5245 Tribology (3 credit hours)
- EML 5311 System Control (3 credit hours)
- EML 5105 Gas Kinetics and Statistical Thermodynamics (3 credit hours)
- EEL 5625 Applied Control System (3 credit hours)
- EML 5546 Engineering Design with Composite Materials (3 credit hours)
- EML 6203 Advanced Vibrational Systems (3 credit hours)
- EML 6067 Finite Elements in Mechanical, Materials and Aerospace Engineering I (3 credit hours)

**Thesis Option—6 Credit Hours**

Thesis students must complete an independent research project, and write and defend a thesis describing the project. Students may not register for thesis credit hours until an advisory committee has been appointed and the committee has reviewed the program of study and the proposed thesis topic.

- EML 6971 Thesis (6 credit hours)

The College of Engineering and Computer Science requires that all thesis defense announcements be approved by the student's advisor and posted on the college's website and on the Events Calendar at the College of Graduate Studies website at least two weeks before the defense date.

### Nonthesis Option—6 Credit Hours

Nonthesis students are required to take EML 6085 Research Methods in MMAE or EML 6918 Directed Research as part of their 30-credit-hour course requirement. Furthermore, they must take an additional elective beyond the 12 credit hours of electives described above.

- EML 6085 Research Methods in MMAE (3 credit hours) or EML 6918 Directed Research (3 credit hours)
- Elective (3 credit hours)

### Equipment Fee

Students in the Mechanical Engineering MSME program pay a $90 equipment fee each semester that they are enrolled.

### INDEPENDENT LEARNING

The Independent Learning requirement is met by successful completion of a master's thesis for the thesis option. The nonthesis option requires either EML 6085 Research Methods in MMAE (3 credit hours) or EML 6918 Directed Research (3 credit hours) as the student's independent learning experience.

### Application Requirements

For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

The College of Engineering and Computer Science encourages prospective applicants to complete a pre-application form (www.cecs.ucf.edu/preapp) before completing the online application for graduate admission.

In addition to the general UCF graduate application requirements, applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended.
- A bachelor's degree in Mechanical or Aerospace Engineering, or a closely related discipline.
- Résumé.
- Statement of educational, research, and professional career objectives.
- Applicants applying to this program who have attended a college/university outside the United States must provide a course-by-course credential evaluation with GPA calculation. Credential

evaluations are accepted from World Education Services (WES) or Josef Silny and Associates, Inc. only.

Faculty members may choose to conduct face-to-face or telephone interviews before accepting an applicant into their research program.

Additional courses may be required to correct deficiencies. Applicants should contact the MMAE graduate program director for more information.

### Application Deadlines

**All application materials must be submitted by the appropriate deadline listed below.**

| Miniature Engineering Systems | Fall Priority | Fall | Spring | Summer |
|---|---|---|---|---|
| Domestic Applicants | Jan 15 | Jul 15 | Dec 1 | Apr 15 |
| International Applicants | Jan 15 | Jan 15 | Jul 1 | Nov 1 |
| International Transfer Applicants | Jan 15 | Mar 1 | Sep 1 | Dec 15 |

## FINANCIALS

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### Fellowships

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UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

# Program Action Request Form

This form is to be used to revise, add, suspend, or inactivate degree programs, tracks, or certificate programs. A new form must be used for each program, track, or certificate.

**PLEASE NOTE:** The deadline for new tracks or certificates is **February 1 of each year**. Any proposal for new tracks or certificates received after this date will not be included in the next year's catalog. Revisions to existing programs, tracks, or certificates are **due by March 15**. Any proposals for revisions received after that date will not be included in the next year's catalog. Please include catalog copy (description, curriculum, contact information, application requirements, and application deadlines). For revisions – attach the catalog copy **showing changes (use Track Changes in Word)**.

College/Unit(s) Submitting Proposal: **College of Engineering and Computer Science**

Proposed Effective Term/Year: **Summer 2011**

Unit(s) Housing Program: **Industrial Engineering and Management Systems**

Name of program, track, and/or certificate: **Industrial Engineering PhD IE**

**Description of program (this description will show up in the graduate catalog copy):**

## INDUSTRIAL ENGINEERING PHD

### PROGRAM DESCRIPTION

The Doctor of Philosophy in Industrial Engineering is 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, systems engineering, and human engineering/ergonomics.

The Industrial Engineering program is structured to support the emergence of Central Florida as a national center of high technology as well as supporting the diverse service industries in the region and throughout the nation.

### CURRICULUM

The Industrial Engineering PhD program requires a minimum of 72 credit hours beyond the bachelor's degree. Beyond the master's degree, students must complete at least 27 credit hours of required courses that include 6 credit hours of doctoral core, 9 credit hours in specialization core courses in a selected area



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(engineering management, human engineering/ergonomics, interactive simulation and training quality engineering, systems operations and modeling, or systems engineering), and 12 credit hours of doctoral elective courses, in addition to 15 credit hours of dissertation.

Of the total course work taken, 27 hours must be formal course work exclusive of independent study and 15 credit hours must consist of dissertation research (EIN 7980). All remaining hours are determined with a faculty adviser and approved by the department.

## Total Credit Hours Required:

72 Credit Hours Minimum beyond the Bachelor's Degree

As a pre-doctoral student at the beginning of the PhD program, a preliminary program of study must be developed with the graduate program coordinator and meet with departmental approval. At this time transfer credit will be evaluated on a course-by-course basis. After completion of the Qualifying Examination and admission as a doctoral student, the official program of study is developed with an adviser and must meet with departmental approval. The student's dissertation committee approves the final program of study after the Candidacy Examination is passed. The degree must be completed within seven years from the date of admission as a pre-doctoral student and within four years of passing the Candidacy Examination.

The Department of Industrial Engineering and Management Systems monitors student progress and may revert any student to Nondegree status if performance standards or academic progress are not maintained. Satisfactory academic performance in a program includes, but is not limited to, maintaining at least a 3.0 GPA in all graduate work taken as part of (or transferred into) the program of study. Satisfactory performance also involves maintaining the standards of academic progress and professional integrity expected in our discipline. Failure to maintain these standards may result in dismissal from the program.

**Depending on a student's chosen focus area, the formal coursework for this program can be taken entirely through FEEDS.**

## Prerequisites

Students must have background in the following areas.

- MS degree in IE or related discipline
- MUST have MS Core knowledge*

  * Knowledge to be tested through Qualifying Examination (QE)

Students without a B.S.I.E. (or M.S.I.E. from UCF) degree must have four additional required courses as articulation courses. See Credit Waived from an Earned Master's Degree and Articulation Section below.

## REQUIRED COURSE S (27 CREDIT HOURS)

### Doctoral Core Courses (6 Credit Hours)

- ESI 6891 IEMS Research Methods
- Select one:
  - ESI 6247 Experimental Design and Taguchi Methods
  - EIN 5388 Forecasting

### Specialization Core (9 Credit Hours)

Select one of the following focus areas.

#### Human System Engineering/Ergonomics

• EIN 5248C Ergonomics
• EIN 6270C Work Physiology
• EIN 5251 Usability Engineering

#### Engineering Management

• EIN 5108 The Environment of Technical Organizations
• EIN 6459 Concurrent Engineering
• EIN 6182 Engineering Management

#### Interactive Simulation and Training Systems

• EIN 5255C Interactive Simulation
• EIN 6649C. Intelligent Tutoring Training System Design
• EIN 6645 Real Time Simulation Agents

#### Quality Systems Engineering

• ESI 6224 Quality Management
• ESI 5227 Total Quality Improvement
• ESI 5236 Reliability Engineering

#### Systems Operations and Modeling

• ESI 5531 Discrete System Simulation*
• ESI 6358 Decision Analysis
• ESI 5306 Operations Research*

* For BSIE these will be replaced by ESI 6532 and ESI 6418

### Systems Engineering

- EIN 6215: System Safety Engineering and Management
- ESI 5359: Risk Assessment and Management
- ESI 6358: Decision Analysis

## Doctoral Elective Courses (12 credit hours)

- Up to four unrestricted electives

## CREDIT WAIVED FROM AN EARNED MASTER'S DEGREE AND ARTICULATION (30 HOURS)

A maximum of 30 semester credit hours from an earned master's degree may be applied toward these requirements. Waived credits are evaluated on a course-by-course basis.

## Articulation Courses

Non BSIE or MSIE students need to take the four courses that constitute the MS core. These courses are:

- ESI 5219: Engineering Statistics
- EIN 5140: Project Engineering
- ESI 6551C: Systems Engineering
- EIN 6357: Advanced Engineering Economic Analysis

In addition, these students are encouraged to take additional articulation courses, if needed, from any of the following areas:

## Group A: Human System Engineering/Ergonomics

- EIN 6270C Work Physiology (3 credit hours)
- EIN 6258 Human-Computer Interaction (3 credit hours)
- EIN 6279C Biomechanics (3 credit hours)
- EIN 6215 Systems Safety Engineering and Management (3 credit hours)
- EIN 5251 Usability Engineering (3 credit hours)
- EIN 5248C Ergonomics (3 credit hours)

## Group B: Traditional IE (IE, Engineering Management, Quality, Manufacturing)

- ESI 6225 Quality Design and Control (3 credit hours)
- ESI 6224 Quality Management (3 credit hours)
- ESI 5236 Reliability Engineering (3 credit hours)
- EIN 5346 Engineering Logistics (3 credit hours)
- EIN 5108 The Environment of Technical Organizations

- EIN 6182 Engineering Management
- EIN 5117 Management Information Systems I (3 credit hours)

**Group C: Simulation, Optimization, and Modeling**

- ESI 6336 Queuing Systems (3 credit hours)
- ESI 6358 Decision Analysis (3 credit hours)
- ESI 5359 Risk Assessment and Management (3 credit hours)
- ESI 5306 Operations Research
- ESI 6418 Linear Programming and Extensions
- ESI 6532 Object-Oriented Simulation

## EXAMINATIONS

In addition to the Qualifying Examination, the student must pass a Candidacy Examination and a Dissertation Defense Examination.

The Qualifying Examination (QE) is a written exam that focuses in student's mastery of the content covered in the IEMS MS program's core courses that are listed above.

IEMS MS students who plan to continue their studies for Ph.D. I.E. can take the QE in the last semester before or the first semester after graduation. Graduates from other MS programs may delay taking the QE until they have taken the MS core courses. The maximum delay is one year after admission to the program. Courses other than MS core that are taken to prepare for the QE cannot be part of the doctoral POS.

The Candidacy Examination may be taken any time after successful completion of the Qualifying Examination and is a two-step examination, consisting of a written exam and oral presentation of a research area to the Dissertation Committee. Knowledge to be tested in the written portion of the examination includes the three required courses of the focus area that constitute the specialization core. The oral portion of the examination includes an oral presentation of a detailed dissertation proposal. The objective of the candidacy exam is to determine if the student has the breadth and depth of knowledge required to conduct independent research in the proposed area.

The Dissertation Defense Examination is an oral examination taken in defense of the written dissertation. The College of Engineering and Computer Science requires that all dissertation defense announcements are approved by the student's advisor and posted on the college's website and on the Events Calendar of the College of Graduate Studies website at least two weeks before the defense date.

## Dissertation Committee Requirement

The doctoral committee must consist of a minimum of four members: at least three, including the committee chair, must be graduate faculty members from within the student's department, and one must be

at large, from graduate faculty members or graduate faculty scholars outside the Industrial Engineering faculty. The committee chair must be a member of the graduate faculty who is approved to direct dissertations. Faculty members with joint appointments in IEMS may serve as department-faculty committee members. Adjunct faculty and off-campus experts who are graduate faculty scholars serve as the outside-the-department person on the committee, as well as serve as co-chairs of the committee with the approval of the department Chair. The College of Graduate Studies reserves the right to review appointments to advisory committees, place a representative on any advisory committee, or appoint a co-adviser.

All committee members vote on acceptance or rejection of the dissertation proposal and the final dissertation. The dissertation proposal or final dissertation must be approved by the advisory committee with no more than one dissenting vote.

## Admission to Candidacy

The following are required to be admitted to candidacy and enroll in dissertation hours:

- Completion of all course work, except for dissertation hours.
- Successful completion of the candidacy examination, including successful defense of the written dissertation proposal.
- The dissertation advisory committee is formed, consisting of approved graduate faculty and graduate faculty scholars.
- Submittal of an approved program of study.

## IEMS Graduate Courses by Focus Area

### Engineering Management

- EIN 5108 The Environment of Technical Organizations (3 credit hours)
- EIN 5117 Management Information Systems I (3 credit hours)
- EIN 5140 Project Engineering (3 credit hours)
- EIN 5356 Cost Engineering (3 credit hours)
- EIN 5346 Engineering Logistics (3 credit hours)
- EIN 6182 Engineering Management (3 credit hours)
- EIN 6339 Operations Engineering (3 credit hours)
- EIN 6357 Advanced Engineering Economic Analysis (3 credit hours)
- EIN 6459 Concurrent Engineering (3 credit hours)

### Human Systems Engineering/Ergonomics

- EIN 5248C Ergonomics (3 credit hours)
- EIN 5251 Usability Engineering (3 credit hours)

- EIN 6215 System Safety Engineering and Management (3 credit hours)
- EIN 6279C Biomechanics (3 credit hours)
- EIN 6258 Human Computer Interaction (3 credit hours)
- EIN 6264C Industrial Hygiene (3 credit hours)
- EIN 6270C Work Physiology (3 credit hours)

**Systems Operations and Modeling**

- ESI 5306 Operations Research (3 credit hours)
- ESI 6336 Queuing Systems (3 credit hours)
- ESI 6358 Decision Analysis (3 credit hours)
- ESI 6418 Linear Programming and Extensions (3 credit hours)
- ESI 5531 Discrete Systems Simulation (3 credit hours)
- ESI 6217 Statistical Aspects of Digital Simulation (3 credit hours)
- ESI 6532 Object-oriented Simulation (3 credit hours)
- EIN 6425 Scheduling and Sequencing (3 credit hours)

**Interactive Simulation and Training Systems**

- EIN 5255C Interactive Simulation (3 credit hours)
- EIN 5317 Training System Design (3 credit hours)
- EIN 6645 Real-Time Simulation Agents (3 credit hours)
- EIN 6647 Intelligent Simulation (3 credit hours)
- EIN 6649C Intelligent Tutoring Training System Design (3 credit hours)
- EIN 6528 Simulation Based Life Cycle Engineering (3 credit hours)

**Quality Systems Engineering**

- ESI 5227 Total Quality Improvement (3 credit hours)
- ESI 5236 Reliability Engineering (3 credit hours)
- ESI 6224 Quality Management (3 credit hours)
- ESI 6225 Quality Design and Control (3 credit hours)
- ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)
- ESI 5219 Engineering Statistics (3 credit hours)
- EIN 6336 Production and Inventory Systems (3 credit hours)

**Systems Engineering**

- ESI 6551C Systems Engineering (3 credit hours)
- EIN 5388 Forecasting (3 credit hours)
- EIN 5392C Manufacturing Systems Engineering (3 credit hours)

**Other**

- EIN 5936 Seminar in Industrial Engineering: Doctoral Research (1 credit hour)
- ESI 6891 IEMS Research Methods (3 credit hours)
- EGN 5858C Prototyping and Product Realization (3 credit hours)

## Equipment Fee

**Students in the Industrial Engineering MS program pay a $90 equipment fee each semester that they are enrolled. For part-time students, the equipment fee is $45 per semester.**

## INDEPENDENT LEARNING

The Independent Learning requirement is met by successful completion of the student's candidacy and dissertation defense examinations.

### Application Requirements

For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

The College of Engineering and Computer Science encourages prospective applicants to complete a pre-application form (www.cecs.ucf.edu/preapp) before completing the online application for graduate admission.

The following application requirements are effective for Summer 2011 applicants and beyond. Spring 2011 applicants, please refer to the 2010-11 catalog.

In addition to the general UCF graduate application requirements, applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended.
- Official, competitive GRE score taken within the last five years.
- Master's degree in Industrial Engineering or a closely related discipline.
- Résumé.
- Statement of educational, research, and professional career objectives.
- Three letters of recommendation.
- Applicants to this program are required to complete the necessary information requested for the ETS PPI (Personal Potential Index) report that is available during the GRE examination. All official PPI reports must be submitted directly to the UCF College of Graduate Studies (use UCF Institution Code: 5233).



UCF College of Graduate Studies – P.O. Box 160112, Orlando, FL 32816-0112
**Questions?** Contact Rhonda Nelson at rlnelson@mail.ucf.edu

Faculty members may choose to conduct face-to-face or telephone interviews before accepting an applicant into their research program.

Fellowships and assistantships may be awarded based on the student's GPA, GRE scores, letters of recommendation, curriculum vitae/resume, and goals statement.

Students must complete any needed articulation course work and pass a PhD Qualifying Examination in order to be admitted as a regular doctoral student. This exam is normally taken within the first year after all articulation work is completed.

## FINANCIALS

Graduate students may receive financial assistance through fellowships, assistantships, tuition support, or loans. For more information, see Student Finances, which describes the types of financial assistance available at UCF and provides general guidance in planning your graduate finances. The Financial Information section of the Graduate Catalog is another key resource.

### Fellowships

Fellowships are awarded based on academic merit to highly qualified students. They are paid to students through the Office of Student Financial Assistance, based on instructions provided by the College of Graduate Studies. Fellowships are given to support a student's graduate study and do not have a work obligation. For more information, see Fellowships, which includes descriptions of UCF fellowships and what you should do to be considered for a fellowship.

**Contact Info**
**Graduate Program**
**Ahmad Elshennawy PhD**
Professor
ahmade@mail.ucf.edu
Telephone: 407-823-2204
Engineering 2, Room 430

**DELIVERY - Will program be delivered:** ☐ Face to face ☐ Completely online x Mixed delivery

**Admissions deadlines**: (Please specify if you have a different deadline for the track than for the program?)

N/A

**Application requirements:** (Please specify if you have different application requirements for the track than for the program? Will you admit directly to the track?)

N/A

**Program Director(s) and contact information:** (name, email, phone, campus address, program website address)

Dr. Ahmad Elshennawy, ahmade@mail.ucf.edu, 312 Engineering 2, 407– 823-2204

**Please check one: This action affects a:** x Program ☐ Track ☐ Certificate

**Please check one: This action is a(n):**

☐ **Addition.** Please proceed to Part A.

x **Revision.** If a revision applies to multiple tracks, please list them here and then proceed to Part A:

☐ **Inactivation**

☐ **Temporary Suspension of Admissions. Give Length of Suspension:**

**Temporary suspension of admissions:** The program will be removed from the online application. A notation will be entered in the graduate catalog indicating the length of the suspension of admissions. Currently enrolled students will not experience any issues with continued enrollment.

**Inactivation:** Admissions will be suspended for new students and the program will be removed from the online application. Students active in the program are eligible to complete the program under the appropriate criteria and an appropriate teach-out plan is required. The program will be removed from the catalog as of the approved term.

**If you checked inactivation or you are temporarily suspending admissions, please go to Part B and complete it.**

## Signature Page

**RECOMMENDATIONS**

| | | | |
|---|---|---|---|
| ☐ Yes ☐ No | **Department Chair:** | **Date:** |
| ☐ Yes ☐ No | **College Curriculum Committee Chair:** | **Date:** |
| ☐ Yes ☐ No | **College Dean or Unit Head:** | **Date:** |
| ☐ Yes ☐ No | **Chair or GSC:** | **Date:** |
| ☐ Yes ☐ No | **Dean, College of Graduate Studies:** | **Date:** |

**APPROVAL**

**Provost and Vice President for Academic Affairs:** **Date:**

## Distribution: After approval is received from the Provost, distribution will be to:

Department(s); College; Registrar; Associate Registrar; Institutional Research; Academic Services; Faculty Senate;

University Analysis and Planning Support; College of Graduate Studies

UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

## Part A – For additions or revisions of programs, tracks or certificates

**Brief Statement of Program Change and rationale:** (Please indicate the change, the rationale for the change, how it affects the unit and faculty teaching in and students enrolled in the program, track or certificate. If there are changes to the credit hours of the program, required courses or other requirements, please state those changes. Remember to attach the catalog copy showing changes, using Track Changes in Word.)

**The Change:** Less required courses and more flexibility in offering electives
**Rationale:** Improving quality of course delivery and less restricted electives.
**Impact on Faculty:** More efficiency, more time to conduct research, seek external funding, and increase tha number and quality of publications.
**Impact on Students:** Better scheduling of courses for faster time to graduate.

**Will students be moved from an existing program, track, or certificate into this new program, track, or certificate?**

☐ Yes x No

If yes, state the name of the program or track where students are currently enrolled and provide a list of students if possible:

---

**Will students have the option to stay in their existing program, track, or certificate?** x Yes ☐ No

### Name Change

**Are you changing the name of an existing program, track, or certificate?** ☐ Yes x No

If yes, provide the new name of the program, track, or certificate:

Provide the name of the current program, track, or certificate:

**When is the name change effective?** Please note: A name change will apply to the record of all students who are currently enrolled, readmitted or newly admitted into this program as of the effective date of this change.

**Will students have the option to stay in their existing program, track, or certificate?** ☐ Yes ☐ No

**If you are requesting a CIP Code change for an existing program, track, or certificate, please provide:**

old CIP:

new CIP:

If a name change is your only revision, stop here. Otherwise, complete the rest of Part A.

## Part A - Continued

Specify the faculty who will participate in the program, track or certificate and their credentials to do so: (List faculty and a brief paragraph of their credentials.)

Waldemar Karwowski, Ph.D., Professor and Chair, Texas Tech: IE, Human System Integration, Ergonomics/Human Engineering
Lesia Crumpton-Young, Ph.D., Professor, Texas A&M: Human Engineering/Ergonomics, Industrial Engineering
Ahmad K. Elshennawy, Ph.D., Professor & Associate Chair, Penn State: IE, Quality and Reliability, Production Systems
Christopher Geiger, Ph.D., Assistant Professor, Purdue University: Production Systems, IE, Simulation, OR
Robert L. Hoekstra, Ph.D., Associate Professor, Cincinnati: Manufacturing Engineering, Engineering Management
Timothy G. Kotnour, Ph.D., Associate Professor, Virginia Tech: Engineering Management, IE
Gene C.H. Lee, Ph.D., P.E., Associate Professor, Texas Tech: Human Engineering/Ergonomics, IE, Safety Engineering/Management
Pamela R. McCauley-Bush, Ph.D., Associate Professor, University of Oklahoma: Engineering/Ergonomics, IE, Biomechanics
Mansooreh Mollaghasemi, Ph.D., Associate Professor, University of Louisville: IE, Simulation, OR, Decision Analysis
Dima Nazzal, Ph.D., Assistant Professor, Georgia Tech: OR, Industrial Engineering, Simulation & Modeling
Michael D. Proctor, Ph.D., Associate Professor, N. Carolina State: Interactive Simulation, Training System Design
Luis Rabelo, Ph.D., Associate Professor, University of Missouri: Production/Manufacturing Systems, IE, Management
Charles H. Reilly, Ph.D., Professor, Purdue University: OR, Industrial Engineering, Statistics
Serge Sala-Diakanda, Ph.D., Visiting Assistant Professor, UCF: Systems Engineering, Statistics, Simulation
José A. Sepúlveda, Ph.D., P.E., Associate Professor, University of Pittsburgh: Simulation, IE, OR, production Systems
William Thompson, Ph.D., Associate Professor, Arizona State: Engineering management, IE, Production Systems, Quality
Kent E. Williams, Ph.D., Associate Professor, University of Connecticut: Training Systems, Statistics, Interactive Simulation

**Impact of changes on students:** Will current students be impacted by the addition or revision of a program, track or certificate? If so, how?

No. There will more flexibility that allows the students to select the courses that best suit their needs.

**If applicable**, provide a written agreement (email is fine) from all involved units that they are in support of, will provide courses to, or will participate in the program, track, or certificate. Please attach the correspondence and also list the units here.

N/A

**If an addition**, provide a statement of who is likely to enroll and why. Please state if there is licensure or certification that depends upon this education, etc. Also, complete the following table.

N/A

| | Year 1 | Year 2 | Year 3 |
|---|---|---|---|
| Headcount | | | |
| SCHs | | | |

**If an addition**, indicate likely career or student outcomes upon completion: (What will students do? What will their job titles be?)

| |
|---|
| |

## Part A - Continued

**If an addition or there are substantial REVISIONS** to existing tracks or certificates, please complete the following table on financial support: (Specify all forms of support – assistantships, fellowships, and tuition remission.)

| | No. assistantship students | Source of funds | No. fellowship students (specify fellowship) | No. tuition remissions | Source of funds |
|---|---|---|---|---|---|
| Year 1 | | | | | |
| Year 2 | | | | | |
| Year 3 | | | | | |

## Checklist of items to be provided:

x **Electronic graduate catalog copy for additions; track changes included if there are revisions. (required)**

☐ **Attach all appropriate course action requests that will be necessary to implement the changes. (required)**

☐ **Emails showing consultation with other units. (if applicable)**

☐ **If an addition, list of 1-3 students and 1-3 faculty for profiles in the graduate catalog (provide email address so Graduate Studies can contact them to write profiles and take photos). You may provide draft copy of profiles if you wish.**

☐ **If an addition, what disciplines does this program, track or certificate belong to? What other UCF graduate programs, tracks, or certificates are related to it? This information will be used to provide additional links for prospective students to search in the online graduate catalog.**

## Part B – For inactivations or suspensions of programs, tracks, or certificates

**Are students currently enrolled in the program?** ☐ Yes ☐ No

If yes, number of current students:

**Please specify the intended time period of inactivation or suspension:**

If program, track, or certificate is being inactivated or suspended, then attach a "teach out" plan for all current students specifying how they can finish the program or where students will be placed if moving to another program. The "teach out" plan should specify when courses will be offered to enable students to finish. Specify whether students will remain in the existing program to finish, and if so, when the completion date will be, whether students will be moved to another program, etc. Please provide a list of students where applicable.

Sample teach out plan: Enter the terms and courses that will be taught for each term throughout the last semester.

| Summer 2011 | Fall 2011 | Spring 2011 | Summer 2012 | Fall 2012 |
|---|---|---|---|---|
| | | | | |
| | | | | |
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## Checklist of items to be provided:

☐ **Attach all appropriate course action requests that will be necessary to implement the changes. (required)**

☐ **Emails showing consultation with other units. (if applicable)**



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**Questions?** Contact Rhonda Nelson at rlnelson@mail.ucf.edu

# INDUSTRIAL ENGINEERING PHD

## PROGRAM DESCRIPTION

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, ~~operations research, simulation modeling and analysis,~~quality systems engineering ~~interactive,~~ interactive simulation, systems engineering, ~~quality, manufacturing~~ and human engineering/ergonomics.

The Industrial Engineering program is structured to support the emergence of Central Florida as a national center of high technology as well as supporting the diverse service industries in the region and throughout the nation.

## CURRICULUM

The Industrial Engineering PhD program requires a minimum of ~~81~~ 72 credit hours beyond the bachelor's degree. Beyond the master's degree, s~~S~~tudents must complete at least ~~21~~ 27 credit hours of required ~~core~~ courses that include 6 credit hours of doctoral core, ~~,~~ 9 ~~15~~ credit hours in specialization core courses in a selected area (engineering management, human engineering/ergonomics, interactive simulation and training quality engineering, systems operations and modeling, or systems engineering)~~industrial engineering, interactive simulation, simulation modeling and analysis, operations research, quality, human engineering/ergonomics, manufacturing, or management systems)~~, and 12~~21 27~~ credit hours of doctoral elective courses, in addition to ~~electives, and 24~~ 15 credit hours of dissertation.

Of the total course work taken, 27 hours must be formal course work exclusive of independent study and ~~24~~ 15 credit hours must consist of dissertation research (EIN 7980). All remaining hours are determined with a faculty adviser and approved by the department.

### Total Credit Hours Required:

~~81~~ 72 Credit Hours Minimum beyond the Bachelor's Degree

As a pre-doctoral student at the beginning of the PhD program, a preliminary program of study must be developed with the graduate program coordinator and meet with departmental approval. At this time transfer credit will be evaluated on a course-by-course basis. After completion of the Qualifying Examination and admission as a doctoral student, the official program of study is developed with an adviser and must meet with departmental approval. The student's dissertation committee approves the final program of study after the Candidacy Examination is passed. The degree must be completed within seven years from the date of

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admission as a pre-doctoral student and within four years of passing the Candidacy Examination.

The Department of Industrial Engineering and Management Systems monitors student progress and may revert any student to Nondegree status if performance standards or academic progress are not maintained. Satisfactory academic performance in a program includes, but is not limited to, maintaining at least a 3.0 GPA in all graduate work taken as part of (or transferred into) the program of study. Satisfactory performance also involves maintaining the standards of academic progress and professional integrity expected in our discipline. Failure to maintain these standards may result in dismissal from the program.

**Depending on a student's chosen focus area ~~of specialization~~, this program can be taken entirely through FEEDS.**

**Prerequisites~~/Co-requisites/Articulation Classes~~**

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Students must have background in the following areas.

- MS degree in IE or related discipline
- MUST have MS Core knowledge*

* Knowledge to be tested through Qualifying Examination (QE)

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- ~~Computer programming capability. C, C++, or Java recommended.~~
- ~~Calculus through Differential Equations (MAP 2302)~~

Students without a B.S.I.E. (or M.S.I.E. from UCF) degree ~~or without the F.E. or the P.E. in industrial engineering~~ must have four additional required courses as articulation courses. See Credit Waived from an Earned Master's Degree and Articulation Section below.~~These students must take at least one course from each of the following areas and a second course from one of the areas.~~

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~~**Ergonomics**~~

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- ~~EIN 6270C Work Physiology (3 credit hours)~~

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- ~~EIN 6264C Industrial Hygiene (3 credit hours)~~
- ~~EIN 6258 Human-Computer Interaction (3 credit hours)~~
- ~~EIN 6279C Biomechanics (3 credit hours)~~
- ~~EIN 6215 Systems Safety Engineering and Management (3 credit hours)~~
- ~~EIN 5251 Usability Engineering (3 credit hours)~~

- ~~EIN 5248C Ergonomics (3 credit hours)~~

**~~Quality/Manufacturing~~**

- ~~ESI 6225 Quality Design and Control (3 credit hours)~~
- ~~ESI 6224 Quality Management (3 credit hours)~~
- ~~ESI 5236 Reliability Engineering (3 credit hours)~~
- ~~ESI 5227 Total Quality Improvement (3 credit hours)~~
- ~~EIN 6398 Advanced and Nontraditional Manufacturing Processes (3 credit hours)~~
- ~~EIN 6330 Quality Control in Automation (3 credit hours)~~
- ~~EIN 5607C Computer Control of Manufacturing System (3 credit hours)~~
- ~~EIN 5415C Tool Engineering and Manufacturing Analysis (3 credit hours)~~
- ~~EIN 5392C Manufacturing Systems Engineering (3 credit hours)~~
- ~~EIN 5368C Integrated Factory Automation Systems (3 credit hours)~~
- ~~EGN 5858C Prototyping and Product Realization (3 credit hours)~~
- ~~EGN 5855C Metrology (3 credit hours)~~
- ~~EIN 5117 Management Information Systems I (3 credit hours)~~

**~~Other~~**

- ~~EIN 5117 Management Information Systems I (3 credit hours)~~
- ~~ESI 6336 Queueing Systems (3 credit hours)~~
- ~~ESI 6358 Decision Analysis (3 credit hours)~~
- ~~ESI 5359 Risk Assessment and Management (3 credit hours)~~
- ~~EIN 5346 Engineering Logistics (3 credit hours)~~
- ~~EIN 5388 Forecasting (3 credit hours)~~

## REQUIRED COURSES (~~30-36~~27 CREDIT HOURS)

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## Doctoral Core Courses (—21 6 Credit Hours)

- ESI 6891 IEMS Research Methods
- Select one:
  - ESI 6247 Experimental Design and Taguchi Methods
  - EIN 5388 Forecasting
- ~~EIN 5140 Project Engineering (3 credit hours)~~
- ~~EIN 6336 Production and Inventory Control (3 credit hours)~~
- ~~EIN 6357 Advanced Engineering Economic Analysis (3 credit hours)~~
- ~~ESI 5219 Engineering Statistics (3 credit hours)~~
- ~~ESI 5306 Operations Research (3 credit hours)~~
- ~~ESI 5531 Discrete Systems Simulation (3 credit hours)~~
- ~~ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)~~

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## Specialization Core (—9 ~~15~~ Credit Hours~~), depending upon specialization~~

Select one of the following focus areas ~~of specialization~~.

### Human System Engineering/Ergonomics

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- EIN 5248C Ergonomics
- EIN 6270C Work Physiology
- EIN 5251 Usability Engineering

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### Engineering Management

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- EIN 5108 The Environment of Technical Organizations
- EIN 6459 Concurrent Engineering
- EIN 6182 Engineering Management

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### ~~Training Systems Design and Engineering~~Interactive Simulation and Training Systems

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- EIN 5255C Interactive Simulation
- ~~EIN 5317 Training Systems Design~~EIN 6649C Intelligent Tutoring Training System Design
- ~~EIN 5346 Engineering Logistics~~EIN 6645 Real Time Simulation Agents

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### Quality Systems Engineering

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- ESI 6224 Quality Management
- ESI 5227 Total Quality Improvement
- ESI 5236 Reliability Engineering

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### Systems Operations and Modeling

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- ESI 5531 Discrete System Simulation*
- ESI 6358 Decision Analysis
- ESI 5306 Operations Research*

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* For BSIE these will be replaced by ESI 6532 and ESI 6418

**Systems Engineering**

- EIN 6215: System Safety Engineering and Management
- ESI 5359: Risk Assessment and Management
- ESI 6358: Decision Analysis

**~~Industrial Engineering~~**

- ~~EIN 5117 Management Information Systems I (3 credit hours)~~
- ~~ESI 6225 Quality Design and Control (3 credit hours)~~
- ~~ESI 6418 Linear Programming and Extensions (3 credit hours)~~

**~~Interactive Simulation~~**

- ~~EIN 5255 Interactive Simulation (3 credit hours)~~
- ~~EIN 5317 Training System Design (3 credit hours)~~
- ~~EIN 6645 Real-Time Simulation Agents (3 credit hours)~~
- ~~EIN 6649C Intelligent Tutoring Training System Design (3 credit hours)~~
- ~~EIN 6528 Simulation-based Life Cycle Engineering (3 credit hours)~~

**~~Simulation Modeling and Analysis~~**

- ~~ESI 6217 Statistical Aspects of Digital Simulation (3 credit hours)~~
- ~~ESI 6532 Object-oriented Simulation (3 credit hours)~~
- ~~ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)~~

**~~Operations Research~~**

- ~~ESI 6336 Queueing Systems (or STA 5825 Stochastic Processes and Applied Probability Theory) (3 credit hours)~~
- ~~ESI 6418 Linear Programming and Extensions (3 credit hours)~~
- ~~STA 6236 Regression Analysis (3 credit hours)~~

**~~Quality~~**

- ~~ESI 5227 Total Quality Improvement (3 credit hours) or ESI 6224 Quality Management (3 credit hours)~~
- ~~ESI 5236 Reliability Engineering (3 credit hours)~~
- ~~ESI 6225 Quality Design and Control (3 credit hours)~~

**~~Human Engineering/Ergonomics~~**

- ~~EIN 5248C Ergonomics (3 credit hours)~~
- ~~EIN 6279C Biomechanics (3 credit hours)~~

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- ~~EIN 6258 Human Computer Interaction (3 credit hours)~~

**~~Manufacturing~~**

- ~~EIN 5368C Integrated Factory Automation Systems (3 credit hours)~~
- ~~EIN 5392C Manufacturing Systems Engineering (3 credit hours)~~
- ~~EIN 6459 Concurrent Engineering (3 credit hours)~~

**~~Management Systems~~**

- ~~EIN 5108 The Environment of Technical Organizations (3 credit hours)~~
- ~~EIN 5117 Management Information Systems I (3 credit hours)~~
- ~~EIN 6182 Engineering Management (3 credit hours)~~
- ~~EIN 6339 Operations Engineering (3 credit hours)~~

**~~Elective Courses—21-27 Credit Hours, including articulation courses~~**

- ~~A maximum of 12 hours of Independent Study (6908) or directed research may be included in a PhD program of study.~~

**~~Dissertation—24 Credit Hours~~**

- ~~EIN 7980 Dissertation (24 credits hours minimum)~~

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## Doctoral Elective Courses (12 credit hours)

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- Nine hours of doctoral research preferred as electives
- Up to four unrestricted electives

## CREDIT WAIVED FROM AN EARNED MASTER'S DEGREE AND ARTICULATION (30 HOURS)

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A maximum of 30 semester credit hours from an earned master's degree may be applied toward these requirements. Waived credits are evaluated on a course-by-course basis.

## Articulation Courses

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Non BSIE or MSIE students need to take the four courses that constitute the MS core. These courses are:

- ESI 5219: Engineering Statistics
- EIN 5140: Project Engineering
- ESI 6551C: Systems Engineering
- EIN 6357: Advanced Engineering Economic Analysis

In addition, these students are encouraged to take additional articulation courses, if needed, from any of the following areas:

**Group A: Human System Engineering/Ergonomics**

- EIN 6270C Work Physiology (3 credit hours)
- EIN 6258 Human-Computer Interaction (3 credit hours)
- EIN 6279C Biomechanics (3 credit hours)
- EIN 6215 Systems Safety Engineering and Management (3 credit hours)
- EIN 5251 Usability Engineering (3 credit hours)
- EIN 5248C Ergonomics (3 credit hours)

**Group B: Traditional IE (IE, Engineering Management, Quality, Manufacturing)**

- ESI 6225 Quality Design and Control (3 credit hours)
- ESI 6224 Quality Management (3 credit hours)
- ESI 5236 Reliability Engineering (3 credit hours)
- EIN 5346 Engineering Logistics (3 credit hours)
- EIN 5108 The Environment of Technical Organizations
- EIN 6182 Engineering Management
- EIN 5117 Management Information Systems I (3 credit hours)

**Group C: Simulation, Optimization, and Modeling**

- ESI 6336 Queuing Systems (3 credit hours)
- ESI 6358 Decision Analysis (3 credit hours)
- ESI 5359 Risk Assessment and Management (3 credit hours)
- ESI 5306 Operations Research
- ESI 6418 Linear Programming and Extensions
- ESI 6532 Object-Oriented Simulation

## EXAMINATIONS

In addition to the Qualifying Examination, the student must pass a Candidacy Examination~~, a Dissertation Proposal Examination,~~ and a Dissertation Defense Examination.

The Qualifying Examination (QE) is a written exam that focuses in student's mastery of the content covered in the IEMS MS program's core courses that are listed above.

IEMS MS students who plan to continue their studies for Ph.D. I.E. can take the QE in the last semester before or the first semester after graduation. Graduates from other MS programs may delay taking the QE until they have taken the MS core courses. The maximum delay is one year after admission to the program. Courses other than MS core that are taken to prepare for the QE are cannot be part of the doctoral POS.

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The Candidacy Examination may be taken any time after successful completion of the Qualifying Examination and is a two-step examination, consisting ~~typically consists of~~of a written exam and oral presentation of a research area to the Dissertation Committee. Knowledge to be tested in the written portion of the examination includes the three required courses of the focus area that constitute the specialization core. The oral portion of the examination includes an oral presentation of a detailed dissertation proposal. The objective of the candidacy exam is to ~~followed by a written examination to~~ determine if the student has the breadth and depth of knowledge required to conduct independent research in the proposed area.

~~The Dissertation Proposal Examination consists of a written and oral presentation of a detailed dissertation proposal.~~ The Dissertation Defense Examination is an oral examination taken in defense of the written dissertation. The College of Engineering and Computer Science requires that all dissertation defense announcements are approved by the student's advisor and posted on the college's website and on the Events Calendar of the College of Graduate Studies website at least two weeks before the defense date.

## Dissertation Committee Requirement

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The doctoral committee must consist of a minimum of four members: at least three must be graduate faculty members from within the student's department, and one must be at large, from graduate faculty scholars outside the Industrial Engineering faculty. The committee chair must be a member of the graduate faculty who is approved to direct dissertations. Faculty members with joint appointments in IEMS may serve as department-faculty committee members. Adjunct faculty and off-campus experts who are graduate faculty scholars may serve as the outside-the-department person on the committee, as well as serve as co-chairs of the committee with the approval of the department Chair. The College of Graduate Studies reserves the right to review appointments to advisory committees, place a representative on any advisory committee, or appoint a co-adviser.

Joint faculty members may serve as committee chairs. Off-campus experts and adjunct faculty who are graduate faculty scholars may not serve as committee chairs, but may serve as co-chairs.

All committee members vote on acceptance or rejection of the dissertation proposal and the final dissertation. The dissertation proposal or final dissertation must be approved by the advisory committee with no more than one dissenting vote.

## Admission to Candidacy

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The following are required to be admitted to candidacy and enroll in dissertation hours:

- Completion of all course work, except for dissertation hours.
- Successful completion of the candidacy examination.
- Successful defense of the written dissertation proposal.
- The dissertation advisory committee is formed, consisting of approved graduate faculty and graduate faculty scholars.

- Submittal of an approved program of study.

## IEMS Graduate Courses by Focus Areas ~~of Study~~

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### Engineering Management

- EIN 5108 The Environment of Technical Organizations (3 credit hours)
- EIN 5117 Management Information Systems I (3 credit hours)
- EIN 5140 Project Engineering (3 credit hours)
- EIN 5356 Cost Engineering (3 credit hours)
- EIN 5346 Engineering Logistics (3 credit hours)
- EIN 6182 Engineering Management (3 credit hours)
- EIN 6339 Operations Engineering (3 credit hours)
- EIN 6357 Advanced Engineering Economic Analysis (3 credit hours)
- EIN 6459 Concurrent Engineering (3 credit hours)

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### Human Systems Engineering/Ergonomics

- EIN 5248C Ergonomics (3 credit hours)
- EIN 5251 Usability Engineering (3 credit hours)
- EIN 6215 System Safety Engineering and Management (3 credit hours)
- EIN 6279C Biomechanics (3 credit hours)
- EIN 6258 Human Computer Interaction (3 credit hours)
- EIN 6264C Industrial Hygiene (3 credit hours)
- EIN 6270C Work Physiology (3 credit hours)

### ~~Manufacturing/Operations Management~~

- ~~EGN 5720 Internal Combustion Engine Analysis and Optimization (3 credit hours)~~
- ~~EGN 6721C Experimental Methods for High Performance Engine Manufacturing (3 credit hours)~~
- ~~EIN 5368C Integrated Factory Automation Systems (3 credit hours)~~
- ~~EIN 5388 Forecasting (3 credit hours)~~
- ~~EIN 5392C Manufacturing Systems Engineering (3 credit hours)~~
- ~~EIN 5607C Computer Control of Manufacturing Systems (3 credit hours)~~
- ~~EIN 6336 Production and Inventory Control (3 credit hours)~~
- ~~EIN 6459 Concurrent Engineering (3 credit hours)~~
- ~~EIN 6425 Scheduling and Sequencing (3 credit hours)~~
- ~~EIN 6930 Manufacturing Engineering Seminar (3 credit hours)~~

- ~~EGN 5858C Prototyping and Product Realization (3 credit hours)~~

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### Systems Operations and Modeling ~~Research~~

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- ESI 5306 Operations Research (3 credit hours)
- ~~ESI 5419C Engineering Applications of Linear and Nonlinear Optimization (3 credit hours)~~
- ESI 6336 ~~Queueing~~Queuing Systems (3 credit hours)
- ESI 6358 Decision Analysis (3 credit hours)
- ESI 6418 Linear Programming and Extensions (3 credit hours)
- ESI 5531 Discrete Systems Simulation (3 credit hours)
- ESI 6217 Statistical Aspects of Digital Simulation (3 credit hours)
- ESI 6532 Object-oriented Simulation (3 credit hours)
- EIN 6425 Scheduling and Sequencing (3 credit hours)

- ~~ESI 6448 Network Analysis and Integer Programming (3 credit hours)~~

- ~~ESI 6551C Systems Engineering (3 credit hours)~~

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**Interactive Simulation and Training Systems**

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- EIN 5255C Interactive Simulation (3 credit hours)
- EIN 5317 Training System Design (3 credit hours)
- EIN 6645 Real-Time Simulation Agents (3 credit hours)
- EIN 6647 Intelligent Simulation (3 credit hours)
- EIN 6649C Intelligent Tutoring Training System Design (3 credit hours)
- ~~ESI 5531 Discrete Systems Simulation (3 credit hours)~~
- ~~ESI 6217 Statistical Aspects of Digital Simulation (3 credit hours)~~
- ~~ESI 6532 Object-oriented Simulation (3 credit hours)~~
- EIN 6528 Simulation Based Life Cycle Engineering (3 credit hours)

**~~Statistics and~~ Quality ~~Control~~Systems Engineering**

- ESI 5227 Total Quality Improvement (3 credit hours)
- ESI 5236 Reliability Engineering (3 credit hours)
- ESI 6224 Quality Management (3 credit hours)
- ESI 6225 Quality Design and Control (3 credit hours)
- ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)
- ESI 5219 Engineering Statistics (3 credit hours)
- EIN 6336 Production and Inventory Systems (3 credit hours)

**Systems Engineering**

- ESI 6551C Systems Engineering (3 credit hours)
- EIN 5388 Forecasting (3 credit hours)
- EIN 5392C Manufacturing Systems Engineering (3 credit hours)

**Other**

- EIN 5936 Seminar in Industrial Engineering: Doctoral Research (1 credit hour)
- ESI 6891 IEMS Research Methods (3 credit hours)
- ~~EIN 6930 Manufacturing Engineering Seminar (3 credit hours)~~
- EGN 5858C Prototyping and Product Realization (3 credit hours)
-

## Equipment Fee

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Students in the Industrial Engineering PhD program pay a $90 equipment fee each semester that they are enrolled.

## INDEPENDENT LEARNING

The Independent Learning requirement is met by successful completion of the student's candidacy and dissertation defense examinations.

### Application Requirements

For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

The College of Engineering and Computer Science encourages prospective applicants to complete a pre-application form (www.cecs.ucf.edu/preapp) before completing the online application for graduate admission.

The following application requirements are effective for Spring 2011 applicants and beyond. Fall 2010 applicants, please refer to the 2009-10 catalog.

In addition to the general UCF graduate application requirements, applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended.
- Official, competitive GRE score taken within the last five years.
- Master's degree in Industrial Engineering or a closely related discipline.
- Résumé.
- Statement of educational, research, and professional career objectives.
- Three letters of recommendation.
- Applicants to this program are required to complete the necessary information requested for the ETS PPI (Personal Potential Index) report that is available during the GRE examination. All official PPI reports must be submitted directly to the UCF College of Graduate Studies (use UCF Institution Code: 5233).

Faculty members may choose to conduct face-to-face or telephone interviews before accepting an applicant into their research program.

Selected outstanding applicants who have a GPA of at least 3.4 in the last 60 attempted semester hours of their undergraduate degrees and have GRE scores above the 80th percentile in both the verbal and quantitative sections of the GRE may be considered for direct entrance as pre-doctoral students with bachelor's degrees.

Fellowships and assistantships may be awarded based on the student's GPA, GRE scores, letters of recommendation, curriculum vitae/resume, and goals statement.

Students must complete any needed articulation course work and pass a PhD Qualifying Examination in order to be admitted as a regular doctoral student. This exam is normally taken within the first year after all articulation work is completed.

## FINANCIALS

Graduate students may receive financial assistance through fellowships, assistantships, tuition support, or loans. For more information, see Student Finances, which describes the types of financial assistance available at UCF and provides general guidance in planning your graduate finances. The Financial Information section of the Graduate Catalog is another key resource.

### Fellowships

Fellowships are awarded based on academic merit to highly qualified students. They are paid to students through the Office of Student Financial Assistance, based on instructions provided by the College of Graduate Studies. Fellowships are given to support a student's graduate study and do not have a work obligation. For more information, see Fellowships, which includes descriptions of UCF fellowships and what you should do to be considered for a fellowship.

### Contact Info

**Graduate Program**
**Ahmad Elshennawy PhD**
Professor
ahmade@mail.ucf.edu
Telephone: 407-823-2204
Engineering 2, Room 430 Map

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UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

# Program Action Request Form

This form is to be used to revise, add, suspend, or inactivate degree programs, tracks, or certificate programs. A new form must be used for each program, track, or certificate.

**PLEASE NOTE:** The deadline for new tracks or certificates is **February 1 of each year**. Any proposal for new tracks or certificates received after this date will not be included in the next year's catalog. Revisions to existing programs, tracks, or certificates are **due by March 15**. Any proposals for revisions received after that date will not be included in the next year's catalog. Please include catalog copy (description, curriculum, contact information, application requirements, and application deadlines). For revisions – attach the catalog copy **showing changes (use Track Changes in Word)**.

College/Unit(s) Submitting Proposal: **College of Engineering and Computer Science**

Proposed Effective Term/Year: **Summer 2011**

Unit(s) Housing Program: **Industrial Engineering and Management Systems**

Name of program, track, and/or certificate: **Industrial Engineering MS Program**

**Description of program (this description will show up in the graduate catalog copy):**

INDUSTRIAL ENGINEERING MS

PROGRAM DESCRIPTION

The Master of Science programs in Industrial Engineering are designed to produce highly skilled industrial engineers, engineering managers, technical professionals, and leaders for the global economy. The program offers specialization tracks in the areas of:

- Engineering Management,
- Human Systems Engineering/Ergonomics,
- Interactive Simulation and Training Systems,
- ~~Operations Research,~~ Professional Engineering Management,
- Quality Systems Engineering,
- Systems Operation and ~~Simulation~~ Modeling ~~and Analysis~~, and
- Systems Engineering.

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 Industrial Engineering programs are structured to support the emergence of Central Florida as a national center of high technology as well as supporting the diverse service industries in the region and throughout the nation.

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Additional information can be found at www.iems.ucf.edu.

Application Requirements

For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

The College of Engineering and Computer Science encourages prospective applicants to complete a pre-application form (www.cecs.ucf.edu/preapp) before completing the online application for graduate admission.

In addition to the general UCF graduate application requirements, applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended.
- A bachelor's degree in Industrial Engineering or a related discipline.
- ~~Official, competitive GRE score taken within the last five years.~~
- Two letters of recommendation.
- Résumé.
- Statement of educational, research, and professional career objectives.

Faculty members may choose to conduct face-to-face or telephone interviews before accepting an applicant into their research program.

FINANCIALS

Graduate students may receive financial assistance through fellowships, assistantships, tuition support, or loans. For more information, see Student Finances, which describes the types of financial assistance available at UCF and provides general guidance in planning your graduate finances. The Financial Information section of the Graduate Catalog is another key resource.

Fellowships

Fellowships are awarded based on academic merit to highly qualified students. They are paid to students through the Office of Student Financial Assistance, based on instructions provided by the College of Graduate Studies. Fellowships are given to support a student's graduate study and do not have a work obligation. For more information, see Fellowships, which includes descriptions of UCF fellowships and what you should do to be considered for a fellowship.

Contact Info

Ahmad Elshennawy, Ph.D.
Professor
ahmade@mail.ucf.edu
Telephone: 407-823-2204
Engineering 2, Room 430

UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

**DELIVERY - Will program be delivered:** ☐ Face to face ☐ Completely online ☐ Mixed delivery

**Admissions deadlines**: (Please specify if you have a different deadline for the track than for the program?)

N/A

**Application requirements:** (Please specify if you have different application requirements for the track than for the program? Will you admit directly to the track?)

N/A

**Program Director(s) and contact information:** (name, email, phone, campus address, program website address)

Dr. Ahmad Elshennawy, ahmade@mail.ucf.edu, 312 Engineering 2, 407– 823-2204

**Please check one: This action affects a:** ☐ Program ☐ Track ☐ Certificate

**Please check one: This action is a(n):**

☐ **Addition.** Please proceed to Part A.

x **Revision.** If a revision applies to multiple tracks, please list them here and then proceed to Part A:

- Accelerated BS to MS
- Human Engineering/Ergonomics
- Engineering Management
- Interactive Simulation and Training Systems
- Manufacturing Engineering
- Operations Research
- Professional Engineering Management
- Quality Engineering
- Simulation Modeling and Analysis
- Systems Engineering

☐ **Inactivation**

☐ **Temporary Suspension of Admissions. Give Length of Suspension:**

**Temporary suspension of admissions:** The program will be removed from the online application. A notation will be entered in the graduate catalog indicating the length of the suspension of admissions. Currently enrolled students will not experience any issues with continued enrollment.

**Inactivation:** Admissions will be suspended for new students and the program will be removed from the online application. Students active in the program are eligible to complete the program under the appropriate criteria and an appropriate teach-out plan is required. The program will be removed from the catalog as of the approved term.

**If you checked inactivation or you are temporarily suspending admissions, please go to Part B and complete it.**



UCF College of Graduate Studies – P.O. Box 160112, Orlando, FL 32816-0112
**Questions?** Contact Rhonda Nelson at rlnelson@mail.ucf.edu

UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

## Signature Page

**RECOMMENDATIONS**

| | | | |
|---|---|---|---|
| ☐ Yes ☐ No | **Department Chair:** | **Date:** |
| ☐ Yes ☐ No | **College Curriculum Committee Chair:** | **Date:** |
| ☐ Yes ☐ No | **College Dean or Unit Head:** | **Date:** |
| ☐ Yes ☐ No | **Chair or GSC:** | **Date:** |
| ☐ Yes ☐ No | **Dean, College of Graduate Studies:** | **Date:** |

**APPROVAL**

**Provost and Vice President for Academic Affairs:** **Date:**

### Distribution: After approval is received from the Provost, distribution will be to:

Department(s); College; Registrar; Associate Registrar; Institutional Research; Academic Services; Faculty Senate; University Analysis and Planning Support; College of Graduate Studies



UCF College of Graduate Studies – P.O. Box 160112, Orlando, FL 32816-0112
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UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

## Part A – For additions or revisions of programs, tracks or certificates

**Brief Statement of Program Change and rationale:** (Please indicate the change, the rationale for the change, how it affects the unit and faculty teaching in and students enrolled in the program, track or certificate. If there are changes to the credit hours of the program, required courses or other requirements, please state those changes. Remember to attach the catalog copy showing changes, using Track Changes in Word.)

**The Change:** Fewer tracks, less required courses, and more flexibility in offering electives
**Rationale:** It has become necessary that changes be made to our MS program. Objectives of the change include teaching fewer courses and improving quality of course delivery.
**Impact on Faculty:** More efficiency, more time to conduct research, seek external funding, and increase tha number and quality of publications.
**Impact on Students:** More concentration courses, better scheduling of courses for faster time to graduate.

**Will students be moved from an existing program, track, or certificate into this new program, track, or certificate?**

☐ Yes x No

If yes, state the name of the program or track where students are currently enrolled and provide a list of students if possible:

**Will students have the option to stay in their existing program, track, or certificate?** x Yes ☐ No

### Name Change

**Are you changing the name of an existing program, track, or certificate?** ☐ Yes x No

If yes, provide the new name of the program, track, or certificate:

Provide the name of the current program, track, or certificate:

**When is the name change effective?** Please note: A name change will apply to the record of all students who are currently enrolled, readmitted or newly admitted into this program as of the effective date of this change.

**Will students have the option to stay in their existing program, track, or certificate?** ☐ Yes ☐ No

**If you are requesting a CIP Code change for an existing program, track, or certificate, please provide:**

old CIP:

new CIP:

If a name change is your only revision, stop here. Otherwise, complete the rest of Part A.



UCF College of Graduate Studies – P.O. Box 160112, Orlando, FL 32816-0112
**Questions?** Contact Rhonda Nelson at rlnelson@mail.ucf.edu

## Part A - Continued

Specify the faculty who will participate in the program, track or certificate and their credentials to do so: (List faculty and a brief paragraph of their credentials.)

Waldemar Karwowski, Ph.D., Professor and Chair, Texas Tech: IE, Human System Integration, Ergonomics/Human Engineering
Lesia Crumpton-Young, Ph.D., Professor, Texas A&M: Human Engineering/Ergonomics, Industrial Engineering
Ahmad K. Elshennawy, Ph.D., Professor & Associate Chair, Penn State: IE, Quality and Reliability, Production Systems
Christopher Geiger, Ph.D., Assistant Professor, Purdue University: Production Systems, IE, Simulation, OR
Robert L. Hoekstra, Ph.D., Associate Professor, Cincinnati: Manufacturing Engineering, Engineering Management
Timothy G. Kotnour, Ph.D., Associate Professor, Virginia Tech: Engineering Management, IE
Gene C.H. Lee, Ph.D., P.E., Associate Professor, Texas Tech: Human Engineering/Ergonomics, IE, Safety Engineering/Management
Pamela R. McCauley-Bush, Ph.D., Associate Professor, University of Oklahoma: Engineering/Ergonomics, IE, Biomechanics
Mansooreh Mollaghasemi, Ph.D., Associate Professor, University of Louisville: IE, Simulation, OR, Decision Analysis
Dima Nazzal, Ph.D., Assistant Professor, Georgia Tech: OR, Industrial Engineering, Simulation & Modeling
Michael D. Proctor, Ph.D., Associate Professor, N. Carolina State: Interactive Simulation, Training System Design
Luis Rabelo, Ph.D., Associate Professor, University of Missouri: Production/Manufacturing Systems, IE, Management
Charles H. Reilly, Ph.D., Professor, Purdue University: OR, Industrial Engineering, Statistics
Serge Sala-Diakanda, Ph.D., Visiting Assistant Professor, UCF: Systems Engineering, Statistics, Simulation
José A. Sepúlveda, Ph.D., P.E., Associate Professor, University of Pittsburgh: Simulation, IE, OR, production Systems
William Thompson, Ph.D., Associate Professor, Arizona State: Engineering management, IE, Production Systems, Quality
Kent E. Williams, Ph.D., Associate Professor, University of Connecticut: Training Systems, Statistics, Interactive Simulation

**Impact of changes on students:** Will current students be impacted by the addition or revision of a program, track or certificate? If so, how?

There will be minimum impact of changing the program on students. Revised tracks are more flexible and allow the students to select the concentration area and associated courses that best suit their needs. If there will be a change, it will definitely be a better one.

**If applicable**, provide a written agreement (email is fine) from all involved units that they are in support of, will provide courses to, or will participate in the program, track, or certificate. Please attach the correspondence and also list the units here.

N/A

**If an addition**, provide a statement of who is likely to enroll and why. Please state if there is licensure or certification that depends upon this education, etc. Also, complete the following table.

N/A

| | Year 1 | Year 2 | Year 3 |
|---|---|---|---|
| Headcount | | | |
| SCHs | | | |

**If an addition**, indicate likely career or student outcomes upon completion: (What will students do? What will their job titles be?)

## Part A - Continued

**If an addition or there are substantial REVISIONS** to existing tracks or certificates, please complete the following table on financial support: (Specify all forms of support – assistantships, fellowships, and tuition remission.)

| | No. assistantship students | Source of funds | No. fellowship students (specify fellowship) | No. tuition remissions | Source of funds |
|---|---|---|---|---|---|
| Year 1 | | | | | |
| Year 2 | | | | | |
| Year 3 | | | | | |

## Checklist of items to be provided:

x **Electronic graduate catalog copy for additions; track changes included if there are revisions. (required)**

☐ **Attach all appropriate course action requests that will be necessary to implement the changes. (required)**

☐ **Emails showing consultation with other units. (if applicable)**

☐ **If an addition, list of 1-3 students and 1-3 faculty for profiles in the graduate catalog (provide email address so Graduate Studies can contact them to write profiles and take photos). You may provide draft copy of profiles if you wish.**

☐ **If an addition, what disciplines does this program, track or certificate belong to? What other UCF graduate programs, tracks, or certificates are related to it? This information will be used to provide additional links for prospective students to search in the online graduate catalog.**

UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

## Part B – For inactivations or suspensions of programs, tracks, or certificates

**Are students currently enrolled in the program?** ☐ Yes ☐ No

If yes, number of current students:

**Please specify the intended time period of inactivation or suspension:**

If program, track, or certificate is being inactivated or suspended, then attach a "teach out" plan for all current students specifying how they can finish the program or where students will be placed if moving to another program. The "teach out" plan should specify when courses will be offered to enable students to finish. Specify whether students will remain in the existing program to finish, and if so, when the completion date will be, whether students will be moved to another program, etc. Please provide a list of students where applicable.

Sample teach out plan: Enter the terms and courses that will be taught for each term throughout the last semester.

| Summer 2011 | Fall 2011 | Spring 2011 | Summer 2012 | Fall 2012 |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
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### Checklist of items to be provided:

☐ **Attach all appropriate course action requests that will be necessary to implement the changes. (required)**

☐ **Emails showing consultation with other units. (if applicable)**



UCF College of Graduate Studies – P.O. Box 160112, Orlando, FL 32816-0112
**Questions?** Contact Rhonda Nelson at rlnelson@mail.ucf.edu

INDUSTRIAL ENGINEERING MS

PROGRAM DESCRIPTION

The Master of Science programs in Industrial Engineering are designed to produce highly skilled industrial engineers, engineering managers, technical professionals, and leaders for the global economy. The program offers specialization tracks in the areas of:

- Engineering Management,
- Human Systems Engineering/Ergonomics,
- Interactive Simulation and Training Systems,
- ~~Manufacturing Engineering,~~
- ~~Operations Research,~~
- Professional Engineering Management,
- Quality Systems Engineering,
- Systems Operation and ~~Simulation~~ Modeling ~~and Analysis~~, and
- Systems Engineering.

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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 Industrial Engineering programs are structured to support the emergence of Central Florida as a national center of high technology as well as supporting the diverse service industries in the region and throughout the nation.

Additional information can be found at www.iems.ucf.edu.

Application Requirements

For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

The College of Engineering and Computer Science encourages prospective applicants to complete a pre-application form (www.cecs.ucf.edu/preapp) before completing the online application for graduate admission.

In addition to the general UCF graduate application requirements, applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended.
- A bachelor's degree in Industrial Engineering or a related discipline.
- ~~Official, competitive GRE score taken within the last five years.~~
- Two letters of recommendation.
- Résumé.
- Statement of educational, research, and professional career objectives.

Faculty members may choose to conduct face-to-face or telephone interviews before accepting an applicant into their research program.

FINANCIALS

Graduate students may receive financial assistance through fellowships, assistantships, tuition support, or loans. For more information, see Student Finances, which describes the types of financial assistance available at UCF and provides general guidance in planning your graduate finances. The Financial Information section of the Graduate Catalog is another key resource.

Fellowships

Fellowships are awarded based on academic merit to highly qualified students. They are paid to students through the Office of Student Financial Assistance, based on instructions provided by the College of Graduate Studies. Fellowships are given to support a student's graduate study and do not have a work obligation. For more information, see Fellowships, which includes descriptions of UCF fellowships and what you should do to be considered for a fellowship.

Contact Info

Ahmad Elshennawy PhD
Professor
ahmade@mail.ucf.edu
Telephone: 407-823-2204
Engineering 2, Room 430

# ACCELERATED BS TO MS

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## TRACK DESCRIPTION

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The accelerated undergraduate/graduate program in Industrial Engineering allows highly qualified undergraduate majors in Industrial Engineering to begin taking graduate-level courses that will count toward their master's degree while completing their baccalaureate program. Participation will enable completion of the Bachelor of Science and Master of Science degrees in five instead of six years for students enrolled in full-time course work.

The Master of Science Industrial Engineering programs are designed to produce highly skilled industrial engineers, engineering managers, technical professionals, and leaders for the global economy. The program offers specialization tracks in the areas of Engineering Management, Human Engineering/Ergonomics, Interactive Simulation and Training Systems, Manufacturing Engineering, Operations Research, Quality Engineering, Simulation Modeling and Analysis, and Systems Engineering.

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 Industrial Engineering graduate programs are structured to support the emergence of Central Florida as a national center of high technology as well as supporting the diverse service industries in the region and throughout the nation.

Additional information can be found at www.iems.ucf.edu.

## CURRICULUM

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### Total Credit Hours Required:

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30 Credit Hours Minimum beyond the Bachelor's Degree

The BSIE is awarded after fulfilling all university requirements including completing 128 credit hours of course work and 71 credit hours of engineering courses. The MSIE is awarded upon completion of the master's program. Courses designated in General Education Program and Common Program Prerequisites are usually completed in the first 60 hours (see engineering major requirements in the Undergraduate Catalog).

Up to 12 credit hours of approved 5000- or 6000-level courses with grades "B" (3.0) or better may be counted towards the BS and MS degrees. Additional notes on the Accelerated Undergraduate and Graduate Program in Industrial Engineering:

- Students who change degree programs and select this major must adopt the most current catalog.
- Students must earn at least a "B" (3.0) in each undergraduate and graduate engineering course for them to be counted toward the major.

### Undergraduate Requirements

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Please see the current edition of the Undergraduate Catalog or the academics section of the College of Engineering and Computer Science website, link given above, for additional information about this program

## Graduate Requirements

Please see Industrial Engineering MS graduate program requirements in the track of interest.

## Equipment Fee

Students in the Industrial Engineering MS program pay a $90 equipment fee each semester that they are enrolled.

## ~~INDEPENDENT LEARNING~~ Independent Learning

The Independent Learning Requirement is met by successful completion of a master's thesis. Nonthesis students will complete a comprehensive exam or specific course as mandated by their specialization.

## APPLICATION REQUIREMENTS

For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

The Accelerated BS to MS program in Industrial Engineering allows highly qualified University of Central Florida undergraduate majors in Industrial Engineering to begin taking graduate level courses that will count toward their master's degree while completing their baccalaureate degree program. Students apply for admission to the accelerated program in either their junior year or senior year. If the student has a degree in the discipline, but were not previously part of this accelerated program, then they should apply to either the Engineering Management Track, Human Engineering/Ergonomics Track, Interactive Simulation and Training Systems Track, Manufacturing Engineering Track, Operations Research Track, Quality Engineering, Simulation Modeling and Analysis Track, Systems Engineering Track, or The General Industrial Engineering Program without a track selection. Additional information about this track may be located at: http://www.cecs.ucf.edu/academics/acceleratedbstomsprograms.

The College of Engineering and Computer Science encourages prospective applicants to complete a pre-application form (www.cecs.ucf.edu/preapp) before completing the online application for graduate admission.

In addition to the general UCF graduate application requirements, applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended.
- ~~Official, competitive GRE score taken within the last five years.~~
- Two letters of recommendation.
- A bachelor's degree in Engineering or a closely related discipline.
- Résumé.
- Statement of educational, research, and professional career objectives.

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Faculty members may choose to conduct face-to-face or telephone interviews before accepting an applicant into their research program.

## FINANCIALS

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Graduate students may receive financial assistance through fellowships, assistantships, tuition support, or loans. For more information, see Student Finances, which describes the types of financial assistance available at UCF and provides general guidance in planning your graduate finances. The Financial Information section of the Graduate Catalog is another key resource.

### Fellowships

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Fellowships are awarded based on academic merit to highly qualified students. They are paid to students through the Office of Student Financial Assistance, based on instructions provided by the College of Graduate Studies. Fellowships are given to support a student's graduate study and do not have a work obligation. For more information, see Fellowships, which includes descriptions of UCF fellowships and what you should do to be considered for a fellowship.

## CONTACT INFO

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Ahmad Elshennawy PhD
Professor
ahmade@mail.ucf.edu
Telephone: 407-823-2204
Engineering 2, Room 430

# HUMAN SYSTEMS ENGINEERING/ERGONOMICS

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## TRACK DESCRIPTION

As technology has become more sophisticated, the need to design for the human user has become more difficult, yet even more important. Human engineering and ergonomics assist in ensuring that as technology advances, the abilities, limitations, and needs of humans are considered in the system design. This not only supports the needs of the user, it also optimizes the efficiency and usability of the system designed. Traditionally, ergonomics has been associated with biomechanical issues and work measurement and performance issues in physical system design, as well as occupational and industrial safety. The broader focus of human engineering encompasses those issues as well as incorporating the reaction and effectiveness of human interaction with systems, both physical systems and virtual systems such as computer-based models.

The Human Engineering/Ergonomics track in the Industrial Engineering MS program is designed for students who have an undergraduate degree in Engineering or a closely related discipline. The program is designed to provide students with the necessary knowledge in human engineering and ergonomics to effectively design tasks, industrial systems, and work environments that maximize human performance, safety, and overall productivity.

The Industrial Engineering graduate programs are structured to support the emergence of Central Florida as a national center of high technology as well as supporting the diverse service industries in the region and throughout the nation.

Additional information can be found at www.iems.ucf.edu.

International students may only take one course per semester in a totally online format while attending UCF on a F-1 visa. Courses in this program can be taken in mixed mode for international students at UCF or fully online for international students who are not on visas. If you have questions, please consult the International Service Center at www.intl.ucf.edu.

## CURRICULUM

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### Total Credit Hours Required:

30 Credit Hours Minimum beyond the Bachelor's Degree

The Human Engineering/Ergonomics track in the Industrial Engineering MS program requires an undergraduate degree in Engineering or a closely related discipline. A student with an undergraduate degree outside of industrial engineering may be required to take additional prerequisite courses.

The track offers both thesis and nonthesis options with each requiring 30 credit hours of courses beyond the bachelor's degree. The thesis option requires 12 credit hours of required MS core courses, ~~12~~ 9 credit hours of ~~electives~~ concentration courses, ~~and~~ 6 thesis credit hours, and 3 hours of electives. Students must also write and successfully defend their thesis. The nonthesis option requires 12 credit hours of required MS core courses, 9 credit hours of track courses, and 9 hours of electives. ~~and 18 credit hours of electives.~~ Students must also pass a comprehensive oral examination at the end of their program of study.

All programs of study must include 24 credit hours of required and elective courses, exclusive of thesis and research. At least one-half of the credit hours (including thesis hours) of all courses in a master's program of study must be at the 6000 level or higher.

Research studies are required in one or more courses. The research study and report will focus on reviewing and analyzing contemporary research in the profession in order to help students acquire knowledge and skills pertaining to research-based best practices. In addition, students may engage in directed independent studies, directed research or a research report during their studies.

A program of study must be developed with the graduate program director and meet with departmental approval. Students on assistantships must take 9 credit hours per semester to satisfy the university's requirement for full-time status. Most students working full time take 6 credit hours per semester. At that rate, the program can be completed in 6 semesters or less. However, students with more time available and with an early start on a thesis, if applicable, can finish the program in 3 semesters.

## Prerequisites

- ~~MAC 2313 Mathematics through Calculus III (4 credit hours)~~
- ~~EIN 3314C Work Measurement and Design (3 credit hours)~~
- ~~EIN 4243C Human Engineering (or equivalent) (3 credit hours)~~
- ~~Computer programming capability. C, C++, or Java recommended.~~
- Computer programming capability. Proficiency with MS Office expected. C++ or Java recommended.
- Mathematics through Calculus II (MAC 2312)
- STA 3032 or equivalent
- Others, as needed by specific courses
- For MSIE degree: A BS degree in Engineering

## ~~Required~~ Master Core Courses~~—~~ (12 Credit Hours)

- ESI 5219: Engineering Statistics
- EIN 5140: Project Engineering
- ESI 6551C: Systems Engineering
- EIN 6357: Advanced Engineering Economic Analysis

- ~~EIN 5248C Ergonomics (3 credit hours)~~
- ~~EIN 6279C Biomechanics (3 credit hours) or EIN 6270C Work Psychology (3 credit hours)~~
- ~~ESI 5219 Engineering Statistics (3 credit hours)~~
- ~~EIN 5251 Usability Engineering (3 credit hours)~~

## Concentration Courses ~~Restricted Electives—~~(9 Credit Hours)

Select three courses from the following courses.

- EIN 5248C Ergonomics
- EIN 6270C Work Physiology
- EIN 5251 Usability Engineering
- ~~EIN 5140 Project Engineering (3 credit hours)~~
- ~~EIN 6215 System Safety Engineering and Management (3 credit hours)~~

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- ~~EIN 6258 Human Computer Interaction (3 credit hours)~~
- ~~ESI 6358 Decision Analysis (3 credit hours)~~
- ~~ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)~~
- ~~Psychology Elective (3 credit hours)~~

Thesis Option—9 Credit Hours

All thesis students must complete an independent research project and successfully write and defend their thesis. Furthermore, they must take an additional 3 credit hours of electives beyond the 9 credit hours of restricted electives described above.

- EIN 6971 Thesis (6 credit hours)
- Elective (3 credit hours).

The College of Engineering and Computer Science requires that all thesis defense announcements be approved by the student's adviser and posted on the college's website and on the Events Calendar at the College of Graduate Studies website at least two weeks before the defense date.

Nonthesis Option—9 Credit Hours

All nonthesis students must take an additional 9 credit hours of electives beyond the 9 credit hours of restricted electives described above.

- Electives (9 credit hours)

## Comprehensive Examination

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All nonthesis students must also pass a comprehensive examination prior to graduation. Please see the program director for details.

## Equipment Fee

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Students in the Industrial Engineering MS program pay a $90 equipment fee each semester that they are enrolled.

## ~~INDEPENDENT LEARNING~~Independent Learning

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The Independent Learning Requirement is met by successful completion of a master's thesis or comprehensive exam for nonthesis students.

## APPLICATION REQUIREMENTS

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For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

The College of Engineering and Computer Science encourages prospective applicants to complete a pre-application form (www.cecs.ucf.edu/preapp) before completing the online application for graduate admission.

In addition to the general UCF graduate application requirements, applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended.
- A bachelor's degree in Engineering or a closely related discipline.
- ~~Official, competitive GRE score taken within the last five years.~~
- Two letters of recommendation.
- Résumé.
- Statement of educational, research, and professional career objectives.

Faculty members may choose to conduct face-to-face or telephone interviews before accepting an applicant into their research program.

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### Fellowships

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Ahmad Elshennawy PhD
Professor
ahmade@mail.ucf.edu
Telephone: 407-823-2204
Engineering 2, Room 430

# ENGINEERING MANAGEMENT

## TRACK DESCRIPTION

The Engineering Management track in the Industrial Engineering MS program focuses on effective decision-making in engineering and technological organizations. Addressing the needs of engineers and scientists moving into management positions, engineering management complements their technical backgrounds with the human aspects, organizational and financial issues, project considerations, resource allocation, and the extended analytical tools required for effective decision-making and program management. This program is designed for technically qualified individuals who plan to assume a management role in project or program-oriented environments in industry or government. It provides the analytical, organizational, and managerial skills to bridge the gap between a technical specialty and technical management.

The Industrial Engineering programs are structured to support the emergence of Central Florida as a national center of high technology as well as supporting the diverse service industries in the region and throughout the nation.

Additional information can be found at www.iems.ucf.edu.

International students may only take one course per semester in a totally online format while attending UCF on a F-1 visa. Courses in this program can be taken in mixed mode for international students at UCF or fully online for international students who are not on visas. If you have questions, please consult the International Service Center at www.intl.ucf.edu.

## CURRICULUM

### Total Credit Hours Required:

30 Credit Hours Minimum beyond the Bachelor's Degree

This program can be taken entirely through the Florida Engineering Educational Delivery System (FEEDS), which provides video-streamed versions of classes over the Internet.

The Engineering Management track in the Industrial Engineering MS program requires an undergraduate degree in Engineering or a closely related discipline. Students with undergraduate degrees outside of industrial engineering may be required to take additional prerequisite courses.

The track offers thesis, nonthesis, or Profesional Science Master's (PSM) options with each requiring 30 credit hours of courses. Thesis option students take 12 credit hours of required Master Core courses, ~~12~~ 9 credit hours of ~~electives~~ track courses, ~~and~~ 6 thesis credit hours, and 3 credit hours of electives. They must also complete an independent research project and write and successfully defend their thesis. Nonthesis option students take 12 credit hours of required Master Core courses, 9 credit hours of concentration courses, and ~~18~~ 9 credit hours of electives. They must also pass a comprehensive oral examination at the end of their program of study. PSM option students take 12 credit hours of required courses, 15 credit hours of electives, and 3 credit hours of professional internship. They must also pass a comprehensive oral examination at the end of their program of study.

Research studies are required in one or more courses. The research study and report will focus on reviewing and analyzing contemporary research in the profession in order to help students acquire knowledge and skills pertaining to research-based best practices.

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An approved program of study must be developed in consultation with the graduate program director. All programs of study require 24 hours of core and elective course work, exclusive of thesis hours. At least one-half of the credit hours of all courses (including thesis hours) in a master's program of study must be at the 6000 level or higher.

Students on assistantships must take 9 credit hours per semester to satisfy the university's requirement for full-time status. Most students working full time take 6 credit hours per semester. At that rate, the program can be completed in 6 semesters or less. However, students with more time available and with an early start on a thesis, if applicable, can finish the program in 3 semesters.

Prerequisites

- ~~Mathematics through Calculus III (MAC 2313)~~
- Computer programming capability. Proficiency with MS Office expected. C++ , Visual BASIC, or Java recommended.
- Mathematics through Calculus II (MAC 2312)
- STA 3032 or equivalent
- Others, as needed by specific courses
- For MSIE degree: A BS degree in Engineering

Master Core Courses (12 Credit hours)~~Courses~~)

- ESI 5219: Engineering Statistics
- EIN 5140 Project Engineering
- ESI 6551C: Systems Engineering
- EIN 6357: Advanced Engineering Economic Analysis

~~Required Courses—12 Credit Hours~~

- ~~EIN 5108 The Environment of Technical Organizations (3 credit hours)~~
- ~~EIN 5140 Project Engineering (3 credit hours)~~
- ~~EIN 6182 Engineering Management (3 credit hours)~~
- ~~ESI 5219 Engineering Statistics (3 credit hours)~~

~~Restricted Electives~~Concentration Courses (~~—~~9 Credit Hours)

- EIN 5108 The Environment of Technical Organizations
- EIN 6459 Concurrent Engineering
- EIN 6182 Engineering Management - -

~~All students, thesis, nonthesis and PSM, must select three courses from the following courses.~~

- ~~EIN 5117 Management Information Systems I (3 credit hours)~~
- ~~EIN 5251 Usability Engineering (3 credit hours)~~
- ~~EIN 6357 Advanced Engineering Economic Analysis (3 credit hours)~~
- ~~EIN 6339 Operations Engineering (3 credit hours)~~
- ~~EIN 6224 Quality Management (3 credit hours)~~
- ~~ESI 6358 Decision Analysis (3 credit hours)~~
- ~~EIN 6528 Simulation-based Life Cycle Engineering (3 credit hours)~~
- ~~EIN 5356 Cost Engineering (3 credit hours)~~

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- ~~EIN 6326 Technology Strategy (3 credit hours)~~
- ~~EIN 6936 Seminar in Advanced Industrial Engineering (3 credit hours)~~
- ~~ESI 6551C Systems Engineering (3 credit hours)~~

Thesis Option—9 Credit Hours

Thesis students must complete an independent research project and then write and successfully defend their thesis. Furthermore, an additional 3 credit hours ~~of an electives~~of electives are required beyond the 9 credit hours of ~~restricted electives~~ concentration courses described above.

- EIN 6971 Thesis (6 credit hours)
- Elective (3 credit hours)

Nonthesis Option—9 Credit Hours

Nonthesis students must take 9 additional credit hours of electives beyond the 9 credit hours of concentration courses ~~restricted electives~~ described above.

- Electives (9 credit hours)

Comprehensive Examination

Nonthesis students must successfully pass an oral comprehensive examination to fulfill degree requirements. Please see the program director for further details.

Professional Science Master's Option—9 Credit Hours

The Professional Science Master's (PSM) option ensures that students seeking a mix of professional and technical courses are able to structure their programs of study accordingly. Two of the core courses, EIN 5108 and EIN 6182, are predominantly professional-content courses. In addition, students choosing this option must select at least one elective that is predominantly professional in content. Finally, the PSM option includes a one-semester, 3-credit-hour internship.

- EIN 6946 Internship (3 credit hours)
- Electives (6 credit hours), subject to the requirement that at least one-half of the credit hours on a student's program of study must be at the 6000 level and that at least one of the elective courses must have substantial professional content.

Comprehensive Examination

PSM students must successfully pass an oral comprehensive examination to fulfill degree requirements. Please see the program director for further details.

Equipment Fee

Students in the Industrial Engineering MS program pay a $90 equipment fee each semester that they are enrolled. For part-time students, the equipment fee is $45 per semester.

~~INDEPENDENT LEARNING~~Independent Learning

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The Independent Learning Requirement is met by successful completion of a master's thesis, EIN 6182 Engineering Management for nonthesis students, or EIN 6182 and EIN 6946 Internship for PSM students.

## Application Requirements

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For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

The College of Engineering and Computer Science encourages prospective applicants to complete a pre-application form (www.cecs.ucf.edu/preapp) before completing the online application for graduate admission.

In addition to the general UCF graduate application requirements, applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended.
- A bachelor's degree in Engineering or a closely related discipline.
- ~~Official, competitive GRE score taken within the last five years.~~
- Two letters of recommendation.
- Résumé.
- Statement of educational, research, and professional career objectives.

Faculty members may choose to conduct face-to-face or telephone interviews before accepting an applicant into their research program.

~~Application Deadlines~~

~~All application materials must be submitted by the appropriate deadline listed below.~~

| ~~Engineering Management~~ | ~~Fall Priority~~ | ~~Fall~~ | ~~Spring~~ | ~~Summer~~ |
|---|---|---|---|---|
| ~~Domestic Applicants~~ | ~~Jan 15~~ | ~~Jul 15~~ | ~~Dec 1~~ | ~~Apr 15~~ |
| ~~International Applicants~~ | ~~Jan 15~~ | ~~Jan 15~~ | ~~Jul 1~~ | ~~Nov 1~~ |
| ~~International Transfer Applicants~~ | ~~Jan 15~~ | ~~Mar 1~~ | ~~Sep 1~~ | ~~Dec 15~~ |

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### Fellowships

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Professor
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# INTERACTIVE SIMULATION AND TRAINING SYSTEMS

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## TRACK DESCRIPTION

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The Interactive Simulation and Training Systems track in the Industrial Engineering MS program focuses on providing a fundamental understanding of significant topics relative to simulation systems and the requirements, design, development, and use of such systems for knowledge transfer in the technical environment. Additionally, the program addresses the evolving and multiple discipline application of interactive simulation by providing a wealth of electives to support development of individual student interests and talents. In conjunction with UCF's Institute for Simulation and Training, industrial organizations involved in simulation in the Central Florida region, military organizations, and other governmental organizations, the program provides exposure to both military and commercial interactive simulation and training systems.

The program's emphasis is on the application and development of interactive simulation and training systems to meet various requirements including, but not limited to: simulators, skill trainers, organizational learning systems, computer and web-based interactive simulation systems and other novel interactive simulation efforts. The interactive simulation and training systems curriculum prepares individuals with an undergraduate degree in engineering, science, education, psychology, mathematics or other related disciplines for careers in simulation, focusing particularly on the interactive simulation and training systems industries.

The Industrial Engineering graduate programs are structured to support the emergence of Central Florida as a national center of high technology as well as supporting the diverse service industries in the region and throughout the nation.

Additional information can be found at www.iems.ucf.edu.

## CURRICULUM

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### Total Credit Hours Required:

30 Credit Hours Minimum beyond the Bachelor's Degree

The Interactive Simulation and Training Systems track in the Industrial Engineering MS program requires an undergraduate degree in Engineering or a closely related discipline. Students with undergraduate degrees outside of industrial engineering may be required to take additional prerequisite courses.

The track offers both a thesis option and a nonthesis option with each requiring 30 credit hours of courses beyond the bachelor's degree. Thesis option students take 12 credit hours of required Master Core courses, 9 credit hours of concentration courses, 6 thesis credit hours, and 3 credit hours of electives. They must also complete an independent research project and write and successfully defend their thesis. Nonthesis option students take 12 credit hours of required Master Core courses, 9 credit hours of track courses, and 9 credit hours of electives. They must also pass a comprehensive oral examination at the end of their program of study. ~~Thesis students take 9 credit hours of required courses, 15 credit hours of electives and 6 thesis credit hours. In addition, they must complete an independent research project and write and defend their thesis. Nonthesis students take 9 credit hours of required courses and 21 credit hours of electives. They also must pass a comprehensive oral examination at the end of their program of study.~~

Research studies are required in one or more courses. The research study and report will focus on reviewing and analyzing contemporary research the profession in order to help students acquire knowledge and skills pertaining to research-based best practices. In addition, students may engage in directed independent studies, directed research or a research report during their studies.

An approved program of study must be developed in consultation with the graduate program director. At least one-half of the credit hours (including thesis hours) required in a master's program of study must be at the 6000 level or higher. All programs of study must have at least 24 hours of required and elective courses exclusive of thesis and research.

Students on assistantships must take 9 credit hours per semester to satisfy the university's requirement for full-time status. Most students working full time take 6 credit hours per semester. At that rate, the program can be completed in 6 semesters or less. However, students with more time available and with an early start on a thesis, if applicable, can finish the program in 3 semesters.

Prerequisites

- Computer programming capability. Proficiency with MS Office expected. C++ , Visual BASIC, or Java recommended.
- Mathematics through Calculus II (MAC 2312)
- STA 3032 or equivalent
- Others, as needed by specific courses
- For MSIE degree: A BS degree in Engineering

Master Core Courses (12 Credit hours))

- ESI 5219: Engineering Statistics
- EIN 5140 Project Engineering
- ESI 6551C: Systems Engineering
- EIN 6357: Advanced Engineering Economic Analysis

~~Prerequisites~~

- ~~Computer programming capability. C, C++, or Java recommended.~~
- ~~Mathematics through Differential Equations (MAP 2302)~~

~~Required Courses—9 Credit Hours~~

- ~~EIN 5255C Interactive Simulation (3 credit hours)~~
- ~~EIN 5317 Training Systems Design (3 credit hours)~~
- ~~ESI 5219 Engineering Statistics (3 credit hours)~~

~~Restricted Electives—12 Credit Hours~~

Concentration Courses (9 credit hours)

All students, both thesis and nonthesis, must select ~~four~~ three courses from the following list of restricted electives.

- EIN 5255C Interactive Simulation

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- EIN 5317 Training Systems Design
- EIN 6645C Real-Time Simulation Agents ~~(3 credit hours)~~
- EIN 6649C Intelligent Tutoring Training System Design ~~(3 credit hours)~~
- ~~ESI 5531 Discrete Systems Simulation (3 credit hours)~~
- ~~ESI 6532 Object-Oriented Simulation (3 credit hours)~~
- ~~EIN 6258 Human Computer Interaction(3 credit hours)~~
- ~~EIN 5140 Project Engineering (3 credit hours)~~
- EIN 6647 Intelligent Simulation ~~(3 credit hours)~~
- EIN 6528 Simulation-based Life Cycle Engineering ~~(3 credit hours)~~

Thesis Option—9 Credit Hours

Thesis students must complete an additional elective beyond the ~~12~~ 9 credit hours of ~~restricted electives~~ concentration courses described above. They must also complete an independent research project and write and defend a thesis according to program guidelines.

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- EIN 6971 Thesis (6 credit hours)
- Elective (3 credit hours)

The College of Engineering and Computer Science requires that all thesis defense announcements be approved by the student's adviser and posted on the college's website and on the Events Calendar at the College of Graduate Studies website at least two weeks before the defense date.

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Nonthesis Option—9 Credit Hours

Nonthesis students must take 9 additional credit hours of electives beyond the ~~12~~ 9 credit hours of concentration courses ~~restricted electives~~ described above.

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- Electives (9 credit hours)

Comprehensive Examination

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Nonthesis students who do not take EIN 6647 must successfully pass an oral comprehensive examination over their graduate course work. Please see the program director for further details.

## Equipment Fee

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Students in the Industrial Engineering MS program pay a $90 equipment fee each semester that they are enrolled.

## ~~INDEPENDENT LEARNING~~Independent Learning

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The Independent Learning Requirement is met by successful completion of a master's thesis. Nonthesis students must pass an oral comprehensive exam or EIN 6647 Intelligent Simulation.

## Application Requirements

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For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

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- One official transcript (in a sealed envelope) from each college/university attended.
- A bachelor's degree in Engineering or a closely related discipline.
- ~~Official, competitive GRE score taken within the last five years.~~
- Two letters of recommendation.
- Résumé.
- Statement of educational, research, and professional career objectives.

Faculty members may choose to conduct face-to-face or telephone interviews before accepting an applicant into their research program.

~~*Application Deadlines*~~

~~*All application materials must be submitted by the appropriate deadline listed below.*~~

| ~~*Interactive Simulation and Training Systems*~~ | ~~*Fall Priority*~~ | ~~*Fall*~~ | ~~*Spring*~~ | ~~*Summer*~~ |
|---|---|---|---|---|
| ~~*Domestic Applicants*~~ | ~~*Jan 15*~~ | ~~*Jul 15*~~ | ~~*Dec 1*~~ | ~~*Apr 15*~~ |
| ~~*International Applicants*~~ | ~~*Jan 15*~~ | ~~*Jan 15*~~ | ~~*Jul 1*~~ | ~~*Nov 1*~~ |
| ~~*International Transfer Applicants*~~ | ~~*Jan 15*~~ | ~~*Mar 1*~~ | ~~*Sep 1*~~ | ~~*Dec 15*~~ |

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Ahmad Elshennawy PhD
Professor
ahmade@mail.ucf.edu
Telephone: 407-823-2204
Engineering 2, Room 430

~~Manufacturing Engineering~~

~~TRACK DESCRIPTION~~

~~The design and operation of manufacturing systems requires a broad knowledge of manufacturing processes and systems, an understanding of the information base required for effective system operation, and the integration of information with those processes and systems to improve productivity. The Manufacturing Engineering track provides that basic knowledge and supports education in new manufacturing concepts such as concurrent design and manufacturing, the virtual factory, and agile manufacturing. The Manufacturing Engineering curriculum builds on an undergraduate degree in Engineering, Mathematics, Computer Science, or an allied field to develop a strong understanding of manufacturing engineering, manufacturing systems, and the tools required to design, improve, and manage those systems.~~

~~The High Performance Engine Optimization Focus of the Manufacturing Engineering track in the Industrial Engineering MS program focuses on developing both the theoretical basis and the practical skills necessary to develop racing engines. The theoretical basis includes advanced concepts for the induction, combustion and exhaust systems, component design, data analysis, and systems design. The practical skills include instrumentation, dynamometer operation, flow bench operation, engine assembly, and metrology. This balance between the theoretical and practical prepares the student for a position with a professional racing team or as an engineer with an engine development organization.~~

~~The Industrial Engineering graduate programs are structured to support the emergence of Central Florida as a national center of high technology as well as supporting the diverse service industries in the region and throughout the nation.~~

~~Additional information can be found at www.iems.ucf.edu.~~

~~CURRICULUM~~

~~Total Credit Hours Required:~~
~~30 Credit Hours Minimum beyond the Bachelor's Degree~~

~~The Manufacturing Engineering track in the Industrial Engineering MS program requires an undergraduate degree in engineering or a closely related discipline. A student with an undergraduate degree outside of industrial engineering may be required to take additional prerequisites.~~

~~The program offers both a thesis option and a nonthesis option with each requiring 30 credit hours of courses. The program also offers a High Performance Internal Combustion Engine Optimization Focus with a thesis and nonthesis option.~~

~~Thesis option students take 12 credit hours of required courses, 12 credit hours of electives, and 6 thesis credit hours. They must also conduct an independent research project and write and successfully defend a thesis. Nonthesis option students take 12 credit hours of required courses and 18 credit hours of electives. They must also pass a comprehensive oral examination at the end of their program of study.~~

~~Research studies are required in one or more courses. The research study and report will focus on reviewing and analyzing contemporary research in the profession in order to help students acquire knowledge and skills pertaining to research-based best practices. In addition, students may engage in directed independent studies, directed research or a research report during their studies.~~

A program of study must be developed with the graduate program director and meet with departmental approval. All programs of study must consist of 24 credit hours of required and elective courses exclusive of thesis and research. At least one-half of the credit hours (including thesis hours) required in a master's program of study must be at the 6000 level or higher.

Students on assistantships must take 9 credit hours per semester to satisfy the university's requirement for full-time status. Most students working full time take 6 credit hours per semester. At that rate, the program can be completed in 6 semesters or less. However, students with more time available and with an early start on a thesis, if applicable, can finish the program in 3 semesters.

Prerequisites

- Computer programming capability. C, C++, or Java recommended.
- Mathematics through Differential Equations (MAP 2302)

Required Courses—12 Credit Hours

- EIN 6336 Production and Inventory Control (3 credit hours)
- EIN 5368C Integrated Factory Automation Systems (3 credit hours)
- ESI 5219 Engineering Statistics (3 credit hours)
- EGN 5858C Prototyping and Product Realization (3 credit hours) or EIN 6459 Concurrent Engineering (3 credit hours)

Restricted Electives—9 Credit Hours

All students, both thesis and nonthesis, must select three courses from the following list of restricted electives.

- EIN 6339 Operations Engineering (3 credit hours)
- EIN 5140 Project Engineering (3 credit hours)
- EIN 5607C Computer Control of Manufacturing Systems (3 credit hours)
- EIN 5248C Ergonomics (3 credit hours)
- ESI 5306 Operations Research (3 credit hours)
- ESI 5236 Reliability Engineering (3 credit hours)
- ESI 6225 Quality Design and Control (3 credit hours)

Thesis Option—9 Credit Hours

Thesis students must take an additional elective beyond the 9 credit hours of restricted electives described above. In addition, they must conduct an independent research project and write and successfully defend a thesis according to program guidelines.

- EIN 6971 Thesis (6 credit hours)
- Elective (3 credit hours)

The College of Engineering and Computer Science requires that all thesis defense announcements be approved by the student's adviser and posted on the college's website and on the university-wide Events Calendar at the College of Graduate Studies website at least two weeks before the defense date.

Nonthesis Option—9 Credit Hours

Nonthesis students must take 9 additional credit hours of courses beyond the 9 credit hours of restricted electives described above.

- Electives (9 credit hours)

Comprehensive Examination

Nonthesis students must also successfully pass an oral comprehensive examination to fulfill degree requirements. Please see the program director for further details.

Equipment Fee

Students in the Industrial Engineering MS program pay a $90 equipment fee each semester that they are enrolled.

INDEPENDENT LEARNING

The Independent Learning Requirement is met by successful completion of a master's thesis or comprehensive exam for nonthesis students.

Application Requirements

For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

The College of Engineering and Computer Science encourages prospective applicants to complete a pre-application form (www.cecs.ucf.edu/preapp) before completing the online application for graduate admission.

In addition to the general UCF graduate application requirements, applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended.
- A bachelor's degree in Engineering or a closely related discipline.
- Official, competitive GRE score taken within the last five years.
- Two letters of recommendation.
- Résumé.
- Statement of educational, research, and professional career objectives.

Faculty members may choose to conduct face-to-face or telephone interviews before accepting an applicant into their research program.

Application Deadlines

All application materials must be submitted by the appropriate deadline listed below.

| Manufacturing Engineering | Fall Priority | Fall | Spring | Summer |
|---|---|---|---|---|
| Domestic Applicants | Jan 15 | Jul 15 | Dec 1 | Apr 15 |
| International Applicants | Jan 15 | Jan 15 | Jul 1 | Nov 1 |

International Transfer Applicants Jan 15 Mar 1 Sep 1 Dec 15

FINANCIALS

Graduate students may receive financial assistance through fellowships, assistantships, tuition support, or loans. For more information, see Student Finances, which describes the types of financial assistance available at UCF and provides general guidance in planning your graduate finances. The Financial Information section of the Graduate Catalog is another key resource.

Fellowships

Fellowships are awarded based on academic merit to highly qualified students. They are paid to students through the Office of Student Financial Assistance, based on instructions provided by the College of Graduate Studies. Fellowships are given to support a student's graduate study and do not have a work obligation. For more information, see Fellowships, which includes descriptions of UCF fellowships and what you should do to be considered for a fellowship.

Contact Info

Ahmad Elshennawy PhD
Professor
ahmade@mail.ucf.edu
Telephone: 407-823-2204
Engineering 2, Room 430

~~Operations Research~~

~~TRACK DESCRIPTION~~

~~The Operations Research track in the Industrial Engineering MS program uses mathematics and computer-based systems to model operational processes and decisions in order to develop and evaluate alternatives that will lead to gains in efficiency and effectiveness. Drawing on probability, statistics, simulation, optimization, and stochastic processes, Operations Research provides many of the analytic tools used by industrial engineers as well as by other analysts to improve processes, decision-making, and management by individuals and organizations. The program is designed for students who have an undergraduate degree in engineering, mathematics, or science. The curriculum builds on an undergraduate Engineering, Mathematics, or Science degree to develop a strong modeling and analytical capability to improve processes and decision-making.~~

~~The Industrial Engineering graduate programs are structured to support the emergence of Central Florida as a national center of high technology as well as supporting the diverse service industries in the region and throughout the nation.~~

~~Additional information can be found at www.iems.ucf.edu.~~

~~International students may only take one course per semester in a totally online format while attending UCF on a F-1 visa. Courses in this program can be taken in mixed mode for international students at UCF or fully online for international students who are not on visas. If you have questions, please consult the International Service Center at www.intl.ucf.edu.~~

~~CURRICULUM~~

~~Total Credit Hours Required:~~
~~30 Credit Hours Minimum beyond the Bachelor's Degree~~

~~This program can be taken entirely through the Florida Engineering Educational Delivery System (FEEDS), which provides video-streamed versions of classes over the Internet.~~

~~The Operations Research MS track requires an undergraduate degree in Engineering or a closely related discipline. Students with undergraduate degrees outside of industrial engineering may be required to take additional prerequisite courses.~~

~~The program offers both a thesis option and a nonthesis option with each requiring 30 credit hours of courses. Thesis option students will take 12 credit hours of required courses, 12 credit hours of electives and 6 thesis credit hours. They must also conduct an independent research project and write and defend a thesis. Nonthesis option students will take 12 credit hours of required courses and 18 credit hours of electives. They must also pass a comprehensive oral examination at the end of their program of study.~~

~~Research studies are required in one or more courses. The research study and report will focus on reviewing and analyzing contemporary research in the profession in order to help students acquire knowledge and skills pertaining to research-based best practices. In addition, students may engage in directed independent studies, directed research or a research report during their studies.~~

~~An approved program of study must be developed in consultation with the graduate program director. All programs of study must consist of 24 hours of required and elective courses, exclusive of~~

thesis and research. At least one-half of the credit hours (including thesis hours) required in a master's program of study must be taken in courses at the 6000 level or higher.

Students on assistantships must take 9 credit hours per semester to satisfy the university's requirement for full-time status. Most students working full time take 6 credit hours per semester. At that rate, the program can be completed in 6 semesters or less. However, students with more time available and with an early start on a thesis, if applicable, can finish the program in 3 semesters.

Prerequisites

- Mathematics through Differential Equations (MAP 2302)
- Operations Research (ESI 4312 or ESI 5306)
- Computer programming capability. C, C++, or Java recommended.

Required Courses—12 Credit Hours

- ESI 5219 Engineering Statistics (3 credit hours)
- ESI 6418 Linear Programming and Extensions (3 credit hours) or ESI 5419C Engineering Applications of Linear and Nonlinear Optimization (3 credit hours)
- ESI 6358 Decision Analysis (3 credit hours)
- ESI 6336 Queuing Systems (3 credit hours)

Restricted Electives—9 Credit Hours

All students, both thesis and nonthesis, must select three courses from the following courses.

- EIN 6336 Production and Inventory Control (3 credit hours)
- ESI 5236 Reliability Engineering (3 credit hours)
- ESI 5306 Operations Research (3 credit hours)
- ESI 5531 Discrete Systems Simulation (3 credit hours)
- ESI 6217 Statistical Aspects of Digital Simulation (3 credit hours)
- ESI 6532 Object-oriented Simulation (3 credit hours)

Thesis Option—9 Credit Hours

Thesis students must complete an additional elective beyond the 9 credit hours of restricted electives described above. They must also complete an independent research study and write and successfully defend a thesis according to program guidelines.

- EIN 6971 Thesis (6 credit hours)
- Elective (3 credit hours)

The College of Engineering and Computer Science requires that all thesis defense announcements be approved by the student's adviser and posted on the college's website and on the Events Calendar at the College of Graduate Studies website at least two weeks before the defense date.

Nonthesis Option—9 Credit Hours

Nonthesis students must complete 9 credit hours of additional electives beyond the 9 credit hours of restricted electives described above.

- Electives (9 credit hours)

Comprehensive Examination

Nonthesis students must also successfully pass an oral comprehensive examination over their graduate course work. Please see the program director for further details.

Equipment Fee

Students in the Industrial Engineering MS program pay a $90 equipment fee each semester that they are enrolled.

INDEPENDENT LEARNING

The Independent Learning requirement is met by successful completion of a master's thesis or comprehensive exam.

Application Requirements

For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

The College of Engineering and Computer Science encourages prospective applicants to complete a pre-application form (www.cecs.ucf.edu/preapp) before completing the online application for graduate admission.

In addition to the general UCF graduate application requirements, applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended.
- A bachelor's degree in Engineering or a closely related discipline.
- Official, competitive GRE score taken within the last five years.
- Two letters of recommendation.
- Résumé.
- Statement of educational, research, and professional career objectives.

Faculty members may choose to conduct face-to-face or telephone interviews before accepting an applicant into their research program.

Application Deadlines

All application materials must be submitted by the appropriate deadline listed below.

| | | | | |
|---|---|---|---|---|
| Operations Research | Fall Priority | Fall | Spring | Summer |
| Domestic Applicants | Jan 15 | Jul 15 | Dec 1 | Apr 15 |
| International Applicants | Jan 15 | Jan 15 | Jul 1 | Nov 1 |
| International Transfer Applicants | Jan 15 | Mar 1 | Sep 1 | Dec 15 |

~~FINANCIALS~~

~~Graduate students may receive financial assistance through fellowships, assistantships, tuition support, or loans. For more information, see Student Finances, which describes the types of financial assistance available at UCF and provides general guidance in planning your graduate finances. The Financial Information section of the Graduate Catalog is another key resource.~~

~~Fellowships~~

~~Fellowships are awarded based on academic merit to highly qualified students. They are paid to students through the Office of Student Financial Assistance, based on instructions provided by the College of Graduate Studies. Fellowships are given to support a student's graduate study and do not have a work obligation. For more information, see Fellowships, which includes descriptions of UCF fellowships and what you should do to be considered for a fellowship.~~

~~Contact Info~~

~~Ahmad Elshennawy PhD~~
~~Professor~~
~~ahmade@mail.ucf.edu~~
~~Telephone: 407-823-2204~~
~~Engineering 2, Room 430~~

# PROFESSIONAL ENGINEERING MANAGEMENT

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## TRACK DESCRIPTION

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The Professional Engineering Management option is a cohort-based program where specific cohorts are established periodically based upon needs of industry. For information about the start of the next cohort please contact the IEMS Graduate Coordinator Dr. Elshennawy (ahmade@mail.ucf.edu) or the Program Director Dr. Kotnour (tkotnour@mail.ucf.edu).

The Professional Engineering Management (PEM) track in the Industrial Engineering MS 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.

## CURRICULUM

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### Total Credit Hours Required:

30 Credit Hours Minimum beyond the Bachelor's Degree

The Professional Engineering Management (PEM) track in the Industrial Engineering MS program requires an undergraduate degree in Engineering or a closely related discipline. Students with undergraduate degrees outside of industrial engineering may be required to take additional prerequisites. The program is designed to be a lock-step, cohort-based program that can be completed in approximately 15 to 18 months. It is available only in a nonthesis format that requires 12 credit hours of required courses and 18 credit hours of restricted electives.

Research studies are required in one or more courses. The research study and report will focus on reviewing and analyzing contemporary research in the profession in order to help students acquire knowledge and skills pertaining to research-based best practices.

A program of study must be developed with the graduate program director and meet with departmental approval. At least one-half of the credit hours required in a master's program of study must be taken in courses at the 6000 level or higher.

Prerequisites

- Mathematics through Calculus II (MAC 2312)

Required Courses—12 Credit Hours

- EIN 5108 The Environment of Technical Organizations ~~(3 credit hours)~~
- EIN 5140 Project Engineering ~~(3 credit hours)~~
- EIN 6182 Engineering Management ~~(3 credit hours)~~
- ESI 5219 Engineering Statistics ~~(3 credit hours)~~

Restricted Electives—18 Credit Hours

For each PEM cohort, six of the following courses will be offered.

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- EIN 5117 Management Information Systems I (3 credit hours)
- EIN 5251 Usability Engineering (3 credit hours)

- EIN 6357 Advanced Engineering Economic Analysis (3 credit hours)
- EIN 6339 Operations Engineering (3 credit hours)
- ESI 6224 Quality Management (3 credit hours)
- ESI 6358 Decision Analysis (3 credit hours)
- EIN 6528 Simulation-based Life Cycle Engineering (3 credit hours)
- EIN 5356 Cost Engineering (3 credit hours)
- EIN 6326 Technology Strategy (3 credit hours)
- EIN 6459 Concurrent Engineering (3 credit hours)
- EIN 6936 Seminar in Advanced Industrial Engineering (3 credit hours)
- ESI 6551C Systems Engineering (3 credit hours)

### Equipment Fee

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Full-time students in the Industrial Engineering MS program pay a $90 equipment fee each semester that they are enrolled. For part-time students, the equipment fee is $45 per semester.

### ~~INDEPENDENT LEARNING~~Independent Learning

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The Independent Learning Requirement is met by successful completion of the research studies required in individual courses, EIN 6182 Engineering Management, and the capstone project that requires that students integrate material from all the courses in their program.

## Application Requirements

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For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

In addition to the general UCF graduate application requirements, applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended.
- A bachelor's degree in Engineering or a closely related discipline.
- Two letters of recommendation.
- Résumé.
- Statement of educational, research, and professional career objectives.
- Applicants applying to this program who have attended a college/university outside the United States must provide a course-by-course credential evaluation with GPA calculation. Credential evaluations are accepted from World Education Services (WES) or Josef Silny and Associates, Inc. only.

## FINANCIALS

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Graduate students may receive financial assistance through fellowships, assistantships, tuition support, or loans. For more information, see Student Finances, which describes the types of financial assistance available at UCF and provides general guidance in planning your graduate finances. The Financial Information section of the Graduate Catalog is another key resource.

### Fellowships

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Fellowships are awarded based on academic merit to highly qualified students. They are paid to students through the Office of Student Financial Assistance, based on instructions provided by the College of Graduate Studies. Fellowships are given to support a student's graduate study and do not have a work obligation. For more information, see Fellowships, which includes descriptions of UCF fellowships and what you should do to be considered for a fellowship.

## CONTACT INFO

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Ahmad Elshennawy PhD
Professor
ahmade@mail.ucf.edu
Telephone: 407-823-2204
Engineering 2, Room 430

# QUALITY SYSTEMS ENGINEERING

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## TRACK DESCRIPTION

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The Quality Engineering track in the Industrial Engineering MS program focuses on providing the knowledge for improving product and process quality in manufacturing and service industries. Quality Engineering provides both the quantitative tools for measuring quality and the managerial focus and organizational insight required to implement effective continuous improvement programs and incorporate the voice of the customer. The Quality Engineering curriculum builds on an undergraduate degree in Engineering, Science, Mathematics, or a closely related discipline to provide the necessary knowledge to plan, control, and improve the product assurance function in government, military, service, or manufacturing organizations.

The Industrial Engineering graduate programs are structured to support the emergence of Central Florida as a national center of high technology as well as supporting the diverse service industries in the region and throughout the nation.

Additional information can be found at www.iems.ucf.edu.

International students may only take one course per semester in a totally online format while attending UCF on a F-1 visa. Courses in this program can be taken in mixed mode for international students at UCF or fully online for international students who are not on visas. If you have questions, please consult the International Service Center at www.intl.ucf.edu.

## CURRICULUM

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### Total Credit Hours Required:

30 Credit Hours Minimum beyond the Bachelor's Degree

This program can be taken entirely through the Florida Engineering Educational Delivery System (FEEDS), which provides video-streamed versions of classes over the Internet.

The Quality Engineering track in the Industrial Engineering MS program requires an undergraduate degree in Engineering or a closely related discipline. Students with undergraduate degrees outside of industrial engineering may be required to take additional prerequisites.

The track offers both thesis or nonthesis options with each requiring 30 credit hours of courses. The thesis option requires 12 credit hours of required courses, 12 credit hours of electives and 6 thesis credit hours. Students must also conduct an independent research study and write and successfully defend a thesis. The nonthesis option requires 12 credit hours of required courses and 18 credit hours of electives. Students must also pass a comprehensive oral examination at the end of their program of study.

Research studies are required in one or more courses. The research study and report will focus on reviewing and analyzing contemporary research in the profession in order to help students acquire knowledge and skills pertaining to research-based best practices. In addition, students may engage in directed independent studies, directed research or a research report during their studies.

A program of study must be developed with the graduate program director and meet with departmental approval. All programs of study must consist of 24 hours of required and elective courses, exclusive of thesis and research. At least one-half of the credit hours (including thesis hours) required in a master's program of study must be at the 6000 level or higher.

Students on assistantships must take 9 credit hours per semester to satisfy the university's requirement for full-time status. Most students working full time take 6 credit hours per semester. At that rate, the program can be completed in 6 semesters or less. However, students with more time available and with an early start on a thesis, if applicable, can finish the program in 3 semesters.

Prerequisites

- Computer programming capability. Proficiency with MS Office expected. C++ , Visual BASIC, or Java recommended.
- Mathematics through Calculus II (MAC 2312)
- STA 3032 or equivalent
- Others, as needed by specific courses
- For MSIE degree: A BS degree in Engineering
- ~~Computer programming capability. C, C++, or Java recommended.~~
- ~~Mathematics through Differential Equations (MAP 2302)~~

Master Core ~~Required~~ Courses (~~—~~12 Credit Hours)

- ESI 5219: Engineering Statistics
- EIN 5140 Project Engineering
- ESI 6551C: Systems Engineering
- EIN 357: Advanced Engineering Economic Analysis

Concentration Courses (9 credit hours)

- ~~ESI 5219 Engineering Statistics (3 credit hours)~~
- ESI 5236 Reliability Engineering ~~(3 credit hours)~~
- ESI 6224 Quality Management ~~(3 credit hours)~~
- ESI 6225 Quality Design and Control ~~(3 credit hours)~~

~~Restricted Electives—9 Credit Hours~~

~~All students, both thesis and nonthesis, must select three courses from the following list of restricted electives.~~

- ~~EIN 5140 Project Engineering (3 credit hours)~~
- ~~EIN 6339 Operations Engineering (3 credit hours)~~
- ~~ESI 5227 Total Quality Improvement (3 credit hours)~~
- ~~EIN 6336 Production and Inventory Control (3 credit hours)~~
- ~~ESI 5306 Operations Research (3 credit hours)~~
- ~~ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)~~
- ~~EIN 5368C Integrated Factory Automation Systems (3 credit hours)~~

Thesis Option—9 Credit Hours

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Thesis students must complete an additional elective beyond the 9 credit hours of ~~restricted electives~~ concentration courses described above. They must also complete an independent research study and write and successfully defend a thesis according to program guidelines.

- EIN 6971 Thesis (6 credit hours)
- Elective (3 credit hours)

The College of Engineering and Computer Science requires that all thesis defense announcements be approved by the student's adviser and posted on the college's website and on the university-wide Events Calendar at the College of Graduate Studies website at least two weeks before the defense date.

Nonthesis Option—9 Credit Hours

Nonthesis students must take 9 additional credit hours of electives beyond the 9 credit hours of concentration courses ~~restricted electives~~ described above.

- Electives (9 credit hours)

Comprehensive Examination

Nonthesis students must also successfully pass an oral comprehensive examination at the completion of their studies to fulfill degree requirements. Please see the program director for further details.

## Equipment Fee

Students in the Industrial Engineering MS program pay a $90 equipment fee each semester that they are enrolled.

## ~~INDEPENDENT LEARNING~~Independent Learning

The Independent Learning requirement is met by successful completion of a master's thesis or comprehensive exam.

## Application Requirements

For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

The College of Engineering and Computer Science encourages prospective applicants to complete a pre-application form (www.cecs.ucf.edu/preapp) before completing the online application for graduate admission.

In addition to the general UCF graduate application requirements, applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended.
- A bachelor's degree in Engineering or a closely related discipline.

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- ~~Official, competitive GRE score taken within the last five years.~~
- Two letters of recommendation.
- Résumé.
- Statement of educational, research, and professional career objectives.

Faculty members may choose to conduct face-to-face or telephone interviews before accepting an applicant into their research program.

~~Application Deadlines~~

~~All application materials must be submitted by the appropriate deadline listed below.~~

| ~~Quality Engineering~~ | ~~Fall Priority~~ | ~~Fall~~ | ~~Spring~~ | ~~Summer~~ |
|---|---|---|---|---|
| ~~Domestic Applicants~~ | ~~Jan 15~~ | ~~Jul 15~~ | ~~Dec 1~~ | ~~Apr 15~~ |
| ~~International Applicants~~ | ~~Jan 15~~ | ~~Jan 15~~ | ~~Jul 1~~ | ~~Nov 1~~ |
| ~~International Transfer Applicants~~ | ~~Jan 15~~ | ~~Mar 1~~ | ~~Sep 1~~ | ~~Dec 15~~ |

## FINANCIALS

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### Fellowships

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Ahmad Elshennawy PhD
Professor
ahmade@mail.ucf.edu
Telephone: 407-823-2204
Engineering 2, Room 430

# SYSTEMS OPERATION AND ~~SIMULATION~~ MODELING ~~AND ANALYSIS~~

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## TRACK DESCRIPTION

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The Systems Operation and Modeling track in the Industrial Engineering MS program uses mathematics and computer-based systems to model operational processes and decisions in order to develop and evaluate alternatives that will lead to gains in efficiency and effectiveness. Drawing on probability, statistics, simulation, optimization, and stochastic processes, Operations Research provides many of the analytic tools used by industrial engineers as well as by other analysts to improve processes, decision-making, and management by individuals and organizations. The track also ~~The Simulation Modeling and Analysis track in the Industrial Engineering MS program focuses on~~ provide~~s~~~~ing~~ a fundamental understanding of the functional and technical design requirements for simulation in manufacturing and service industries. The program is based on a systems modeling paradigm and provides coding and development capability in the context of a broader systems framework. Significant exposure to design and analysis aspects is a core element of the track.

The curriculum builds on an undergraduate Engineering, Mathematics, or Science degree to develop a strong modeling and analytical capability to improve processes and decision-making and ~~The Simulation Modeling and Analysis curriculum prepares individuals with an undergraduate degree in Engineering, Science, Mathematics, or a closely related discipline for careers in simulation, focusing particularly on~~ using simulation as an analysis and design tool for the manufacturing and service industries.

~~The Simulation Modeling and Analysis track in the Industrial Engineering MS program focuses on providing a fundamental understanding of the functional and technical design requirements for simulation in manufacturing and service industries. The program is based on a systems modeling paradigm and provides coding and development capability in the context of a broader systems framework. Significant exposure to design and analysis aspects is a core element of the track. The Simulation Modeling and Analysis curriculum prepares individuals with an undergraduate degree in Engineering, Science, Mathematics, or a closely related discipline for careers in simulation, focusing particularly on using simulation as an analysis and design tool for the manufacturing and service industries.~~

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The Industrial Engineering graduate programs are structured to support the emergence of Central Florida as a national center of high technology as well as supporting the diverse service industries in the region and throughout the nation.

Additional information can be found at www.iems.ucf.edu.

International students may only take one course per semester in a totally online format while attending UCF on a F-1 visa. Courses in this program can be taken in mixed mode for international students at UCF or fully online for international students who are not on visas. If you have questions, please consult the International Service Center at www.intl.ucf.edu.

## CURRICULUM

### Total Credit Hours Required:

30 Credit Hours Minimum beyond the Bachelor's Degree

This program can be taken entirely through the Florida Engineering Educational Delivery System (FEEDS), which provides video-streamed versions of classes over the Internet.

The Systems Operation ~~Simulation~~and Modeling ~~and Analysis~~ track in the Industrial Engineering MS program requires an undergraduate degree in Engineering or a closely related discipline. Students with undergraduate degrees outside of industrial engineering may be required to take additional prerequisite courses.

The track offers both thesis and nonthesis options with each requiring 30 credit hours of courses. Thesis students take 12 credit hours of required core courses, ~~12~~ 9 credit hours of ~~electives~~ concentration courses, ~~and~~ 6 thesis credit hours, and 3 hours of electives. They must also complete an independent research study and write and successfully defend their thesis. Nonthesis option students will take 12 credit hours of required core, 9 credit hours of concentration courses, ~~courses~~ and ~~18~~ 9 credit hours of electives. They must also pass a comprehensive oral examination at the end of their program of study.

Research studies are required in one or more courses. The research study and report will focus on reviewing and analyzing contemporary research in ~~the~~ the profession in order to help students acquire knowledge and skills pertaining to research-based best practices. In addition, students may engage in directed independent studies, directed research or a research report during their studies.

A approved program of study must be developed in ~~consultation~~consultation with the graduate program director. All programs of study must have 24 hours of required and elective course work, exclusive of thesis and research. At least one-half of the credit hours (including thesis hours) required in a master's program of study must be taken in courses at the 6000 level or higher.

Students on assistantships must take 9 credit hours per semester to satisfy the university's requirement for full-time status. Most students working full time take 6 credit hours per semester. At that rate, the program can be completed in 6 semesters or less. However, students with more time available and with an early start on a thesis, if applicable, can finish the program in 3 semesters.

Prerequisites

- Computer programming capability. Proficiency with MS Office expected. C++ , Visual BASIC, or Java recommended.
- Mathematics through Calculus II (MAC 2312)
- STA 3032 or equivalent
- Others, as needed by specific courses
- For MSIE degree: A BS degree in Engineering
- ~~Computer programming capability. C, C++, or Java recommended.~~
- ~~Mathematics through Differential Equations (MAP 2302)~~
- ~~Operations Research (ESI 4312 or ESI 5306)*~~

~~*This requirement may be met by taking ESI 5306 as part of the program of study.~~

Required Core Courses—12 Credit Hours

- ESI 5219: Engineering Statistics
- EIN 5140 Project Engineering
- ESI 6551C: Systems Engineering
- EIN 6357 Advanced Engineering Economic Analysis
- ~~ESI 5531 Discrete Systems Simulation (3 credit hours)~~
- ~~ESI 6532 Object-Oriented Simulation (3 credit hours)~~
- ~~ESI 5219 Engineering Statistics (3 credit hours)~~

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- ~~ESI 6217 Statistical Aspects of Digital Simulation (3 credit hours)~~

~~Restricted Electives:~~Concentration Courses (~~—~~9 Credit Hours)

All students, both thesis and nonthesis, must select three courses from the following courses~~:~~:

- ESI 5531 Discrete System Simulation *
- ESI 5306 Operations Research **
- EIN 6336 Production and Inventory Control
- EIN 6425 Scheduling and Sequencing
- ESI 6358 Decision Analysis
- ESI 6336 Queuing Systems
- ESI 6418 Linear Programming and Extensions
- ESI 6532 Object oriented Simulation

* Not open to students who have taken ESI 4523C or an equivalent course previously.
** Not open to students who have taken ESI 4312 or an equivalent course previously.

- ~~EIN 5255C Interactive Simulation (3 credit hours)~~
- ~~EIN 5317 Training System Design (3 credit hours)~~
- ~~EIN 6258 Human-Computer Interaction (3 credit hours)~~
- ~~EIN 6645 Real-Time Simulation Agents (3 credit hours)~~
- ~~ESI 6336 Queueing Systems (3 credit hours)~~
- ~~ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)~~

Thesis Option—9 Credit Hours

Thesis students must take an additional 3 credit hour elective beyond the 9 credit hours of restricted electives described above. They must also complete an independent research study and write and defend their thesis according to program guidelines.

- EIN 6971 Thesis (6 credit hours)
- Elective (3 credit hours)

The College of Engineering and Computer Science requires that all thesis defense announcements be approved by the student's adviser and posted on the college's website and on the university-wide Events Calendar at the College of Graduate Studies website at least two weeks before the defense date.

Nonthesis Option—9 Credit Hours

Nonthesis students take 9 additional credit hours of electives beyond the 9 credit hours of restricted electives described above.

- Electives (9 credit hours)

Comprehensive Examination

Nonthesis students must also successfully pass an oral comprehensive examination to fulfill degree requirements. Please see the program director for further details.

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## Equipment Fee

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Students in the Industrial Engineering MS program pay a $90 equipment fee each semester that they are enrolled.

## ~~INDEPENDENT LEARNING~~Independent Learning

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The Independent Learning Requirement is met by successful completion of a master's thesis or comprehensive exam for nonthesis students.

## APPLICATION REQUIREMENTS

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For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

The College of Engineering and Computer Science encourages prospective applicants to complete a pre-application form (www.cecs.ucf.edu/preapp) before completing the online application for graduate admission.

In addition to the general UCF graduate application requirements, applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended.
- A bachelor's degree in Engineering or a closely related discipline.
- ~~Official, competitive GRE score taken within the last five years.~~
- Two letters of recommendation.
- Résumé.
- Statement of educational, research, and professional career objectives.

Faculty members may choose to conduct face-to-face or telephone interviews before accepting an applicant into their research program.

### ~~Application Deadlines~~

~~All application materials must be submitted by the appropriate deadline listed below.~~

| ~~Simulation Modeling and Analysis~~ | ~~Fall Priority~~ | ~~Fall~~ | ~~Spring~~ | ~~Summer~~ |
|---|---|---|---|---|
| ~~Domestic Applicants~~ | ~~Jan 15~~ | ~~Jul 15~~ | ~~Dec 1~~ | ~~Apr 15~~ |
| ~~International Applicants~~ | ~~Jan 15~~ | ~~Jan 15~~ | ~~Jul 1~~ | ~~Nov 1~~ |
| ~~International Transfer Applicants~~ | ~~Jan 15~~ | ~~Mar 1~~ | ~~Sep 1~~ | ~~Dec 15~~ |

## FINANCIALS

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Graduate students may receive financial assistance through fellowships, assistantships, tuition support, or loans. For more information, see Student Finances, which describes the types of financial assistance available at UCF and provides general guidance in planning your graduate finances. The Financial Information section of the Graduate Catalog is another key resource.

### Fellowships

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Fellowships are awarded based on academic merit to highly qualified students. They are paid to students through the Office of Student Financial Assistance, based on instructions provided by the College of Graduate Studies. Fellowships are given to support a student's graduate study and do not have a work obligation. For more information, see Fellowships, which includes descriptions of UCF fellowships and what you should do to be considered for a fellowship.

## CONTACT INFO

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Ahmad Elshennawy PhD
Professor
ahmade@mail.ucf.edu
Telephone: 407-823-2204
Engineering 2, Room 430

# SYSTEMS ENGINEERING

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## TRACK DESCRIPTION

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The Systems Engineering track in the Industrial Engineering MS program is intended for engineers of all engineering disciplines. The program focuses on a systems view of engineering problems related to the management of complex industrial, military, government, and social systems. The MS is flexible by design to accommodate engineers of varied backgrounds, interests, and goals.

The Industrial Engineering graduate programs are structured to support the emergence of Central Florida as a national center of high technology as well as supporting the diverse service industries in the region and throughout the nation.

Additional information can be found at www.iems.ucf.edu.

International students may only take one course per semester in a totally online format while attending UCF on a F-1 visa. Courses in this program can be taken in mixed mode for international students at UCF or fully online for international students who are not on visas. If you have questions, please consult the International Service Center at www.intl.ucf.edu.

## CURRICULUM

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### Total Credit Hours Required:

30 Credit Hours Minimum beyond the Bachelor's Degree

This program can be taken entirely through the Florida Engineering Educational Delivery System (FEEDS), which provides video-streamed versions of classes over the Internet.

The Systems Engineering track in the Industrial Engineering MS program requires an undergraduate degree in Engineering or a closely related discipline. Students with undergraduate degrees outside of industrial engineering may be required to take additional prerequisite courses.

The track offers both thesis and nonthesis options with each requiring 30 credit hours of courses. Thesis students take 12 credit hours of ~~required~~ master core courses, ~~12~~ 9 credit hours of ~~electives~~ concentration courses, ~~and~~ 6 thesis credit hours and 3 credit hours of electives. They must also complete an independent research project and write and successfully defend their thesis. Nonthesis option students take ~~12~~ 12 credit hours of master core courses, ~~required courses and 18~~ 9 credit hours of concentration courses, and 9 credit hours of electives. They must also pass a comprehensive oral examination at the end of their program of study.

Research studies are required in one or more courses. The research study and report will focus on reviewing and analyzing contemporary research in the profession in order to help students acquire knowledge and skills pertaining to research-based best practices. In addition, students may engage in directed independent studies, directed research or a research report during their studies.

An approved program of study must be developed in consultation with the graduate program director. At least 24 credit hours of the program of study must consist of required and elective courses, exclusive of thesis and research. At least one-half of the credit hours (including thesis hours) required in a master's program of study must be taken in courses at the 6000 level or higher.

Students on assistantships must take 9 credit hours per semester to satisfy the university's requirement for full-time status. Most students working full time take 6 credit hours per semester. At that rate, the program can be completed in 6 semesters or less. However, students with more time available and with an early start on a thesis, if applicable, can finish the program in 3 semesters.

Prerequisites

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- Computer programming capability. Proficiency with MS Office expected. C++ , Visual BASIC, or Java recommended.
- Mathematics through Calculus II (MAC 2312)
- STA 3032 or equivalent
- Others, as needed by specific courses
- For MSIE degree: A BS degree in Engineering
- ~~Computer programming capability. C, C++, or Java recommended.~~
- ~~MAP 2302 Mathematics through Differential Equations~~
- ~~MAC 2313 Mathematics through Calculus III~~

~~Required~~ Master Core Courses (~~—~~12 Credit Hours)

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- ESI 5219: Engineering Statistics
- EIN 5140 Project Engineering
- ESI 6551C: Systems Engineering
- EIN 6357 Advanced Engineering Economic Analysis

- ~~ESI 5219 Engineering Statistics (3 credit hours)~~
- ~~ESI 5306 Operations Research (3 credit hours)~~
- ~~ESI 5531 Discrete Systems Simulation (3 credit hours)~~
- ~~ESI 6551C Systems Engineering (3 credit hours)~~

~~Restricted Electives~~Concentration Courses (~~—~~9 Credit Hours)

~~All students, both thesis and nonthesis, must select three courses from the following list of electives.~~

- EIN 6215: System Safety Engineering and Management
- ESI 5359: Risk Assessment and Management
- ESI 6358: Decision Analysis
- ~~EIN 5117 Management Information Systems I (3 credit hours)~~
- ~~EIN 5140 Project Engineering (3 credit hours)~~
- ~~EIN 6215 Systems Safety Engineering and Management (3 credit hours)~~
- ~~EIN 6258 Human-Computer Interaction (3 credit hours)~~
- ~~EIN 6528 Simulation-based Life Cycle Engineering (3 credit hours)~~
- ~~EIN 6647 Intelligent Simulation (3 credit hours)~~
- ~~ESI 6224 Quality Management (3 credit hours)~~
- ~~ESI 6358 Decision Analysis (3 credit hours)~~
- ~~ESI 6532 Object Oriented Simulation (3 credit hours)~~

Thesis Option—9 Credit Hours

Thesis students must take an additional 3 credit hour elective beyond the 9 credit hours of ~~restricted electives~~ concentration courses described above. They must also complete an

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independent research project and write and successfully defend their thesis according to program guidelines.

- EIN 6971 Thesis (6 credit hours)
- Elective (3 credit hours)

The College of Engineering and Computer Science requires that all thesis defense announcements be approved by the student's adviser and posted on the college's website and on the university-wide Events Calendar at the College of Graduate Studies website at least two weeks before the defense date.

Nonthesis Option—9 Credit Hours

Nonthesis students must take 9 credit hours of additional electives ~~breyond~~beyond the 9 credit hours of concentration courses ~~restricted electives~~ described above.

- Electives (9 credit hours)

Comprehensive Examination

Nonthesis students must also successfully pass an oral comprehensive examination to fulfill degree requirements. For further details, please see the program director.

## Equipment Fee

Students in the Industrial Engineering MS program pay a $90 equipment fee each semester that they are enrolled.

## ~~INDEPENDENT LEARNING~~Independent Learning

The Independent Learning requirement is met by successful completion of a master's thesis or comprehensive exam.

## Application Requirements

For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

The College of Engineering and Computer Science encourages prospective applicants to complete a pre-application form (www.cecs.ucf.edu/preapp) before completing the online application for graduate admission.

In addition to the general UCF graduate application requirements, applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended.
- A bachelor's degree in Engineering or a closely related discipline.
- ~~Official, competitive GRE score taken within the last five years.~~
- Two letters of recommendation.

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- Résumé.
- Statement of educational, research, and professional career objectives.

Faculty members may choose to conduct face-to-face or telephone interviews before accepting an applicant into their research program.

~~Application Deadlines~~

~~All application materials must be submitted by the appropriate deadline listed below.~~

| | | | | |
|---|---|---|---|---|
| ~~Systems Engineering~~ | ~~Fall Priority~~ | ~~Fall~~ | ~~Spring~~ | ~~Summer~~ |
| ~~Domestic Applicants~~ | ~~Jan 15~~ | ~~Jul 15~~ | ~~Dec 1~~ | ~~Apr 15~~ |
| ~~International Applicants~~ | ~~Jan 15~~ | ~~Jan 15~~ | ~~Jul 1~~ | ~~Nov 1~~ |
| ~~International Transfer Applicants~~ | ~~Jan 15~~ | ~~Mar 1~~ | ~~Sep 1~~ | ~~Dec 15~~ |

## FINANCIALS

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Graduate students may receive financial assistance through fellowships, assistantships, tuition support, or loans. For more information, see Student Finances, which describes the types of financial assistance available at UCF and provides general guidance in planning your graduate finances. The Financial Information section of the Graduate Catalog is another key resource.

### Fellowships

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Fellowships are awarded based on academic merit to highly qualified students. They are paid to students through the Office of Student Financial Assistance, based on instructions provided by the College of Graduate Studies. Fellowships are given to support a student's graduate study and do not have a work obligation. For more information, see Fellowships, which includes descriptions of UCF fellowships and what you should do to be considered for a fellowship.

## CONTACT INFO

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Ahmad Elshennawy PhD
Professor
ahmade@mail.ucf.edu
Telephone: 407-823-2204
Engineering 2, Room 430

UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

# Program Action Request Form

This form is to be used to revise, add, suspend, or inactivate degree programs, tracks, or certificate programs. A new form must be used for each program, track, or certificate.

**PLEASE NOTE:** The deadline for new tracks or certificates is **February 1 of each year**. Any proposal for new tracks or certificates received after this date will not be included in the next year's catalog. Revisions to existing programs, tracks, or certificates are **due by March 15**. Any proposals for revisions received after that date will not be included in the next year's catalog. Please include catalog copy (description, curriculum, contact information, application requirements, and application deadlines). For revisions – attach the catalog copy **showing changes (use Track Changes in Word)**.

College/Unit(s) Submitting Proposal: **College of Engineering and Computer Science**

Proposed Effective Term/Year: **Summer 2011**

Unit(s) Housing Program: **Industrial Engineering and Management Systems**

Name of program, track, and/or certificate: **Industrial Engineering MSIE Program**

**Description of program (this description will show up in the graduate catalog copy):**

## INDUSTRIAL ENGINEERING MSIE

### PROGRAM DESCRIPTION

The Department of Industrial Engineering and Management Systems offers a Master of Science in Industrial Engineering (MSIE) degree focusing 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 graduate programs are structured to support the emergence of Central Florida as a national center of high technology as well as supporting the diverse service industries in the region and throughout the nation.

Many of the graduate courses offered by the department or required in the MSIE program are offered through the Florida Engineering Educational Delivery System (FEEDS), which provides video-streamed versions of classes over the Internet.

International students may only take one course per semester in a totally online format while attending UCF on a F-1 visa. Courses in this program can be taken in mixed mode for international students at UCF or fully online for international students who are not on visas. If you have questions, please consult the International

Service Center at www.intl.ucf.edu.

## CURRICULUM

The Industrial Engineering and Management Systems MSIE program offers three options for completing the degree with options 1 and 2 having both thesis and nonthesis opportunities. All three options require 30 credit hours of courses beyond the bachelor's degree. Option 1 is designed for individuals desiring a broad generalist approach to management systems. Option 2 is for individuals desiring a more specialist approach to management systems. And Option 3 is for those with BS degrees in engineering that are not in Industrial Engineering.

The MSIE curriculum builds on an undergraduate engineering degree to develop a stronger systems focus and analytical capability. Students with undergraduate degrees outside of industrial engineering may be required to take additional prerequisite courses.

### Total Credit Hours Required:

30 Credit Hours Minimum beyond the Bachelor's Degree

Research studies are required in one or more courses. The research study and report will focus on reviewing and analyzing contemporary research in the profession in order to help students acquire knowledge and skills pertaining to research-based best practices. In addition, students may engage in directed independent studies, directed research or a research report during their studies.

An approved program of study must be developed in consultation with the graduate program director. All programs of study must consist of 24 credit hours of required and elective coursework, exclusive of thesis and research. At least one-half of the credit hours (including thesis hours) required in a master's program of study must be taken in courses at the 6000 level or higher.

Students on assistantships must take 9 credit hours per semester to satisfy the university's requirement for full-time status. Most students working full time take 6 credit hours per semester. At that rate, the program can be completed in 6 semesters or less. However, students with more time available and, with an early start on a thesis, if applicable, can finish the program in 3 semesters.

There are two options for students with a BSIE degree to pursue the MSIE; students with other Bachelor of Science degrees in Engineering may pursue Option 3 only.

### Option 1: Generalist

**This program can be taken entirely through the Florida Engineering Educational Delivery System (FEEDS), which provides video streamed versions of classes over the Internet.** The generalist program provides for both thesis and nonthesis options.

**Required Courses—18 Credit Hours**

- EIN 5117 Management Information Systems I (3 credit hours)
- EIN 5140 Project Engineering (3 credit hours)
- EIN 6357 Advanced Engineering Economic Analysis (3 credit hours) OR ESI 6358 Decision analysis (3 credit hours)
- ESI 5219 Engineering Statistics (3 credit hours)
- ESI 5236 Reliability Engineering (3 credit hours)
- ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)

**Elective Courses—6 Credit Hours**

All students, both thesis and nonthesis, must take 6 credit hours of electives after consultation with their adviser. At least one-half of the credit hours of a student's program of study must be at the 6000 level

**Thesis Option—6 Credit Hours**

- EIN 6971 Thesis (6 credit hours)

The College of Engineering and Computer Science requires that all thesis defense announcements are approved by the student's advisor and posted on the college's website (http://www.cecs.ucf.edu/graddefense/) and on the College of Graduate Studies Events Calendar at least two weeks before the defense date.

**Nonthesis Option**

Nonthesis students must successfully pass an oral comprehensive examination.

**Comprehensive Examination**

For further details, please see the program director.

**Option 2: Follow the requirements for any Industrial Engineering MS track.**

**This option is open only for students who have BSIE degree.** Depending on the MS track a student chooses, this program can be taken entirely through the Florida Engineering Educational Delivery System (FEEDS), which provides video streamed versions of classes over the Internet. The program provides for both thesis and nonthesis options.

**Option 3: For those with other BS degrees in Engineering only.**

This program can be taken entirely through the Florida Engineering Educational Delivery System (FEEDS),

which provides video streamed versions of classes over the Internet, except the prerequisite courses. This option does not provide a thesis option.

The following prerequisite courses are required.

**Prerequisites**

- Computer programming capability. Proficiency with MS Office expected. C++, Visual BASIC, or Java recommended.
- STA 3032 or equivalent
- Others, as needed by specific courses
- BS degree in Engineering
- EIN 3314C Work Measurement and Design (3 credit hours)
- EIN 4333C Industrial Control Systems (3 credit hours)
- EIN 4391C Manufacturing Engineering (3 credit hours)

**Required Courses—24 Credit Hours**

Choose eight courses; at least three courses must be at the 6000 level.

- EIN 5117 Management Information Systems I (3 credit hours)
- EIN 5140 Project Engineering (3 credit hours)
- EIN 5248C Ergonomics (3 credit hours)
- EIN 6336 Production and Inventory Control (3 credit hours)
- EIN 6357 Advanced Engineering Economic analysis (3 credit hours)
- ESI 5219 Engineering Statistics (3 credit hours)
- ESI 5306 Operations Research (3 credit hours)
- ESI 5531 Discrete Systems Simulation (3 credit hours)
- ESI 6225 Quality Design and Control (3 credit hours)
- ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)

**Elective Courses—6 Credit Hours**

- Students select elective courses subject to the requirement that at least one-half of the credit hours of a student's program of study must be at the 6000 level.

**Comprehensive Examination**

Students must successfully pass an oral comprehensive examination to fulfill degree requirements. Please see the program director for further details.

**Equipment Fee**

Students in the Industrial Engineering MSIE program pay equipment fee each semester that they are enrolled as follows:

- $90 for FT students
- $45 for PT students.

### Independent Learning

A research project serves as the independent learning experience for thesis students. Nonthesis students are required to successfully pass an oral comprehensive examination.

## APPLICATION REQUIREMENTS

For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

The College of Engineering and Computer Science encourages prospective applicants to complete a pre-application form (www.cecs.ucf.edu/preapp) before completing the online application for graduate admission.

In addition to the general UCF graduate admission requirements, applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended.
- Bachelor's degree in Industrial Engineering or a closely related discipline.
- Two letters of recommendation.
- Résumé.
- Statement of educational, research, and professional career objectives.

Faculty members may choose to conduct face-to-face or telephone interviews before accepting an applicant into their research program.

## FINANCIALS

Graduate students may receive financial assistance through fellowships, assistantships, tuition support, or loans. For more information, see Student Finances, which describes the types of financial assistance available at UCF and provides general guidance in planning your graduate finances. The Financial Information section of the Graduate Catalog is another key resource.

### Fellowships

Fellowships are awarded based on academic merit to highly qualified students. They are paid to students

through the Office of Student Financial Assistance, based on instructions provided by the College of Graduate Studies. Fellowships are given to support a student's graduate study and do not have a work obligation. For more information, see Fellowships, which includes descriptions of UCF fellowships and what you should do to be considered for a fellowship.

CONTACT INFO

**Graduate Program**
**Ahmad Elshennawy PhD**
Professor
ahmade@mail.ucf.edu
Telephone: 407-823-2204
Engineering 2, Room 312

**DELIVERY - Will program be delivered:** ☐ Face to face ☐ Completely online x Mixed delivery

**Admissions deadlines**: (Please specify if you have a different deadline for the track than for the program?)

N/A

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**Application requirements:** (Please specify if you have different application requirements for the track than for the program? Will you admit directly to the track?)

N/A

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**Program Director(s) and contact information:** (name, email, phone, campus address, program website address)

Dr. Ahmad Elshennawy, ahmade@mail.ucf.edu, 312 Engineering 2, 407– 823-2204

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**Please check one: This action affects a:** x Program ☐ Track ☐ Certificate

**Please check one: This action is a(n):**

☐ **Addition.** Please proceed to Part A.

x **Revision.** If a revision applies to multiple tracks, please list them here and then proceed to Part A:

---

☐ **Inactivation**

☐ **Temporary Suspension of Admissions. Give Length of Suspension:**

---

**Temporary suspension of admissions:** The program will be removed from the online application. A notation will be entered in the graduate catalog indicating the length of the suspension of admissions. Currently enrolled students will not experience any issues with continued enrollment.

**Inactivation:** Admissions will be suspended for new students and the program will be removed from the online application. Students active in the program are eligible to complete the program under the appropriate criteria and an appropriate teach-out plan is required. The program will be removed from the catalog as of the approved term.

## If you checked inactivation or you are temporarily suspending admissions, please go to Part B and complete it.



UCF College of Graduate Studies – P.O. Box 160112, Orlando, FL 32816-0112
**Questions?** Contact Rhonda Nelson at rlnelson@mail.ucf.edu

## Signature Page

**RECOMMENDATIONS**

| | | | |
|---|---|---|---|
| ☐ Yes ☐ No | **Department Chair:** | **Date:** |
| ☐ Yes ☐ No | **College Curriculum Committee Chair:** | **Date:** |
| ☐ Yes ☐ No | **College Dean or Unit Head:** | **Date:** |
| ☐ Yes ☐ No | **Chair or GSC:** | **Date:** |
| ☐ Yes ☐ No | **Dean, College of Graduate Studies:** | **Date:** |

**APPROVAL**

| | |
|---|---|
| **Provost and Vice President for Academic Affairs:** | **Date:** |

## Distribution: After approval is received from the Provost, distribution will be to:

Department(s); College; Registrar; Associate Registrar; Institutional Research; Academic Services; Faculty Senate;

University Analysis and Planning Support; College of Graduate Studies



UCF College of Graduate Studies – P.O. Box 160112, Orlando, FL 32816-0112
**Questions?** Contact Rhonda Nelson at rlnelson@mail.ucf.edu

UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

## Part A – For <u>additions or revisions</u> of programs, tracks or certificates

**Brief Statement of Program Change and rationale:** (Please indicate the change, the rationale for the change, how it affects the unit and faculty teaching in and students enrolled in the program, track or certificate. If there are changes to the credit hours of the program, required courses or other requirements, please state those changes. Remember to attach the catalog copy showing changes, using Track Changes in Word.)

**The Change:** More flexibility in offering electives
**Rationale:** It has become necessary that changes be made to our MS program. Objectives of the change include teaching fewer courses and improving quality of course delivery.
**Impact on Faculty:** More efficiency, more time to conduct research, seek external funding, and increase tha number and quality of publications.
**Impact on Students:** More concentration courses, better scheduling of courses for faster time to graduate.

**Will students be moved from an existing program, track, or certificate into this new program, track, or certificate?**

☐ Yes x No

If yes, state the name of the program or track where students are currently enrolled and provide a list of students if possible:

**Will students have the option to stay in their existing program, track, or certificate?** x Yes ☐ No

### Name Change

**Are you changing the name of an existing program, track, or certificate?** ☐ Yes x No

If yes, provide the new name of the program, track, or certificate:

Provide the name of the current program, track, or certificate:

**When is the name change effective?** Please note: A name change will apply to the record of all students who are currently enrolled, readmitted or newly admitted into this program as of the effective date of this change.

**Will students have the option to stay in their existing program, track, or certificate?** ☐ Yes ☐ No

**If you are requesting a CIP Code change for an existing program, track, or certificate, please provide:**

old CIP:

new CIP:

If a name change is your only revision, stop here. Otherwise, complete the rest of Part A.



UCF College of Graduate Studies – P.O. Box 160112, Orlando, FL 32816-0112
**Questions?** Contact Rhonda Nelson at rlnelson@mail.ucf.edu

## Part A - Continued

Specify the faculty who will participate in the program, track or certificate and their credentials to do so: (List faculty and a brief paragraph of their credentials.)

Waldemar Karwowski, Ph.D., Professor and Chair, Texas Tech: IE, Human System Integration, Ergonomics/Human Engineering
Lesia Crumpton-Young, Ph.D., Professor, Texas A&M: Human Engineering/Ergonomics, Industrial Engineering
Ahmad K. Elshennawy, Ph.D., Professor & Associate Chair, Penn State: IE, Quality and Reliability, Production Systems
Christopher Geiger, Ph.D., Assistant Professor, Purdue University: Production Systems, IE, Simulation, OR
Robert L. Hoekstra, Ph.D., Associate Professor, Cincinnati: Manufacturing Engineering, Engineering Management
Timothy G. Kotnour, Ph.D., Associate Professor, Virginia Tech: Engineering Management, IE
Gene C.H. Lee, Ph.D., P.E., Associate Professor, Texas Tech: Human Engineering/Ergonomics, IE, Safety Engineering/Management
Pamela R. McCauley-Bush, Ph.D., Associate Professor, University of Oklahoma: Engineering/Ergonomics, IE, Biomechanics
Mansooreh Mollaghasemi, Ph.D., Associate Professor, University of Louisville: IE, Simulation, OR, Decision Analysis
Dima Nazzal, Ph.D., Assistant Professor, Georgia Tech: OR, Industrial Engineering, Simulation & Modeling
Michael D. Proctor, Ph.D., Associate Professor, N. Carolina State: Interactive Simulation, Training System Design
Luis Rabelo, Ph.D., Associate Professor, University of Missouri: Production/Manufacturing Systems, IE, Management
Charles H. Reilly, Ph.D., Professor, Purdue University: OR, Industrial Engineering, Statistics
Serge Sala-Diakanda, Ph.D., Visiting Assistant Professor, UCF: Systems Engineering, Statistics, Simulation
José A. Sepúlveda, Ph.D., P.E., Associate Professor, University of Pittsburgh: Simulation, IE, OR, production Systems
William Thompson, Ph.D., Associate Professor, Arizona State: Engineering management, IE, Production Systems, Quality
Kent E. Williams, Ph.D., Associate Professor, University of Connecticut: Training Systems, Statistics, Interactive Simulation

**Impact of changes on students:** Will current students be impacted by the addition or revision of a program, track or certificate? If so, how?

There will be no impact of program revision on students.

**If applicable**, provide a written agreement (email is fine) from all involved units that they are in support of, will provide courses to, or will participate in the program, track, or certificate. Please attach the correspondence and also list the units here.

N/A

**If an addition**, provide a statement of who is likely to enroll and why. Please state if there is licensure or certification that depends upon this education, etc. Also, complete the following table.

N/A

| |
|---|
| |

| | Year 1 | Year 2 | Year 3 |
|---|---|---|---|
| Headcount | | | |
| SCHs | | | |

**If an addition**, indicate likely career or student outcomes upon completion: (What will students do? What will their job titles be?)

| |
|---|
| |

## Part A - Continued

**If an addition or there are substantial REVISIONS** to existing tracks or certificates, please complete the following table on financial support: (Specify all forms of support – assistantships, fellowships, and tuition remission.)

| | No. assistantship students | Source of funds | No. fellowship students (specify fellowship) | No. tuition remissions | Source of funds |
|---|---|---|---|---|---|
| Year 1 | | | | | |
| Year 2 | | | | | |
| Year 3 | | | | | |

## Checklist of items to be provided:

x **Electronic graduate catalog copy for additions; track changes included if there are revisions. (required)**

☐ **Attach all appropriate course action requests that will be necessary to implement the changes. (required)**

☐ **Emails showing consultation with other units. (if applicable)**

☐ **If an addition, list of 1-3 students and 1-3 faculty for profiles in the graduate catalog (provide email address so Graduate Studies can contact them to write profiles and take photos). You may provide draft copy of profiles if you wish.**

☐ **If an addition, what disciplines does this program, track or certificate belong to? What other UCF graduate programs, tracks, or certificates are related to it? This information will be used to provide additional links for prospective students to search in the online graduate catalog.**

## Part B – For inactivations or suspensions of programs, tracks, or certificates

**Are students currently enrolled in the program?** ☐ Yes ☐ No

If yes, number of current students:

_____

**Please specify the intended time period of inactivation or suspension:**

_____

If program, track, or certificate is being inactivated or suspended, then attach a "teach out" plan for all current students specifying how they can finish the program or where students will be placed if moving to another program. The "teach out" plan should specify when courses will be offered to enable students to finish. Specify whether students will remain in the existing program to finish, and if so, when the completion date will be, whether students will be moved to another program, etc. Please provide a list of students where applicable.

| |
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| |

Sample teach out plan: Enter the terms and courses that will be taught for each term throughout the last semester.

| Summer 2011 | Fall 2011 | Spring 2011 | Summer 2012 | Fall 2012 |
|---|---|---|---|---|
| | | | | |
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## Checklist of items to be provided:

☐ **Attach all appropriate course action requests that will be necessary to implement the changes. (required)**

☐ **Emails showing consultation with other units. (if applicable)**



UCF College of Graduate Studies – P.O. Box 160112, Orlando, FL 32816-0112
**Questions?** Contact Rhonda Nelson at rlnelson@mail.ucf.edu

INDUSTRIAL ENGINEERING MS

PROGRAM DESCRIPTION

The Master of Science programs in Industrial Engineering are designed to produce highly skilled industrial engineers, engineering managers, technical professionals, and leaders for the global economy. The program offers specialization tracks in the areas of:

- Engineering Management,
- Human Systems Engineering/Ergonomics,
- Interactive Simulation and Training Systems,
- ~~Manufacturing Engineering,~~
- ~~Operations Research,~~
- Professional Engineering Management,
- Quality Systems Engineering,
- Systems Operation and ~~Simulation~~ Modeling ~~and Analysis~~, and
- Systems Engineering.

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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 Industrial Engineering programs are structured to support the emergence of Central Florida as a national center of high technology as well as supporting the diverse service industries in the region and throughout the nation.

Additional information can be found at www.iems.ucf.edu.

Application Requirements

For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

The College of Engineering and Computer Science encourages prospective applicants to complete a pre-application form (www.cecs.ucf.edu/preapp) before completing the online application for graduate admission.

In addition to the general UCF graduate application requirements, applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended.
- A bachelor's degree in Industrial Engineering or a related discipline.
- ~~Official, competitive GRE score taken within the last five years.~~
- Two letters of recommendation.
- Résumé.
- Statement of educational, research, and professional career objectives.

Faculty members may choose to conduct face-to-face or telephone interviews before accepting an applicant into their research program.

FINANCIALS

Graduate students may receive financial assistance through fellowships, assistantships, tuition support, or loans. For more information, see Student Finances, which describes the types of financial assistance available at UCF and provides general guidance in planning your graduate finances. The Financial Information section of the Graduate Catalog is another key resource.

Fellowships

Fellowships are awarded based on academic merit to highly qualified students. They are paid to students through the Office of Student Financial Assistance, based on instructions provided by the College of Graduate Studies. Fellowships are given to support a student's graduate study and do not have a work obligation. For more information, see Fellowships, which includes descriptions of UCF fellowships and what you should do to be considered for a fellowship.

Contact Info

Ahmad Elshennawy PhD
Professor
ahmade@mail.ucf.edu
Telephone: 407-823-2204
Engineering 2, Room 430

# ACCELERATED BS TO MS

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## TRACK DESCRIPTION

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The accelerated undergraduate/graduate program in Industrial Engineering allows highly qualified undergraduate majors in Industrial Engineering to begin taking graduate-level courses that will count toward their master's degree while completing their baccalaureate program. Participation will enable completion of the Bachelor of Science and Master of Science degrees in five instead of six years for students enrolled in full-time course work.

The Master of Science Industrial Engineering programs are designed to produce highly skilled industrial engineers, engineering managers, technical professionals, and leaders for the global economy. The program offers specialization tracks in the areas of Engineering Management, Human Engineering/Ergonomics, Interactive Simulation and Training Systems, Manufacturing Engineering, Operations Research, Quality Engineering, Simulation Modeling and Analysis, and Systems Engineering.

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 Industrial Engineering graduate programs are structured to support the emergence of Central Florida as a national center of high technology as well as supporting the diverse service industries in the region and throughout the nation.

Additional information can be found at www.iems.ucf.edu.

## CURRICULUM

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### Total Credit Hours Required:

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30 Credit Hours Minimum beyond the Bachelor's Degree

The BSIE is awarded after fulfilling all university requirements including completing 128 credit hours of course work and 71 credit hours of engineering courses. The MSIE is awarded upon completion of the master's program. Courses designated in General Education Program and Common Program Prerequisites are usually completed in the first 60 hours (see engineering major requirements in the Undergraduate Catalog).

Up to 12 credit hours of approved 5000- or 6000-level courses with grades "B" (3.0) or better may be counted towards the BS and MS degrees. Additional notes on the Accelerated Undergraduate and Graduate Program in Industrial Engineering:

- Students who change degree programs and select this major must adopt the most current catalog.
- Students must earn at least a "B" (3.0) in each undergraduate and graduate engineering course for them to be counted toward the major.

### Undergraduate Requirements

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Please see the current edition of the Undergraduate Catalog or the academics section of the College of Engineering and Computer Science website, link given above, for additional information about this program

## Graduate Requirements

Please see Industrial Engineering MS graduate program requirements in the track of interest.

## Equipment Fee

Students in the Industrial Engineering MS program pay a $90 equipment fee each semester that they are enrolled.

## ~~INDEPENDENT LEARNING~~ Independent Learning

The Independent Learning Requirement is met by successful completion of a master's thesis. Nonthesis students will complete a comprehensive exam or specific course as mandated by their specialization.

## APPLICATION REQUIREMENTS

For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

The Accelerated BS to MS program in Industrial Engineering allows highly qualified University of Central Florida undergraduate majors in Industrial Engineering to begin taking graduate level courses that will count toward their master's degree while completing their baccalaureate degree program. Students apply for admission to the accelerated program in either their junior year or senior year. If the student has a degree in the discipline, but were not previously part of this accelerated program, then they should apply to either the Engineering Management Track, Human Engineering/Ergonomics Track, Interactive Simulation and Training Systems Track, Manufacturing Engineering Track, Operations Research Track, Quality Engineering, Simulation Modeling and Analysis Track, Systems Engineering Track, or The General Industrial Engineering Program without a track selection. Additional information about this track may be located at: http://www.cecs.ucf.edu/academics/acceleratedbstomsprograms.

The College of Engineering and Computer Science encourages prospective applicants to complete a pre-application form (www.cecs.ucf.edu/preapp) before completing the online application for graduate admission.

In addition to the general UCF graduate application requirements, applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended.
- ~~Official, competitive GRE score taken within the last five years.~~
- Two letters of recommendation.
- A bachelor's degree in Engineering or a closely related discipline.
- Résumé.
- Statement of educational, research, and professional career objectives.

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Faculty members may choose to conduct face-to-face or telephone interviews before accepting an applicant into their research program.

## FINANCIALS

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Graduate students may receive financial assistance through fellowships, assistantships, tuition support, or loans. For more information, see Student Finances, which describes the types of financial assistance available at UCF and provides general guidance in planning your graduate finances. The Financial Information section of the Graduate Catalog is another key resource.

### Fellowships

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Fellowships are awarded based on academic merit to highly qualified students. They are paid to students through the Office of Student Financial Assistance, based on instructions provided by the College of Graduate Studies. Fellowships are given to support a student's graduate study and do not have a work obligation. For more information, see Fellowships, which includes descriptions of UCF fellowships and what you should do to be considered for a fellowship.

## CONTACT INFO

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Ahmad Elshennawy PhD
Professor
ahmade@mail.ucf.edu
Telephone: 407-823-2204
Engineering 2, Room 430

# HUMAN SYSTEMS ENGINEERING/ERGONOMICS

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## TRACK DESCRIPTION

As technology has become more sophisticated, the need to design for the human user has become more difficult, yet even more important. Human engineering and ergonomics assist in ensuring that as technology advances, the abilities, limitations, and needs of humans are considered in the system design. This not only supports the needs of the user, it also optimizes the efficiency and usability of the system designed. Traditionally, ergonomics has been associated with biomechanical issues and work measurement and performance issues in physical system design, as well as occupational and industrial safety. The broader focus of human engineering encompasses those issues as well as incorporating the reaction and effectiveness of human interaction with systems, both physical systems and virtual systems such as computer-based models.

The Human Engineering/Ergonomics track in the Industrial Engineering MS program is designed for students who have an undergraduate degree in Engineering or a closely related discipline. The program is designed to provide students with the necessary knowledge in human engineering and ergonomics to effectively design tasks, industrial systems, and work environments that maximize human performance, safety, and overall productivity.

The Industrial Engineering graduate programs are structured to support the emergence of Central Florida as a national center of high technology as well as supporting the diverse service industries in the region and throughout the nation.

Additional information can be found at www.iems.ucf.edu.

International students may only take one course per semester in a totally online format while attending UCF on a F-1 visa. Courses in this program can be taken in mixed mode for international students at UCF or fully online for international students who are not on visas. If you have questions, please consult the International Service Center at www.intl.ucf.edu.

## CURRICULUM

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### Total Credit Hours Required:

30 Credit Hours Minimum beyond the Bachelor's Degree

The Human Engineering/Ergonomics track in the Industrial Engineering MS program requires an undergraduate degree in Engineering or a closely related discipline. A student with an undergraduate degree outside of industrial engineering may be required to take additional prerequisite courses.

The track offers both thesis and nonthesis options with each requiring 30 credit hours of courses beyond the bachelor's degree. The thesis option requires 12 credit hours of required MS core courses, ~~12~~ 9 credit hours of ~~electives~~ concentration courses, ~~and~~ 6 thesis credit hours, and 3 hours of electives. Students must also write and successfully defend their thesis. The nonthesis option requires 12 credit hours of required MS core courses, 9 credit hours of track courses, and 9 hours of electives. ~~and 18 credit hours of electives.~~ Students must also pass a comprehensive oral examination at the end of their program of study.

All programs of study must include 24 credit hours of required and elective courses, exclusive of thesis and research. At least one-half of the credit hours (including thesis hours) of all courses in a master's program of study must be at the 6000 level or higher.

Research studies are required in one or more courses. The research study and report will focus on reviewing and analyzing contemporary research in the profession in order to help students acquire knowledge and skills pertaining to research-based best practices. In addition, students may engage in directed independent studies, directed research or a research report during their studies.

A program of study must be developed with the graduate program director and meet with departmental approval. Students on assistantships must take 9 credit hours per semester to satisfy the university's requirement for full-time status. Most students working full time take 6 credit hours per semester. At that rate, the program can be completed in 6 semesters or less. However, students with more time available and with an early start on a thesis, if applicable, can finish the program in 3 semesters.

## Prerequisites

- ~~MAC 2313 Mathematics through Calculus III (4 credit hours)~~
- ~~EIN 3314C Work Measurement and Design (3 credit hours)~~
- ~~EIN 4243C Human Engineering (or equivalent) (3 credit hours)~~
- ~~Computer programming capability. C, C++, or Java recommended.~~
- Computer programming capability. Proficiency with MS Office expected. C++ or Java recommended.
- Mathematics through Calculus II (MAC 2312)
- STA 3032 or equivalent
- Others, as needed by specific courses
- For MSIE degree: A BS degree in Engineering

## ~~Required~~ Master Core Courses~~—~~ (12 Credit Hours)

- ESI 5219: Engineering Statistics
- EIN 5140: Project Engineering
- ESI 6551C: Systems Engineering
- EIN 6357: Advanced Engineering Economic Analysis

- ~~EIN 5248C Ergonomics (3 credit hours)~~
- ~~EIN 6279C Biomechanics (3 credit hours) or EIN 6270C Work Psychology (3 credit hours)~~
- ~~ESI 5219 Engineering Statistics (3 credit hours)~~
- ~~EIN 5251 Usability Engineering (3 credit hours)~~

## Concentration Courses ~~Restricted Electives—~~(9 Credit Hours)

Select three courses from the following courses.

- EIN 5248C Ergonomics
- EIN 6270C Work Physiology
- EIN 5251 Usability Engineering
- ~~EIN 5140 Project Engineering (3 credit hours)~~
- ~~EIN 6215 System Safety Engineering and Management (3 credit hours)~~

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- ~~EIN 6258 Human Computer Interaction (3 credit hours)~~
- ~~ESI 6358 Decision Analysis (3 credit hours)~~
- ~~ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)~~
- ~~Psychology Elective (3 credit hours)~~

Thesis Option—9 Credit Hours

All thesis students must complete an independent research project and successfully write and defend their thesis. Furthermore, they must take an additional 3 credit hours of electives beyond the 9 credit hours of restricted electives described above.

- EIN 6971 Thesis (6 credit hours)
- Elective (3 credit hours).

The College of Engineering and Computer Science requires that all thesis defense announcements be approved by the student's adviser and posted on the college's website and on the Events Calendar at the College of Graduate Studies website at least two weeks before the defense date.

Nonthesis Option—9 Credit Hours

All nonthesis students must take an additional 9 credit hours of electives beyond the 9 credit hours of restricted electives described above.

- Electives (9 credit hours)

## Comprehensive Examination

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All nonthesis students must also pass a comprehensive examination prior to graduation. Please see the program director for details.

## Equipment Fee

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Students in the Industrial Engineering MS program pay a $90 equipment fee each semester that they are enrolled.

## ~~INDEPENDENT LEARNING~~Independent Learning

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The Independent Learning Requirement is met by successful completion of a master's thesis or comprehensive exam for nonthesis students.

## APPLICATION REQUIREMENTS

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For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

The College of Engineering and Computer Science encourages prospective applicants to complete a pre-application form (www.cecs.ucf.edu/preapp) before completing the online application for graduate admission.

In addition to the general UCF graduate application requirements, applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended.
- A bachelor's degree in Engineering or a closely related discipline.
- ~~Official, competitive GRE score taken within the last five years.~~
- Two letters of recommendation.
- Résumé.
- Statement of educational, research, and professional career objectives.

Faculty members may choose to conduct face-to-face or telephone interviews before accepting an applicant into their research program.

## FINANCIALS

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Graduate students may receive financial assistance through fellowships, assistantships, tuition support, or loans. For more information, see Student Finances, which describes the types of financial assistance available at UCF and provides general guidance in planning your graduate finances. The Financial Information section of the Graduate Catalog is another key resource.

### Fellowships

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Fellowships are awarded based on academic merit to highly qualified students. They are paid to students through the Office of Student Financial Assistance, based on instructions provided by the College of Graduate Studies. Fellowships are given to support a student's graduate study and do not have a work obligation. For more information, see Fellowships, which includes descriptions of UCF fellowships and what you should do to be considered for a fellowship.

## CONTACT INFO

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Ahmad Elshennawy PhD
Professor
ahmade@mail.ucf.edu
Telephone: 407-823-2204
Engineering 2, Room 430

# ENGINEERING MANAGEMENT

## TRACK DESCRIPTION

The Engineering Management track in the Industrial Engineering MS program focuses on effective decision-making in engineering and technological organizations. Addressing the needs of engineers and scientists moving into management positions, engineering management complements their technical backgrounds with the human aspects, organizational and financial issues, project considerations, resource allocation, and the extended analytical tools required for effective decision-making and program management. This program is designed for technically qualified individuals who plan to assume a management role in project or program-oriented environments in industry or government. It provides the analytical, organizational, and managerial skills to bridge the gap between a technical specialty and technical management.

The Industrial Engineering programs are structured to support the emergence of Central Florida as a national center of high technology as well as supporting the diverse service industries in the region and throughout the nation.

Additional information can be found at www.iems.ucf.edu.

International students may only take one course per semester in a totally online format while attending UCF on a F-1 visa. Courses in this program can be taken in mixed mode for international students at UCF or fully online for international students who are not on visas. If you have questions, please consult the International Service Center at www.intl.ucf.edu.

## CURRICULUM

### Total Credit Hours Required:

30 Credit Hours Minimum beyond the Bachelor's Degree

This program can be taken entirely through the Florida Engineering Educational Delivery System (FEEDS), which provides video-streamed versions of classes over the Internet.

The Engineering Management track in the Industrial Engineering MS program requires an undergraduate degree in Engineering or a closely related discipline. Students with undergraduate degrees outside of industrial engineering may be required to take additional prerequisite courses.

The track offers thesis, nonthesis, or Profesional Science Master's (PSM) options with each requiring 30 credit hours of courses. Thesis option students take 12 credit hours of required Master Core courses, ~~12~~ 9 credit hours of ~~electives~~ track courses, ~~and~~ 6 thesis credit hours, and 3 credit hours of electives. They must also complete an independent research project and write and successfully defend their thesis. Nonthesis option students take 12 credit hours of required Master Core courses, 9 credit hours of concentration courses, and ~~18~~ 9 credit hours of electives. They must also pass a comprehensive oral examination at the end of their program of study. PSM option students take 12 credit hours of required courses, 15 credit hours of electives, and 3 credit hours of professional internship. They must also pass a comprehensive oral examination at the end of their program of study.

Research studies are required in one or more courses. The research study and report will focus on reviewing and analyzing contemporary research in the profession in order to help students acquire knowledge and skills pertaining to research-based best practices.

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An approved program of study must be developed in consultation with the graduate program director. All programs of study require 24 hours of core and elective course work, exclusive of thesis hours. At least one-half of the credit hours of all courses (including thesis hours) in a master's program of study must be at the 6000 level or higher.

Students on assistantships must take 9 credit hours per semester to satisfy the university's requirement for full-time status. Most students working full time take 6 credit hours per semester. At that rate, the program can be completed in 6 semesters or less. However, students with more time available and with an early start on a thesis, if applicable, can finish the program in 3 semesters.

Prerequisites

- ~~Mathematics through Calculus III (MAC 2313)~~
- Computer programming capability. Proficiency with MS Office expected. C++ , Visual BASIC, or Java recommended.
- Mathematics through Calculus II (MAC 2312)
- STA 3032 or equivalent
- Others, as needed by specific courses
- For MSIE degree: A BS degree in Engineering

Master Core Courses (12 Credit hours)~~Courses~~)

- ESI 5219: Engineering Statistics
- EIN 5140 Project Engineering
- ESI 6551C: Systems Engineering
- EIN 6357: Advanced Engineering Economic Analysis

~~Required Courses—12 Credit Hours~~

- ~~EIN 5108 The Environment of Technical Organizations (3 credit hours)~~
- ~~EIN 5140 Project Engineering (3 credit hours)~~
- ~~EIN 6182 Engineering Management (3 credit hours)~~
- ~~ESI 5219 Engineering Statistics (3 credit hours)~~

~~Restricted Electives~~Concentration Courses (~~—~~9 Credit Hours)

- EIN 5108 The Environment of Technical Organizations
- EIN 6459 Concurrent Engineering
- EIN 6182 Engineering Management - -

~~All students, thesis, nonthesis and PSM, must select three courses from the following courses.~~

- ~~EIN 5117 Management Information Systems I (3 credit hours)~~
- ~~EIN 5251 Usability Engineering (3 credit hours)~~
- ~~EIN 6357 Advanced Engineering Economic Analysis (3 credit hours)~~
- ~~EIN 6339 Operations Engineering (3 credit hours)~~
- ~~EIN 6224 Quality Management (3 credit hours)~~
- ~~ESI 6358 Decision Analysis (3 credit hours)~~
- ~~EIN 6528 Simulation-based Life Cycle Engineering (3 credit hours)~~
- ~~EIN 5356 Cost Engineering (3 credit hours)~~

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- ~~EIN 6326 Technology Strategy (3 credit hours)~~
- ~~EIN 6936 Seminar in Advanced Industrial Engineering (3 credit hours)~~
- ~~ESI 6551C Systems Engineering (3 credit hours)~~

Thesis Option—9 Credit Hours

Thesis students must complete an independent research project and then write and successfully defend their thesis. Furthermore, an additional 3 credit hours ~~of an electives~~of electives are required beyond the 9 credit hours of ~~restricted electives~~ concentration courses described above.

- EIN 6971 Thesis (6 credit hours)
- Elective (3 credit hours)

Nonthesis Option—9 Credit Hours

Nonthesis students must take 9 additional credit hours of electives beyond the 9 credit hours of concentration courses ~~restricted electives~~ described above.

- Electives (9 credit hours)

Comprehensive Examination

Nonthesis students must successfully pass an oral comprehensive examination to fulfill degree requirements. Please see the program director for further details.

Professional Science Master's Option—9 Credit Hours

The Professional Science Master's (PSM) option ensures that students seeking a mix of professional and technical courses are able to structure their programs of study accordingly. Two of the core courses, EIN 5108 and EIN 6182, are predominantly professional-content courses. In addition, students choosing this option must select at least one elective that is predominantly professional in content. Finally, the PSM option includes a one-semester, 3-credit-hour internship.

- EIN 6946 Internship (3 credit hours)
- Electives (6 credit hours), subject to the requirement that at least one-half of the credit hours on a student's program of study must be at the 6000 level and that at least one of the elective courses must have substantial professional content.

Comprehensive Examination

PSM students must successfully pass an oral comprehensive examination to fulfill degree requirements. Please see the program director for further details.

Equipment Fee

Students in the Industrial Engineering MS program pay a $90 equipment fee each semester that they are enrolled. For part-time students, the equipment fee is $45 per semester.

~~INDEPENDENT LEARNING~~Independent Learning

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The Independent Learning Requirement is met by successful completion of a master's thesis, EIN 6182 Engineering Management for nonthesis students, or EIN 6182 and EIN 6946 Internship for PSM students.

## Application Requirements

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For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

The College of Engineering and Computer Science encourages prospective applicants to complete a pre-application form (www.cecs.ucf.edu/preapp) before completing the online application for graduate admission.

In addition to the general UCF graduate application requirements, applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended.
- A bachelor's degree in Engineering or a closely related discipline.
- ~~Official, competitive GRE score taken within the last five years.~~
- Two letters of recommendation.
- Résumé.
- Statement of educational, research, and professional career objectives.

Faculty members may choose to conduct face-to-face or telephone interviews before accepting an applicant into their research program.

~~Application Deadlines~~

~~All application materials must be submitted by the appropriate deadline listed below.~~

| ~~Engineering Management~~ | ~~Fall Priority~~ | ~~Fall~~ | ~~Spring~~ | ~~Summer~~ |
|---|---|---|---|---|
| ~~Domestic Applicants~~ | ~~Jan 15~~ | ~~Jul 15~~ | ~~Dec 1~~ | ~~Apr 15~~ |
| ~~International Applicants~~ | ~~Jan 15~~ | ~~Jan 15~~ | ~~Jul 1~~ | ~~Nov 1~~ |
| ~~International Transfer Applicants~~ | ~~Jan 15~~ | ~~Mar 1~~ | ~~Sep 1~~ | ~~Dec 15~~ |

## FINANCIALS

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Graduate students may receive financial assistance through fellowships, assistantships, tuition support, or loans. For more information, see Student Finances, which describes the types of financial assistance available at UCF and provides general guidance in planning your graduate finances. The Financial Information section of the Graduate Catalog is another key resource.

### Fellowships

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Fellowships are awarded based on academic merit to highly qualified students. They are paid to students through the Office of Student Financial Assistance, based on instructions provided by the College of Graduate Studies. Fellowships are given to support a student's graduate study and do not have a work obligation. For more information, see Fellowships, which includes descriptions of UCF fellowships and what you should do to be considered for a fellowship.

## CONTACT INFO

Ahmad Elshennawy PhD
Professor
ahmade@mail.ucf.edu
Telephone: 407-823-2204
Engineering 2, Room 430

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# INTERACTIVE SIMULATION AND TRAINING SYSTEMS

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## TRACK DESCRIPTION

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The Interactive Simulation and Training Systems track in the Industrial Engineering MS program focuses on providing a fundamental understanding of significant topics relative to simulation systems and the requirements, design, development, and use of such systems for knowledge transfer in the technical environment. Additionally, the program addresses the evolving and multiple discipline application of interactive simulation by providing a wealth of electives to support development of individual student interests and talents. In conjunction with UCF's Institute for Simulation and Training, industrial organizations involved in simulation in the Central Florida region, military organizations, and other governmental organizations, the program provides exposure to both military and commercial interactive simulation and training systems.

The program's emphasis is on the application and development of interactive simulation and training systems to meet various requirements including, but not limited to: simulators, skill trainers, organizational learning systems, computer and web-based interactive simulation systems and other novel interactive simulation efforts. The interactive simulation and training systems curriculum prepares individuals with an undergraduate degree in engineering, science, education, psychology, mathematics or other related disciplines for careers in simulation, focusing particularly on the interactive simulation and training systems industries.

The Industrial Engineering graduate programs are structured to support the emergence of Central Florida as a national center of high technology as well as supporting the diverse service industries in the region and throughout the nation.

Additional information can be found at www.iems.ucf.edu.

## CURRICULUM

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### Total Credit Hours Required:

30 Credit Hours Minimum beyond the Bachelor's Degree

The Interactive Simulation and Training Systems track in the Industrial Engineering MS program requires an undergraduate degree in Engineering or a closely related discipline. Students with undergraduate degrees outside of industrial engineering may be required to take additional prerequisite courses.

The track offers both a thesis option and a nonthesis option with each requiring 30 credit hours of courses beyond the bachelor's degree. Thesis option students take 12 credit hours of required Master Core courses, 9 credit hours of concentration courses, 6 thesis credit hours, and 3 credit hours of electives. They must also complete an independent research project and write and successfully defend their thesis. Nonthesis option students take 12 credit hours of required Master Core courses, 9 credit hours of track courses, and 9 credit hours of electives. They must also pass a comprehensive oral examination at the end of their program of study. ~~Thesis students take 9 credit hours of required courses, 15 credit hours of electives and 6 thesis credit hours. In addition, they must complete an independent research project and write and defend their thesis. Nonthesis students take 9 credit hours of required courses and 21 credit hours of electives. They also must pass a comprehensive oral examination at the end of their program of study.~~

Research studies are required in one or more courses. The research study and report will focus on reviewing and analyzing contemporary research the profession in order to help students acquire knowledge and skills pertaining to research-based best practices. In addition, students may engage in directed independent studies, directed research or a research report during their studies.

An approved program of study must be developed in consultation with the graduate program director. At least one-half of the credit hours (including thesis hours) required in a master's program of study must be at the 6000 level or higher. All programs of study must have at least 24 hours of required and elective courses exclusive of thesis and research.

Students on assistantships must take 9 credit hours per semester to satisfy the university's requirement for full-time status. Most students working full time take 6 credit hours per semester. At that rate, the program can be completed in 6 semesters or less. However, students with more time available and with an early start on a thesis, if applicable, can finish the program in 3 semesters.

Prerequisites

- Computer programming capability. Proficiency with MS Office expected. C++ , Visual BASIC, or Java recommended.
- Mathematics through Calculus II (MAC 2312)
- STA 3032 or equivalent
- Others, as needed by specific courses
- For MSIE degree: A BS degree in Engineering

Master Core Courses (12 Credit hours))

- ESI 5219: Engineering Statistics
- EIN 5140 Project Engineering
- ESI 6551C: Systems Engineering
- EIN 6357: Advanced Engineering Economic Analysis

~~Prerequisites~~

- ~~Computer programming capability. C, C++, or Java recommended.~~
- ~~Mathematics through Differential Equations (MAP 2302)~~

~~Required Courses—9 Credit Hours~~

- ~~EIN 5255C Interactive Simulation (3 credit hours)~~
- ~~EIN 5317 Training Systems Design (3 credit hours)~~
- ~~ESI 5219 Engineering Statistics (3 credit hours)~~

~~Restricted Electives—12 Credit Hours~~

Concentration Courses (9 credit hours)

All students, both thesis and nonthesis, must select ~~four~~ three courses from the following list of restricted electives.

- EIN 5255C Interactive Simulation

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- EIN 5317 Training Systems Design
- EIN 6645C Real-Time Simulation Agents ~~(3 credit hours)~~
- EIN 6649C Intelligent Tutoring Training System Design ~~(3 credit hours)~~
- ~~ESI 5531 Discrete Systems Simulation (3 credit hours)~~
- ~~ESI 6532 Object-Oriented Simulation (3 credit hours)~~
- ~~EIN 6258 Human Computer Interaction(3 credit hours)~~
- ~~EIN 5140 Project Engineering (3 credit hours)~~
- EIN 6647 Intelligent Simulation ~~(3 credit hours)~~
- EIN 6528 Simulation-based Life Cycle Engineering ~~(3 credit hours)~~

Thesis Option—9 Credit Hours

Thesis students must complete an additional elective beyond the ~~12~~ 9 credit hours of ~~restricted electives~~ concentration courses described above. They must also complete an independent research project and write and defend a thesis according to program guidelines.

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- EIN 6971 Thesis (6 credit hours)
- Elective (3 credit hours)

The College of Engineering and Computer Science requires that all thesis defense announcements be approved by the student's adviser and posted on the college's website and on the Events Calendar at the College of Graduate Studies website at least two weeks before the defense date.

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Nonthesis Option—9 Credit Hours

Nonthesis students must take 9 additional credit hours of electives beyond the ~~12~~ 9 credit hours of concentration courses ~~restricted electives~~ described above.

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- Electives (9 credit hours)

Comprehensive Examination

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Nonthesis students who do not take EIN 6647 must successfully pass an oral comprehensive examination over their graduate course work. Please see the program director for further details.

## Equipment Fee

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Students in the Industrial Engineering MS program pay a $90 equipment fee each semester that they are enrolled.

## ~~INDEPENDENT LEARNING~~Independent Learning

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The Independent Learning Requirement is met by successful completion of a master's thesis. Nonthesis students must pass an oral comprehensive exam or EIN 6647 Intelligent Simulation.

## Application Requirements

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For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

The College of Engineering and Computer Science encourages prospective applicants to complete a pre-application form (www.cecs.ucf.edu/preapp) before completing the online application for graduate admission.

In addition to the general UCF graduate application requirements, applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended.
- A bachelor's degree in Engineering or a closely related discipline.
- ~~Official, competitive GRE score taken within the last five years.~~
- Two letters of recommendation.
- Résumé.
- Statement of educational, research, and professional career objectives.

Faculty members may choose to conduct face-to-face or telephone interviews before accepting an applicant into their research program.

~~*Application Deadlines*~~

~~*All application materials must be submitted by the appropriate deadline listed below.*~~

| ~~*Interactive Simulation and Training Systems*~~ | ~~*Fall Priority*~~ | ~~*Fall*~~ | ~~*Spring*~~ | ~~*Summer*~~ |
|---|---|---|---|---|
| ~~*Domestic Applicants*~~ | ~~*Jan 15*~~ | ~~*Jul 15*~~ | ~~*Dec 1*~~ | ~~*Apr 15*~~ |
| ~~*International Applicants*~~ | ~~*Jan 15*~~ | ~~*Jan 15*~~ | ~~*Jul 1*~~ | ~~*Nov 1*~~ |
| ~~*International Transfer Applicants*~~ | ~~*Jan 15*~~ | ~~*Mar 1*~~ | ~~*Sep 1*~~ | ~~*Dec 15*~~ |

## FINANCIALS

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Graduate students may receive financial assistance through fellowships, assistantships, tuition support, or loans. For more information, see Student Finances, which describes the types of financial assistance available at UCF and provides general guidance in planning your graduate finances. The Financial Information section of the Graduate Catalog is another key resource.

### Fellowships

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Fellowships are awarded based on academic merit to highly qualified students. They are paid to students through the Office of Student Financial Assistance, based on instructions provided by the College of Graduate Studies. Fellowships are given to support a student's graduate study and do not have a work obligation. For more information, see Fellowships, which includes descriptions of UCF fellowships and what you should do to be considered for a fellowship.

## CONTACT INFO

Formatted: Font color: Blue, Small caps

Ahmad Elshennawy PhD
Professor
ahmade@mail.ucf.edu
Telephone: 407-823-2204
Engineering 2, Room 430

~~Manufacturing Engineering~~

~~TRACK DESCRIPTION~~

~~The design and operation of manufacturing systems requires a broad knowledge of manufacturing processes and systems, an understanding of the information base required for effective system operation, and the integration of information with those processes and systems to improve productivity. The Manufacturing Engineering track provides that basic knowledge and supports education in new manufacturing concepts such as concurrent design and manufacturing, the virtual factory, and agile manufacturing. The Manufacturing Engineering curriculum builds on an undergraduate degree in Engineering, Mathematics, Computer Science, or an allied field to develop a strong understanding of manufacturing engineering, manufacturing systems, and the tools required to design, improve, and manage those systems.~~

~~The High Performance Engine Optimization Focus of the Manufacturing Engineering track in the Industrial Engineering MS program focuses on developing both the theoretical basis and the practical skills necessary to develop racing engines. The theoretical basis includes advanced concepts for the induction, combustion and exhaust systems, component design, data analysis, and systems design. The practical skills include instrumentation, dynamometer operation, flow bench operation, engine assembly, and metrology. This balance between the theoretical and practical prepares the student for a position with a professional racing team or as an engineer with an engine development organization.~~

~~The Industrial Engineering graduate programs are structured to support the emergence of Central Florida as a national center of high technology as well as supporting the diverse service industries in the region and throughout the nation.~~

~~Additional information can be found at www.iems.ucf.edu.~~

~~CURRICULUM~~

~~Total Credit Hours Required:~~
~~30 Credit Hours Minimum beyond the Bachelor's Degree~~

~~The Manufacturing Engineering track in the Industrial Engineering MS program requires an undergraduate degree in engineering or a closely related discipline. A student with an undergraduate degree outside of industrial engineering may be required to take additional prerequisites.~~

~~The program offers both a thesis option and a nonthesis option with each requiring 30 credit hours of courses. The program also offers a High Performance Internal Combustion Engine Optimization Focus with a thesis and nonthesis option.~~

~~Thesis option students take 12 credit hours of required courses, 12 credit hours of electives, and 6 thesis credit hours. They must also conduct an independent research project and write and successfully defend a thesis. Nonthesis option students take 12 credit hours of required courses and 18 credit hours of electives. They must also pass a comprehensive oral examination at the end of their program of study.~~

~~Research studies are required in one or more courses. The research study and report will focus on reviewing and analyzing contemporary research in the profession in order to help students acquire knowledge and skills pertaining to research-based best practices. In addition, students may engage in directed independent studies, directed research or a research report during their studies.~~

A program of study must be developed with the graduate program director and meet with departmental approval. All programs of study must consist of 24 credit hours of required and elective courses exclusive of thesis and research. At least one-half of the credit hours (including thesis hours) required in a master's program of study must be at the 6000 level or higher.

Students on assistantships must take 9 credit hours per semester to satisfy the university's requirement for full-time status. Most students working full time take 6 credit hours per semester. At that rate, the program can be completed in 6 semesters or less. However, students with more time available and with an early start on a thesis, if applicable, can finish the program in 3 semesters.

Prerequisites

- Computer programming capability. C, C++, or Java recommended.
- Mathematics through Differential Equations (MAP 2302)

Required Courses—12 Credit Hours

- EIN 6336 Production and Inventory Control (3 credit hours)
- EIN 5368C Integrated Factory Automation Systems (3 credit hours)
- ESI 5219 Engineering Statistics (3 credit hours)
- EGN 5858C Prototyping and Product Realization (3 credit hours) or EIN 6459 Concurrent Engineering (3 credit hours)

Restricted Electives—9 Credit Hours

All students, both thesis and nonthesis, must select three courses from the following list of restricted electives.

- EIN 6339 Operations Engineering (3 credit hours)
- EIN 5140 Project Engineering (3 credit hours)
- EIN 5607C Computer Control of Manufacturing Systems (3 credit hours)
- EIN 5248C Ergonomics (3 credit hours)
- ESI 5306 Operations Research (3 credit hours)
- ESI 5236 Reliability Engineering (3 credit hours)
- ESI 6225 Quality Design and Control (3 credit hours)

Thesis Option—9 Credit Hours

Thesis students must take an additional elective beyond the 9 credit hours of restricted electives described above. In addition, they must conduct an independent research project and write and successfully defend a thesis according to program guidelines.

- EIN 6971 Thesis (6 credit hours)
- Elective (3 credit hours)

The College of Engineering and Computer Science requires that all thesis defense announcements be approved by the student's adviser and posted on the college's website and on the university-wide Events Calendar at the College of Graduate Studies website at least two weeks before the defense date.

Nonthesis Option—9 Credit Hours

Nonthesis students must take 9 additional credit hours of courses beyond the 9 credit hours of restricted electives described above.

- Electives (9 credit hours)

Comprehensive Examination

Nonthesis students must also successfully pass an oral comprehensive examination to fulfill degree requirements. Please see the program director for further details.

Equipment Fee

Students in the Industrial Engineering MS program pay a $90 equipment fee each semester that they are enrolled.

INDEPENDENT LEARNING

The Independent Learning Requirement is met by successful completion of a master's thesis or comprehensive exam for nonthesis students.

Application Requirements

For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

The College of Engineering and Computer Science encourages prospective applicants to complete a pre-application form (www.cecs.ucf.edu/preapp) before completing the online application for graduate admission.

In addition to the general UCF graduate application requirements, applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended.
- A bachelor's degree in Engineering or a closely related discipline.
- Official, competitive GRE score taken within the last five years.
- Two letters of recommendation.
- Résumé.
- Statement of educational, research, and professional career objectives.

Faculty members may choose to conduct face-to-face or telephone interviews before accepting an applicant into their research program.

Application Deadlines

All application materials must be submitted by the appropriate deadline listed below.

| Manufacturing Engineering | Fall Priority | Fall | Spring | Summer |
|---|---|---|---|---|
| Domestic Applicants | Jan 15 | Jul 15 | Dec 1 | Apr 15 |
| International Applicants | Jan 15 | Jan 15 | Jul 1 | Nov 1 |

International Transfer Applicants Jan 15 Mar 1 Sep 1 Dec 15

FINANCIALS

Graduate students may receive financial assistance through fellowships, assistantships, tuition support, or loans. For more information, see Student Finances, which describes the types of financial assistance available at UCF and provides general guidance in planning your graduate finances. The Financial Information section of the Graduate Catalog is another key resource.

Fellowships

Fellowships are awarded based on academic merit to highly qualified students. They are paid to students through the Office of Student Financial Assistance, based on instructions provided by the College of Graduate Studies. Fellowships are given to support a student's graduate study and do not have a work obligation. For more information, see Fellowships, which includes descriptions of UCF fellowships and what you should do to be considered for a fellowship.

Contact Info

Ahmad Elshennawy PhD
Professor
ahmade@mail.ucf.edu
Telephone: 407-823-2204
Engineering 2, Room 430

~~Operations Research~~

~~TRACK DESCRIPTION~~

~~The Operations Research track in the Industrial Engineering MS program uses mathematics and computer-based systems to model operational processes and decisions in order to develop and evaluate alternatives that will lead to gains in efficiency and effectiveness. Drawing on probability, statistics, simulation, optimization, and stochastic processes, Operations Research provides many of the analytic tools used by industrial engineers as well as by other analysts to improve processes, decision-making, and management by individuals and organizations. The program is designed for students who have an undergraduate degree in engineering, mathematics, or science. The curriculum builds on an undergraduate Engineering, Mathematics, or Science degree to develop a strong modeling and analytical capability to improve processes and decision-making.~~

~~The Industrial Engineering graduate programs are structured to support the emergence of Central Florida as a national center of high technology as well as supporting the diverse service industries in the region and throughout the nation.~~

~~Additional information can be found at www.iems.ucf.edu.~~

~~International students may only take one course per semester in a totally online format while attending UCF on a F-1 visa. Courses in this program can be taken in mixed mode for international students at UCF or fully online for international students who are not on visas. If you have questions, please consult the International Service Center at www.intl.ucf.edu.~~

~~CURRICULUM~~

~~Total Credit Hours Required:~~
~~30 Credit Hours Minimum beyond the Bachelor's Degree~~

~~This program can be taken entirely through the Florida Engineering Educational Delivery System (FEEDS), which provides video-streamed versions of classes over the Internet.~~

~~The Operations Research MS track requires an undergraduate degree in Engineering or a closely related discipline. Students with undergraduate degrees outside of industrial engineering may be required to take additional prerequisite courses.~~

~~The program offers both a thesis option and a nonthesis option with each requiring 30 credit hours of courses. Thesis option students will take 12 credit hours of required courses, 12 credit hours of electives and 6 thesis credit hours. They must also conduct an independent research project and write and defend a thesis. Nonthesis option students will take 12 credit hours of required courses and 18 credit hours of electives. They must also pass a comprehensive oral examination at the end of their program of study.~~

~~Research studies are required in one or more courses. The research study and report will focus on reviewing and analyzing contemporary research in the profession in order to help students acquire knowledge and skills pertaining to research-based best practices. In addition, students may engage in directed independent studies, directed research or a research report during their studies.~~

~~An approved program of study must be developed in consultation with the graduate program director. All programs of study must consist of 24 hours of required and elective courses, exclusive of~~

thesis and research. At least one-half of the credit hours (including thesis hours) required in a master's program of study must be taken in courses at the 6000 level or higher.

Students on assistantships must take 9 credit hours per semester to satisfy the university's requirement for full-time status. Most students working full time take 6 credit hours per semester. At that rate, the program can be completed in 6 semesters or less. However, students with more time available and with an early start on a thesis, if applicable, can finish the program in 3 semesters.

Prerequisites

- Mathematics through Differential Equations (MAP 2302)
- Operations Research (ESI 4312 or ESI 5306)
- Computer programming capability. C, C++, or Java recommended.

Required Courses—12 Credit Hours

- ESI 5219 Engineering Statistics (3 credit hours)
- ESI 6418 Linear Programming and Extensions (3 credit hours) or ESI 5419C Engineering Applications of Linear and Nonlinear Optimization (3 credit hours)
- ESI 6358 Decision Analysis (3 credit hours)
- ESI 6336 Queuing Systems (3 credit hours)

Restricted Electives—9 Credit Hours

All students, both thesis and nonthesis, must select three courses from the following courses.

- EIN 6336 Production and Inventory Control (3 credit hours)
- ESI 5236 Reliability Engineering (3 credit hours)
- ESI 5306 Operations Research (3 credit hours)
- ESI 5531 Discrete Systems Simulation (3 credit hours)
- ESI 6217 Statistical Aspects of Digital Simulation (3 credit hours)
- ESI 6532 Object-oriented Simulation (3 credit hours)

Thesis Option—9 Credit Hours

Thesis students must complete an additional elective beyond the 9 credit hours of restricted electives described above. They must also complete an independent research study and write and successfully defend a thesis according to program guidelines.

- EIN 6971 Thesis (6 credit hours)
- Elective (3 credit hours)

The College of Engineering and Computer Science requires that all thesis defense announcements be approved by the student's adviser and posted on the college's website and on the Events Calendar at the College of Graduate Studies website at least two weeks before the defense date.

Nonthesis Option—9 Credit Hours

Nonthesis students must complete 9 credit hours of additional electives beyond the 9 credit hours of restricted electives described above.

- Electives (9 credit hours)

Comprehensive Examination

Nonthesis students must also successfully pass an oral comprehensive examination over their graduate course work. Please see the program director for further details.

Equipment Fee

Students in the Industrial Engineering MS program pay a $90 equipment fee each semester that they are enrolled.

INDEPENDENT LEARNING

The Independent Learning requirement is met by successful completion of a master's thesis or comprehensive exam.

Application Requirements

For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

The College of Engineering and Computer Science encourages prospective applicants to complete a pre-application form (www.cecs.ucf.edu/preapp) before completing the online application for graduate admission.

In addition to the general UCF graduate application requirements, applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended.
- A bachelor's degree in Engineering or a closely related discipline.
- Official, competitive GRE score taken within the last five years.
- Two letters of recommendation.
- Résumé.
- Statement of educational, research, and professional career objectives.

Faculty members may choose to conduct face-to-face or telephone interviews before accepting an applicant into their research program.

Application Deadlines

All application materials must be submitted by the appropriate deadline listed below.

| | | | | |
|---|---|---|---|---|
| Operations Research | Fall Priority | Fall | Spring | Summer |
| Domestic Applicants | Jan 15 | Jul 15 | Dec 1 | Apr 15 |
| International Applicants | Jan 15 | Jan 15 | Jul 1 | Nov 1 |
| International Transfer Applicants | Jan 15 | Mar 1 | Sep 1 | Dec 15 |

~~FINANCIALS~~

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~~Fellowships~~

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~~Contact Info~~

~~Ahmad Elshennawy PhD~~
~~Professor~~
~~ahmade@mail.ucf.edu~~
~~Telephone: 407-823-2204~~
~~Engineering 2, Room 430~~

# PROFESSIONAL ENGINEERING MANAGEMENT

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## TRACK DESCRIPTION

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The Professional Engineering Management option is a cohort-based program where specific cohorts are established periodically based upon needs of industry. For information about the start of the next cohort please contact the IEMS Graduate Coordinator Dr. Elshennawy (ahmade@mail.ucf.edu) or the Program Director Dr. Kotnour (tkotnour@mail.ucf.edu).

The Professional Engineering Management (PEM) track in the Industrial Engineering MS 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.

## CURRICULUM

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### Total Credit Hours Required:

30 Credit Hours Minimum beyond the Bachelor's Degree

The Professional Engineering Management (PEM) track in the Industrial Engineering MS program requires an undergraduate degree in Engineering or a closely related discipline. Students with undergraduate degrees outside of industrial engineering may be required to take additional prerequisites. The program is designed to be a lock-step, cohort-based program that can be completed in approximately 15 to 18 months. It is available only in a nonthesis format that requires 12 credit hours of required courses and 18 credit hours of restricted electives.

Research studies are required in one or more courses. The research study and report will focus on reviewing and analyzing contemporary research in the profession in order to help students acquire knowledge and skills pertaining to research-based best practices.

A program of study must be developed with the graduate program director and meet with departmental approval. At least one-half of the credit hours required in a master's program of study must be taken in courses at the 6000 level or higher.

Prerequisites

- Mathematics through Calculus II (MAC 2312)

Required Courses—12 Credit Hours

- EIN 5108 The Environment of Technical Organizations ~~(3 credit hours)~~
- EIN 5140 Project Engineering ~~(3 credit hours)~~
- EIN 6182 Engineering Management ~~(3 credit hours)~~
- ESI 5219 Engineering Statistics ~~(3 credit hours)~~

Restricted Electives—18 Credit Hours

For each PEM cohort, six of the following courses will be offered.

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- EIN 5117 Management Information Systems I (3 credit hours)
- EIN 5251 Usability Engineering (3 credit hours)

- EIN 6357 Advanced Engineering Economic Analysis (3 credit hours)
- EIN 6339 Operations Engineering (3 credit hours)
- ESI 6224 Quality Management (3 credit hours)
- ESI 6358 Decision Analysis (3 credit hours)
- EIN 6528 Simulation-based Life Cycle Engineering (3 credit hours)
- EIN 5356 Cost Engineering (3 credit hours)
- EIN 6326 Technology Strategy (3 credit hours)
- EIN 6459 Concurrent Engineering (3 credit hours)
- EIN 6936 Seminar in Advanced Industrial Engineering (3 credit hours)
- ESI 6551C Systems Engineering (3 credit hours)

### Equipment Fee

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Full-time students in the Industrial Engineering MS program pay a $90 equipment fee each semester that they are enrolled. For part-time students, the equipment fee is $45 per semester.

### ~~INDEPENDENT LEARNING~~Independent Learning

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The Independent Learning Requirement is met by successful completion of the research studies required in individual courses, EIN 6182 Engineering Management, and the capstone project that requires that students integrate material from all the courses in their program.

## Application Requirements

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For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

In addition to the general UCF graduate application requirements, applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended.
- A bachelor's degree in Engineering or a closely related discipline.
- Two letters of recommendation.
- Résumé.
- Statement of educational, research, and professional career objectives.
- Applicants applying to this program who have attended a college/university outside the United States must provide a course-by-course credential evaluation with GPA calculation. Credential evaluations are accepted from World Education Services (WES) or Josef Silny and Associates, Inc. only.

## FINANCIALS

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Graduate students may receive financial assistance through fellowships, assistantships, tuition support, or loans. For more information, see Student Finances, which describes the types of financial assistance available at UCF and provides general guidance in planning your graduate finances. The Financial Information section of the Graduate Catalog is another key resource.

### Fellowships

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Fellowships are awarded based on academic merit to highly qualified students. They are paid to students through the Office of Student Financial Assistance, based on instructions provided by the College of Graduate Studies. Fellowships are given to support a student's graduate study and do not have a work obligation. For more information, see Fellowships, which includes descriptions of UCF fellowships and what you should do to be considered for a fellowship.

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Ahmad Elshennawy PhD
Professor
ahmade@mail.ucf.edu
Telephone: 407-823-2204
Engineering 2, Room 430

# QUALITY SYSTEMS ENGINEERING

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## TRACK DESCRIPTION

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The Quality Engineering track in the Industrial Engineering MS program focuses on providing the knowledge for improving product and process quality in manufacturing and service industries. Quality Engineering provides both the quantitative tools for measuring quality and the managerial focus and organizational insight required to implement effective continuous improvement programs and incorporate the voice of the customer. The Quality Engineering curriculum builds on an undergraduate degree in Engineering, Science, Mathematics, or a closely related discipline to provide the necessary knowledge to plan, control, and improve the product assurance function in government, military, service, or manufacturing organizations.

The Industrial Engineering graduate programs are structured to support the emergence of Central Florida as a national center of high technology as well as supporting the diverse service industries in the region and throughout the nation.

Additional information can be found at www.iems.ucf.edu.

International students may only take one course per semester in a totally online format while attending UCF on a F-1 visa. Courses in this program can be taken in mixed mode for international students at UCF or fully online for international students who are not on visas. If you have questions, please consult the International Service Center at www.intl.ucf.edu.

## CURRICULUM

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### Total Credit Hours Required:

30 Credit Hours Minimum beyond the Bachelor's Degree

This program can be taken entirely through the Florida Engineering Educational Delivery System (FEEDS), which provides video-streamed versions of classes over the Internet.

The Quality Engineering track in the Industrial Engineering MS program requires an undergraduate degree in Engineering or a closely related discipline. Students with undergraduate degrees outside of industrial engineering may be required to take additional prerequisites.

The track offers both thesis or nonthesis options with each requiring 30 credit hours of courses. The thesis option requires 12 credit hours of required courses, 12 credit hours of electives and 6 thesis credit hours. Students must also conduct an independent research study and write and successfully defend a thesis. The nonthesis option requires 12 credit hours of required courses and 18 credit hours of electives. Students must also pass a comprehensive oral examination at the end of their program of study.

Research studies are required in one or more courses. The research study and report will focus on reviewing and analyzing contemporary research in the profession in order to help students acquire knowledge and skills pertaining to research-based best practices. In addition, students may engage in directed independent studies, directed research or a research report during their studies.

A program of study must be developed with the graduate program director and meet with departmental approval. All programs of study must consist of 24 hours of required and elective courses, exclusive of thesis and research. At least one-half of the credit hours (including thesis hours) required in a master's program of study must be at the 6000 level or higher.

Students on assistantships must take 9 credit hours per semester to satisfy the university's requirement for full-time status. Most students working full time take 6 credit hours per semester. At that rate, the program can be completed in 6 semesters or less. However, students with more time available and with an early start on a thesis, if applicable, can finish the program in 3 semesters.

Prerequisites

- Computer programming capability. Proficiency with MS Office expected. C++ , Visual BASIC, or Java recommended.
- Mathematics through Calculus II (MAC 2312)
- STA 3032 or equivalent
- Others, as needed by specific courses
- For MSIE degree: A BS degree in Engineering
- ~~Computer programming capability. C, C++, or Java recommended.~~
- ~~Mathematics through Differential Equations (MAP 2302)~~

Master Core ~~Required~~ Courses (~~—~~12 Credit Hours)

- ESI 5219: Engineering Statistics
- EIN 5140 Project Engineering
- ESI 6551C: Systems Engineering
- EIN 357: Advanced Engineering Economic Analysis

Concentration Courses (9 credit hours)

- ~~ESI 5219 Engineering Statistics (3 credit hours)~~
- ESI 5236 Reliability Engineering ~~(3 credit hours)~~
- ESI 6224 Quality Management ~~(3 credit hours)~~
- ESI 6225 Quality Design and Control ~~(3 credit hours)~~

~~Restricted Electives—9 Credit Hours~~

~~All students, both thesis and nonthesis, must select three courses from the following list of restricted electives.~~

- ~~EIN 5140 Project Engineering (3 credit hours)~~
- ~~EIN 6339 Operations Engineering (3 credit hours)~~
- ~~ESI 5227 Total Quality Improvement (3 credit hours)~~
- ~~EIN 6336 Production and Inventory Control (3 credit hours)~~
- ~~ESI 5306 Operations Research (3 credit hours)~~
- ~~ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)~~
- ~~EIN 5368C Integrated Factory Automation Systems (3 credit hours)~~

Thesis Option—9 Credit Hours

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Thesis students must complete an additional elective beyond the 9 credit hours of ~~restricted electives~~ concentration courses described above. They must also complete an independent research study and write and successfully defend a thesis according to program guidelines.

- EIN 6971 Thesis (6 credit hours)
- Elective (3 credit hours)

The College of Engineering and Computer Science requires that all thesis defense announcements be approved by the student's adviser and posted on the college's website and on the university-wide Events Calendar at the College of Graduate Studies website at least two weeks before the defense date.

Nonthesis Option—9 Credit Hours

Nonthesis students must take 9 additional credit hours of electives beyond the 9 credit hours of concentration courses ~~restricted electives~~ described above.

- Electives (9 credit hours)

Comprehensive Examination

Nonthesis students must also successfully pass an oral comprehensive examination at the completion of their studies to fulfill degree requirements. Please see the program director for further details.

## Equipment Fee

Students in the Industrial Engineering MS program pay a $90 equipment fee each semester that they are enrolled.

## ~~INDEPENDENT LEARNING~~Independent Learning

The Independent Learning requirement is met by successful completion of a master's thesis or comprehensive exam.

## Application Requirements

For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

The College of Engineering and Computer Science encourages prospective applicants to complete a pre-application form (www.cecs.ucf.edu/preapp) before completing the online application for graduate admission.

In addition to the general UCF graduate application requirements, applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended.
- A bachelor's degree in Engineering or a closely related discipline.

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- ~~Official, competitive GRE score taken within the last five years.~~
- Two letters of recommendation.
- Résumé.
- Statement of educational, research, and professional career objectives.

Faculty members may choose to conduct face-to-face or telephone interviews before accepting an applicant into their research program.

~~Application Deadlines~~

~~All application materials must be submitted by the appropriate deadline listed below.~~

| ~~Quality Engineering~~ | ~~Fall Priority~~ | ~~Fall~~ | ~~Spring~~ | ~~Summer~~ |
|---|---|---|---|---|
| ~~Domestic Applicants~~ | ~~Jan 15~~ | ~~Jul 15~~ | ~~Dec 1~~ | ~~Apr 15~~ |
| ~~International Applicants~~ | ~~Jan 15~~ | ~~Jan 15~~ | ~~Jul 1~~ | ~~Nov 1~~ |
| ~~International Transfer Applicants~~ | ~~Jan 15~~ | ~~Mar 1~~ | ~~Sep 1~~ | ~~Dec 15~~ |

## FINANCIALS

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Graduate students may receive financial assistance through fellowships, assistantships, tuition support, or loans. For more information, see Student Finances, which describes the types of financial assistance available at UCF and provides general guidance in planning your graduate finances. The Financial Information section of the Graduate Catalog is another key resource.

### Fellowships

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Fellowships are awarded based on academic merit to highly qualified students. They are paid to students through the Office of Student Financial Assistance, based on instructions provided by the College of Graduate Studies. Fellowships are given to support a student's graduate study and do not have a work obligation. For more information, see Fellowships, which includes descriptions of UCF fellowships and what you should do to be considered for a fellowship.

## CONTACT INFO

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Ahmad Elshennawy PhD
Professor
ahmade@mail.ucf.edu
Telephone: 407-823-2204
Engineering 2, Room 430

# SYSTEMS OPERATION AND ~~SIMULATION~~ MODELING ~~AND ANALYSIS~~

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## TRACK DESCRIPTION

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The Systems Operation and Modeling track in the Industrial Engineering MS program uses mathematics and computer-based systems to model operational processes and decisions in order to develop and evaluate alternatives that will lead to gains in efficiency and effectiveness. Drawing on probability, statistics, simulation, optimization, and stochastic processes, Operations Research provides many of the analytic tools used by industrial engineers as well as by other analysts to improve processes, decision-making, and management by individuals and organizations. The track also ~~The Simulation Modeling and Analysis track in the Industrial Engineering MS program focuses on~~ provide~~s~~~~ing~~ a fundamental understanding of the functional and technical design requirements for simulation in manufacturing and service industries. The program is based on a systems modeling paradigm and provides coding and development capability in the context of a broader systems framework. Significant exposure to design and analysis aspects is a core element of the track.

The curriculum builds on an undergraduate Engineering, Mathematics, or Science degree to develop a strong modeling and analytical capability to improve processes and decision-making and ~~The Simulation Modeling and Analysis curriculum prepares individuals with an undergraduate degree in Engineering, Science, Mathematics, or a closely related discipline for careers in simulation, focusing particularly on~~ using simulation as an analysis and design tool for the manufacturing and service industries.

~~The Simulation Modeling and Analysis track in the Industrial Engineering MS program focuses on providing a fundamental understanding of the functional and technical design requirements for simulation in manufacturing and service industries. The program is based on a systems modeling paradigm and provides coding and development capability in the context of a broader systems framework. Significant exposure to design and analysis aspects is a core element of the track. The Simulation Modeling and Analysis curriculum prepares individuals with an undergraduate degree in Engineering, Science, Mathematics, or a closely related discipline for careers in simulation, focusing particularly on using simulation as an analysis and design tool for the manufacturing and service industries.~~

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The Industrial Engineering graduate programs are structured to support the emergence of Central Florida as a national center of high technology as well as supporting the diverse service industries in the region and throughout the nation.

Additional information can be found at www.iems.ucf.edu.

International students may only take one course per semester in a totally online format while attending UCF on a F-1 visa. Courses in this program can be taken in mixed mode for international students at UCF or fully online for international students who are not on visas. If you have questions, please consult the International Service Center at www.intl.ucf.edu.

## CURRICULUM

### Total Credit Hours Required:

30 Credit Hours Minimum beyond the Bachelor's Degree

This program can be taken entirely through the Florida Engineering Educational Delivery System (FEEDS), which provides video-streamed versions of classes over the Internet.

The Systems Operation ~~Simulation~~and Modeling ~~and Analysis~~ track in the Industrial Engineering MS program requires an undergraduate degree in Engineering or a closely related discipline. Students with undergraduate degrees outside of industrial engineering may be required to take additional prerequisite courses.

The track offers both thesis and nonthesis options with each requiring 30 credit hours of courses. Thesis students take 12 credit hours of required core courses, ~~12~~ 9 credit hours of ~~electives~~ concentration courses, ~~and~~ 6 thesis credit hours, and 3 hours of electives. They must also complete an independent research study and write and successfully defend their thesis. Nonthesis option students will take 12 credit hours of required core, 9 credit hours of concentration courses, ~~courses~~ and ~~18~~ 9 credit hours of electives. They must also pass a comprehensive oral examination at the end of their program of study.

Research studies are required in one or more courses. The research study and report will focus on reviewing and analyzing contemporary research in ~~the~~ the profession in order to help students acquire knowledge and skills pertaining to research-based best practices. In addition, students may engage in directed independent studies, directed research or a research report during their studies.

A approved program of study must be developed in ~~consultation~~consultation with the graduate program director. All programs of study must have 24 hours of required and elective course work, exclusive of thesis and research. At least one-half of the credit hours (including thesis hours) required in a master's program of study must be taken in courses at the 6000 level or higher.

Students on assistantships must take 9 credit hours per semester to satisfy the university's requirement for full-time status. Most students working full time take 6 credit hours per semester. At that rate, the program can be completed in 6 semesters or less. However, students with more time available and with an early start on a thesis, if applicable, can finish the program in 3 semesters.

Prerequisites

- Computer programming capability. Proficiency with MS Office expected. C++ , Visual BASIC, or Java recommended.
- Mathematics through Calculus II (MAC 2312)
- STA 3032 or equivalent
- Others, as needed by specific courses
- For MSIE degree: A BS degree in Engineering
- ~~Computer programming capability. C, C++, or Java recommended.~~
- ~~Mathematics through Differential Equations (MAP 2302)~~
- ~~Operations Research (ESI 4312 or ESI 5306)*~~

~~*This requirement may be met by taking ESI 5306 as part of the program of study.~~

Required Core Courses—12 Credit Hours

- ESI 5219: Engineering Statistics
- EIN 5140 Project Engineering
- ESI 6551C: Systems Engineering
- EIN 6357 Advanced Engineering Economic Analysis
- ~~ESI 5531 Discrete Systems Simulation (3 credit hours)~~
- ~~ESI 6532 Object-Oriented Simulation (3 credit hours)~~
- ~~ESI 5219 Engineering Statistics (3 credit hours)~~

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- ~~ESI 6217 Statistical Aspects of Digital Simulation (3 credit hours)~~

~~Restricted Electives:~~Concentration Courses (~~—~~9 Credit Hours)

All students, both thesis and nonthesis, must select three courses from the following courses~~:~~:

- ESI 5531 Discrete System Simulation *
- ESI 5306 Operations Research **
- EIN 6336 Production and Inventory Control
- EIN 6425 Scheduling and Sequencing
- ESI 6358 Decision Analysis
- ESI 6336 Queuing Systems
- ESI 6418 Linear Programming and Extensions
- ESI 6532 Object oriented Simulation

* Not open to students who have taken ESI 4523C or an equivalent course previously.
** Not open to students who have taken ESI 4312 or an equivalent course previously.

- ~~EIN 5255C Interactive Simulation (3 credit hours)~~
- ~~EIN 5317 Training System Design (3 credit hours)~~
- ~~EIN 6258 Human-Computer Interaction (3 credit hours)~~
- ~~EIN 6645 Real-Time Simulation Agents (3 credit hours)~~
- ~~ESI 6336 Queueing Systems (3 credit hours)~~
- ~~ESI 6247 Experimental Design and Taguchi Methods (3 credit hours)~~

Thesis Option—9 Credit Hours

Thesis students must take an additional 3 credit hour elective beyond the 9 credit hours of restricted electives described above. They must also complete an independent research study and write and defend their thesis according to program guidelines.

- EIN 6971 Thesis (6 credit hours)
- Elective (3 credit hours)

The College of Engineering and Computer Science requires that all thesis defense announcements be approved by the student's adviser and posted on the college's website and on the university-wide Events Calendar at the College of Graduate Studies website at least two weeks before the defense date.

Nonthesis Option—9 Credit Hours

Nonthesis students take 9 additional credit hours of electives beyond the 9 credit hours of restricted electives described above.

- Electives (9 credit hours)

Comprehensive Examination

Nonthesis students must also successfully pass an oral comprehensive examination to fulfill degree requirements. Please see the program director for further details.

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## Equipment Fee

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Students in the Industrial Engineering MS program pay a $90 equipment fee each semester that they are enrolled.

## ~~INDEPENDENT LEARNING~~Independent Learning

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The Independent Learning Requirement is met by successful completion of a master's thesis or comprehensive exam for nonthesis students.

## APPLICATION REQUIREMENTS

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For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

The College of Engineering and Computer Science encourages prospective applicants to complete a pre-application form (www.cecs.ucf.edu/preapp) before completing the online application for graduate admission.

In addition to the general UCF graduate application requirements, applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended.
- A bachelor's degree in Engineering or a closely related discipline.
- ~~Official, competitive GRE score taken within the last five years.~~
- Two letters of recommendation.
- Résumé.
- Statement of educational, research, and professional career objectives.

Faculty members may choose to conduct face-to-face or telephone interviews before accepting an applicant into their research program.

### ~~Application Deadlines~~

~~All application materials must be submitted by the appropriate deadline listed below.~~

| ~~Simulation Modeling and Analysis~~ | ~~Fall Priority~~ | ~~Fall~~ | ~~Spring~~ | ~~Summer~~ |
|---|---|---|---|---|
| ~~Domestic Applicants~~ | ~~Jan 15~~ | ~~Jul 15~~ | ~~Dec 1~~ | ~~Apr 15~~ |
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## FINANCIALS

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### Fellowships

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Professor
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# SYSTEMS ENGINEERING

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## TRACK DESCRIPTION

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The Systems Engineering track in the Industrial Engineering MS program is intended for engineers of all engineering disciplines. The program focuses on a systems view of engineering problems related to the management of complex industrial, military, government, and social systems. The MS is flexible by design to accommodate engineers of varied backgrounds, interests, and goals.

The Industrial Engineering graduate programs are structured to support the emergence of Central Florida as a national center of high technology as well as supporting the diverse service industries in the region and throughout the nation.

Additional information can be found at www.iems.ucf.edu.

International students may only take one course per semester in a totally online format while attending UCF on a F-1 visa. Courses in this program can be taken in mixed mode for international students at UCF or fully online for international students who are not on visas. If you have questions, please consult the International Service Center at www.intl.ucf.edu.

## CURRICULUM

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### Total Credit Hours Required:

30 Credit Hours Minimum beyond the Bachelor's Degree

This program can be taken entirely through the Florida Engineering Educational Delivery System (FEEDS), which provides video-streamed versions of classes over the Internet.

The Systems Engineering track in the Industrial Engineering MS program requires an undergraduate degree in Engineering or a closely related discipline. Students with undergraduate degrees outside of industrial engineering may be required to take additional prerequisite courses.

The track offers both thesis and nonthesis options with each requiring 30 credit hours of courses. Thesis students take 12 credit hours of ~~required~~ master core courses, ~~12~~ 9 credit hours of ~~electives~~ concentration courses, ~~and~~ 6 thesis credit hours and 3 credit hours of electives. They must also complete an independent research project and write and successfully defend their thesis. Nonthesis option students take ~~12~~ 12 credit hours of master core courses, ~~required courses and 18~~ 9 credit hours of concentration courses, and 9 credit hours of electives. They must also pass a comprehensive oral examination at the end of their program of study.

Research studies are required in one or more courses. The research study and report will focus on reviewing and analyzing contemporary research in the profession in order to help students acquire knowledge and skills pertaining to research-based best practices. In addition, students may engage in directed independent studies, directed research or a research report during their studies.

An approved program of study must be developed in consultation with the graduate program director. At least 24 credit hours of the program of study must consist of required and elective courses, exclusive of thesis and research. At least one-half of the credit hours (including thesis hours) required in a master's program of study must be taken in courses at the 6000 level or higher.

Students on assistantships must take 9 credit hours per semester to satisfy the university's requirement for full-time status. Most students working full time take 6 credit hours per semester. At that rate, the program can be completed in 6 semesters or less. However, students with more time available and with an early start on a thesis, if applicable, can finish the program in 3 semesters.

Prerequisites

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- Computer programming capability. Proficiency with MS Office expected. C++ , Visual BASIC, or Java recommended.
- Mathematics through Calculus II (MAC 2312)
- STA 3032 or equivalent
- Others, as needed by specific courses
- For MSIE degree: A BS degree in Engineering
- ~~Computer programming capability. C, C++, or Java recommended.~~
- ~~MAP 2302 Mathematics through Differential Equations~~
- ~~MAC 2313 Mathematics through Calculus III~~

~~Required~~ Master Core Courses (~~—~~12 Credit Hours)

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- ESI 5219: Engineering Statistics
- EIN 5140 Project Engineering
- ESI 6551C: Systems Engineering
- EIN 6357 Advanced Engineering Economic Analysis

- ~~ESI 5219 Engineering Statistics (3 credit hours)~~
- ~~ESI 5306 Operations Research (3 credit hours)~~
- ~~ESI 5531 Discrete Systems Simulation (3 credit hours)~~
- ~~ESI 6551C Systems Engineering (3 credit hours)~~

~~Restricted Electives~~Concentration Courses (~~—~~9 Credit Hours)

~~All students, both thesis and nonthesis, must select three courses from the following list of electives.~~

- EIN 6215: System Safety Engineering and Management
- ESI 5359: Risk Assessment and Management
- ESI 6358: Decision Analysis
- ~~EIN 5117 Management Information Systems I (3 credit hours)~~
- ~~EIN 5140 Project Engineering (3 credit hours)~~
- ~~EIN 6215 Systems Safety Engineering and Management (3 credit hours)~~
- ~~EIN 6258 Human-Computer Interaction (3 credit hours)~~
- ~~EIN 6528 Simulation-based Life Cycle Engineering (3 credit hours)~~
- ~~EIN 6647 Intelligent Simulation (3 credit hours)~~
- ~~ESI 6224 Quality Management (3 credit hours)~~
- ~~ESI 6358 Decision Analysis (3 credit hours)~~
- ~~ESI 6532 Object Oriented Simulation (3 credit hours)~~

Thesis Option—9 Credit Hours

Thesis students must take an additional 3 credit hour elective beyond the 9 credit hours of ~~restricted electives~~ concentration courses described above. They must also complete an

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independent research project and write and successfully defend their thesis according to program guidelines.

- EIN 6971 Thesis (6 credit hours)
- Elective (3 credit hours)

The College of Engineering and Computer Science requires that all thesis defense announcements be approved by the student's adviser and posted on the college's website and on the university-wide Events Calendar at the College of Graduate Studies website at least two weeks before the defense date.

Nonthesis Option—9 Credit Hours

Nonthesis students must take 9 credit hours of additional electives ~~breyond~~beyond the 9 credit hours of concentration courses ~~restricted electives~~ described above.

- Electives (9 credit hours)

Comprehensive Examination

Nonthesis students must also successfully pass an oral comprehensive examination to fulfill degree requirements. For further details, please see the program director.

## Equipment Fee

Students in the Industrial Engineering MS program pay a $90 equipment fee each semester that they are enrolled.

## ~~INDEPENDENT LEARNING~~Independent Learning

The Independent Learning requirement is met by successful completion of a master's thesis or comprehensive exam.

## Application Requirements

For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

The College of Engineering and Computer Science encourages prospective applicants to complete a pre-application form (www.cecs.ucf.edu/preapp) before completing the online application for graduate admission.

In addition to the general UCF graduate application requirements, applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended.
- A bachelor's degree in Engineering or a closely related discipline.
- ~~Official, competitive GRE score taken within the last five years.~~
- Two letters of recommendation.

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- Résumé.
- Statement of educational, research, and professional career objectives.

Faculty members may choose to conduct face-to-face or telephone interviews before accepting an applicant into their research program.

~~Application Deadlines~~

~~All application materials must be submitted by the appropriate deadline listed below.~~

| | | | | |
|---|---|---|---|---|
| ~~Systems Engineering~~ | ~~Fall Priority~~ | ~~Fall~~ | ~~Spring~~ | ~~Summer~~ |
| ~~Domestic Applicants~~ | ~~Jan 15~~ | ~~Jul 15~~ | ~~Dec 1~~ | ~~Apr 15~~ |
| ~~International Applicants~~ | ~~Jan 15~~ | ~~Jan 15~~ | ~~Jul 1~~ | ~~Nov 1~~ |
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## FINANCIALS

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### Fellowships

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Professor
ahmade@mail.ucf.edu
Telephone: 407-823-2204
Engineering 2, Room 430

UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

# Program Action Request Form

This form is to be used to revise, add, suspend, or inactivate degree programs, tracks, or certificate programs. A new form must be used for each program, track, or certificate.

**PLEASE NOTE:** The deadline for new tracks or certificates is **February 1 of each year**. Any proposal for new tracks or certificates received after this date will not be included in the next year's catalog. Revisions to existing programs, tracks, or certificates are **due by March 15**. Any proposals for revisions received after that date will not be included in the next year's catalog. Please include catalog copy (description, curriculum, contact information, application requirements, and application deadlines). For revisions – attach the catalog copy **showing changes (use Track Changes in Word)**.

College/Unit(s) Submitting Proposal: **College of Engineering and Computer Science**

Proposed Effective Term/Year: **Summer 2011**

Unit(s) Housing Program: **Industrial Engineering and Management Systems**

Name of program, track, and/or certificate: **Industrial Engineering MS Engineering Management Track**

**Description of program (this description will show up in the graduate catalog copy):**

## ENGINEERING MANAGEMENT TRACK

### TRACK DESCRIPTION

The Engineering Management track in the Industrial Engineering MS program focuses on effective decision-making in engineering and technological organizations. Addressing the needs of engineers and scientists moving into management positions, engineering management complements their technical backgrounds with the human aspects, organizational and financial issues, project considerations, resource allocation, and the extended analytical tools required for effective decision-making and program management. This program is designed for technically qualified individuals who plan to assume a management role in project or program-oriented environments in industry or government. It provides the analytical, organizational, and managerial skills to bridge the gap between a technical specialty and technical management.

The Industrial Engineering programs are structured to support the emergence of Central Florida as a national center of high technology as well as supporting the diverse service industries in the region and throughout the nation.

Additional information can be found at www.iems.ucf.edu.

International students may only take one course per semester in a totally online format while attending UCF on a F-1 visa. Courses in this program can be taken in mixed mode for international students at UCF or fully online for international students who are not on visas. If you have questions, please consult the International Service Center at www.intl.ucf.edu.

### CURRICULUM

## Total Credit Hours Required:

30 Credit Hours Minimum beyond the Bachelor's Degree

This program can be taken entirely through the Florida Engineering Educational Delivery System (FEEDS), which provides video-streamed versions of classes over the Internet.

The Engineering Management track in the Industrial Engineering MS program requires an undergraduate degree in Engineering or a closely related discipline. Students with undergraduate degrees outside of industrial engineering may be required to take additional prerequisite courses.

The track offers thesis, nonthesis, or Profesional Science Master's (PSM) options with each requiring 30 credit hours of courses. Thesis option students take 12 credit hours of required Master Core courses, 9 credit hours of track courses, 6 thesis credit hours, and 3 credit hours of electives. They must also complete an independent research project and write and successfully defend their thesis. Nonthesis option students take 12 credit hours of required Master Core courses, 9 credit hours of concentration courses, and 9 credit hours of electives. They must also pass a comprehensive oral examination at the end of their program of study. PSM option students take 12 credit hours of required courses, 15 credit hours of electives, and 3 credit hours of professional internship. They must also pass a comprehensive oral examination at the end of their program of study.

Research studies are required in one or more courses. The research study and report will focus on reviewing and analyzing contemporary research in the profession in order to help students acquire knowledge and skills pertaining to research-based best practices.

An approved program of study must be developed in consultation with the graduate program director. All programs of study require 24 hours of core and elective course work, exclusive of thesis hours. At least one-half of the credit hours of all courses (including thesis hours) in a master's program of study must be at the 6000 level or higher.

Students on assistantships must take 9 credit hours per semester to satisfy the university's requirement for full-time status. Most students working full time take 6 credit hours per semester. At that rate, the program can be completed in 6 semesters or less. However, students with more time available and with an early start on a thesis, if applicable, can finish the program in 3 semesters.

## Prerequisites

- Computer programming capability. Proficiency with MS Office expected. C++ , Visual BASIC, or Java recommended.
- Mathematics through Calculus II (MAC 2312)
- STA 3032 or equivalent
- Others, as needed by specific courses
- For MSIE degree: BSIE degree is required

## Master Core Courses (12 Credit hours))

- ESI 5219: Engineering Statistics
- EIN 5140 Project Engineering

- ESI 6551C: Systems Engineering
- EIN 6357: Advanced Engineering Economic Analysis

Concentration Courses (9 Credit Hours)

- EIN 5108 The Environment of Technical Organizations
- EIN 6459 Concurrent Engineering
- EIN 6182 Engineering Management

Thesis Option—9 Credit Hours

Thesis students must complete an independent research project and then write and successfully defend their thesis. Furthermore, an additional 3 credit hours of electives are required beyond the 9 credit hours of concentration courses described above.

- EIN 6971 Thesis (6 credit hours)
- Elective (3 credit hours)

Nonthesis Option—9 Credit Hours

Nonthesis students must take 9 additional credit hours of electives beyond the 9 credit hours of concentration courses described above.

- Electives (9 credit hours)

Comprehensive Examination

Nonthesis students must successfully pass an oral comprehensive examination to fulfill degree requirements. Please see the program director for further details.

Professional Science Master's Option—9 Credit Hours

The Professional Science Master's (PSM) option ensures that students seeking a mix of professional and technical courses are able to structure their programs of study accordingly. Two of the core courses, EIN 5108 and EIN 6182, are predominantly professional-content courses. In addition, students choosing this option must select at least one elective that is predominantly professional in content. Finally, the PSM option includes a one-semester, 3-credit-hour internship.

- EIN 6946 Internship (3 credit hours)
- Electives (6 credit hours), subject to the requirement that at least one-half of the credit hours on a student's program of study must be at the 6000 level and that at least one of the elective courses must have substantial professional content.

Comprehensive Examination

PSM students must successfully pass an oral comprehensive examination to fulfill degree requirements. Please see

the program director for further details.

### Equipment Fee

Students in the Industrial Engineering MS program pay a $90 equipment fee each semester that they are enrolled. For part-time students, the equipment fee is $45 per semester.

### Independent Learning

The Independent Learning Requirement is met by successful completion of a master's thesis, EIN 6182 Engineering Management for nonthesis students, or EIN 6182 and EIN 6946 Internship for PSM students.

## APPLICATION REQUIREMENTS

For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

The College of Engineering and Computer Science encourages prospective applicants to complete a pre-application form (www.cecs.ucf.edu/preapp) before completing the online application for graduate admission.

In addition to the general UCF graduate application requirements, applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended.
- A bachelor's degree in Engineering or a closely related discipline.
- Two letters of recommendation.
- Résumé.
- Statement of educational, research, and professional career objectives.

Faculty members may choose to conduct face-to-face or telephone interviews before accepting an applicant into their research program.

## FINANCIALS

Graduate students may receive financial assistance through fellowships, assistantships, tuition support, or loans. For more information, see Student Finances, which describes the types of financial assistance available at UCF and provides general guidance in planning your graduate finances. The Financial Information section of the Graduate Catalog is another key resource.

### Fellowships

Fellowships are awarded based on academic merit to highly qualified students. They are paid to students through the Office of Student Financial Assistance, based on instructions provided by the College of Graduate Studies. Fellowships are given to support a student's graduate study and do not have a work obligation. For more information, see Fellowships, which includes descriptions of UCF fellowships and what you should do to be considered for a fellowship.

UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

CONTACT INFO

Ahmad Elshennawy PhD
Professor
ahmade@mail.ucf.edu
Telephone: 407-823-2204
Engineering 2, Room 430

**DELIVERY - Will program be delivered:** ☐ Face to face ☐ Completely online x Mixed delivery

**Admissions deadlines**: (Please specify if you have a different deadline for the track than for the program?)

N/A

---

**Application requirements:** (Please specify if you have different application requirements for the track than for the program? Will you admit directly to the track?)

N/A

---

**Program Director(s) and contact information:** (name, email, phone, campus address, program website address)

Dr. Ahmad Elshennawy, ahmade@mail.ucf.edu, 312 Engineering 2, 407– 823-2204

---

**Please check one: This action affects a:** ☐ Program x Track ☐ Certificate

**Please check one: This action is a(n):**

☐ **Addition.** Please proceed to Part A.

x **Revision.** If a revision applies to multiple tracks, please list them here and then proceed to Part A:

---

☐ **Inactivation**

☐ **Temporary Suspension of Admissions. Give Length of Suspension:**

---

**Temporary suspension of admissions:** The program will be removed from the online application. A notation will be entered in the graduate catalog indicating the length of the suspension of admissions. Currently enrolled students will not experience any issues with continued enrollment.

**Inactivation:** Admissions will be suspended for new students and the program will be removed from the online application. Students active in the program are eligible to complete the program under the appropriate criteria and an appropriate teach-out plan is required. The program will be removed from the catalog as of the approved term.

**If you checked inactivation or you are temporarily suspending admissions, please go to Part B and complete it.**



UCF College of Graduate Studies – P.O. Box 160112, Orlando, FL 32816-0112
**Questions?** Contact Rhonda Nelson at rlnelson@mail.ucf.edu

## Signature Page

**RECOMMENDATIONS**

| | | | |
|---|---|---|---|
| ☐ Yes ☐ No | **Department Chair:** | **Date:** |
| ☐ Yes ☐ No | **College Curriculum Committee Chair:** | **Date:** |
| ☐ Yes ☐ No | **College Dean or Unit Head:** | **Date:** |
| ☐ Yes ☐ No | **Chair or GSC:** | **Date:** |
| ☐ Yes ☐ No | **Dean, College of Graduate Studies:** | **Date:** |

**APPROVAL**

**Provost and Vice President for Academic Affairs:** **Date:**

## Distribution: After approval is received from the Provost, distribution will be to:

Department(s); College; Registrar; Associate Registrar; Institutional Research; Academic Services; Faculty Senate;

University Analysis and Planning Support; College of Graduate Studies



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UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

## Part A – For additions or revisions of programs, tracks or certificates

**Brief Statement of Program Change and rationale:** (Please indicate the change, the rationale for the change, how it affects the unit and faculty teaching in and students enrolled in the program, track or certificate. If there are changes to the credit hours of the program, required courses or other requirements, please state those changes. Remember to attach the catalog copy showing changes, using Track Changes in Word.)

**The Change:** Less required courses and more flexibility in offering electives
**Rationale:** Improving quality of course delivery and less restricted electives.
**Impact on Faculty:** More efficiency, more time to conduct research, seek external funding, and increase tha number and quality of publications.
**Impact on Students:** More concentration courses, better scheduling of courses for faster time to graduate.

**Will students be moved from an existing program, track, or certificate into this new program, track, or certificate?**

☐ Yes x No

If yes, state the name of the program or track where students are currently enrolled and provide a list of students if possible:

---

**Will students have the option to stay in their existing program, track, or certificate?** x Yes ☐ No

## Name Change

**Are you changing the name of an existing program, track, or certificate?** ☐ Yes x No

If yes, provide the new name of the program, track, or certificate:

---

Provide the name of the current program, track, or certificate:

---

**When is the name change effective?** Please note: A name change will apply to the record of all students who are currently enrolled, readmitted or newly admitted into this program as of the effective date of this change.

---

**Will students have the option to stay in their existing program, track, or certificate?** ☐ Yes ☐ No

**If you are requesting a CIP Code change for an existing program, track, or certificate, please provide:**

old CIP:

---

new CIP:

---

If a name change is your only revision, stop here. Otherwise, complete the rest of Part A.



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**Questions?** Contact Rhonda Nelson at rlnelson@mail.ucf.edu

## Part A - Continued

Specify the faculty who will participate in the program, track or certificate and their credentials to do so: (List faculty and a brief paragraph of their credentials.)

Waldemar Karwowski, Ph.D., Professor and Chair, Texas Tech: IE, Human System Integration, Ergonomics/Human Engineering
Lesia Crumpton-Young, Ph.D., Professor, Texas A&M: Human Engineering/Ergonomics, Industrial Engineering
Ahmad K. Elshennawy, Ph.D., Professor & Associate Chair, Penn State: IE, Quality and Reliability, Production Systems
Christopher Geiger, Ph.D., Assistant Professor, Purdue University: Production Systems, IE, Simulation, OR
Robert L. Hoekstra, Ph.D., Associate Professor, Cincinnati: Manufacturing Engineering, Engineering Management
Timothy G. Kotnour, Ph.D., Associate Professor, Virginia Tech: Engineering Management, IE
Gene C.H. Lee, Ph.D., P.E., Associate Professor, Texas Tech: Human Engineering/Ergonomics, IE, Safety Engineering/Management
Pamela R. McCauley-Bush, Ph.D., Associate Professor, University of Oklahoma: Engineering/Ergonomics, IE, Biomechanics
Mansooreh Mollaghasemi, Ph.D., Associate Professor, University of Louisville: IE, Simulation, OR, Decision Analysis
Dima Nazzal, Ph.D., Assistant Professor, Georgia Tech: OR, Industrial Engineering, Simulation & Modeling
Michael D. Proctor, Ph.D., Associate Professor, N. Carolina State: Interactive Simulation, Training System Design
Luis Rabelo, Ph.D., Associate Professor, University of Missouri: Production/Manufacturing Systems, IE, Management
Charles H. Reilly, Ph.D., Professor, Purdue University: OR, Industrial Engineering, Statistics
Serge Sala-Diakanda, Ph.D., Visiting Assistant Professor, UCF: Systems Engineering, Statistics, Simulation
José A. Sepúlveda, Ph.D., P.E., Associate Professor, University of Pittsburgh: Simulation, IE, OR, production Systems
William Thompson, Ph.D., Associate Professor, Arizona State: Engineering management, IE, Production Systems, Quality
Kent E. Williams, Ph.D., Associate Professor, University of Connecticut: Training Systems, Statistics, Interactive Simulation

**Impact of changes on students:** Will current students be impacted by the addition or revision of a program, track or certificate? If so, how?

If there will be a change, it will definitely be a better one. There will more flexibility that allows the students to select the courses that best suit their needs.

**If applicable**, provide a written agreement (email is fine) from all involved units that they are in support of, will provide courses to, or will participate in the program, track, or certificate. Please attach the correspondence and also list the units here.

N/A

**If an addition**, provide a statement of who is likely to enroll and why. Please state if there is licensure or certification that depends upon this education, etc. Also, complete the following table.

N/A

| |
|---|
| |

| | Year 1 | Year 2 | Year 3 |
|---|---|---|---|
| Headcount | | | |
| SCHs | | | |

**If an addition**, indicate likely career or student outcomes upon completion: (What will students do? What will their job titles be?)

| |
|---|
| |

## Part A - Continued

**If an addition or there are substantial REVISIONS** to existing tracks or certificates, please complete the following table on financial support: (Specify all forms of support – assistantships, fellowships, and tuition remission.)

| | No. assistantship students | Source of funds | No. fellowship students (specify fellowship) | No. tuition remissions | Source of funds |
|---|---|---|---|---|---|
| Year 1 | | | | | |
| Year 2 | | | | | |
| Year 3 | | | | | |

## Checklist of items to be provided:

x **Electronic graduate catalog copy for additions; track changes included if there are revisions. (required)**

☐ **Attach all appropriate course action requests that will be necessary to implement the changes. (required)**

☐ **Emails showing consultation with other units. (if applicable)**

☐ **If an addition, list of 1-3 students and 1-3 faculty for profiles in the graduate catalog (provide email address so Graduate Studies can contact them to write profiles and take photos). You may provide draft copy of profiles if you wish.**

☐ **If an addition, what disciplines does this program, track or certificate belong to? What other UCF graduate programs, tracks, or certificates are related to it? This information will be used to provide additional links for prospective students to search in the online graduate catalog.**

## Part B – For inactivations or suspensions of programs, tracks, or certificates

**Are students currently enrolled in the program?** ☐ Yes ☐ No

If yes, number of current students:

_____

**Please specify the intended time period of inactivation or suspension:**

_____

If program, track, or certificate is being inactivated or suspended, then attach a "teach out" plan for all current students specifying how they can finish the program or where students will be placed if moving to another program. The "teach out" plan should specify when courses will be offered to enable students to finish. Specify whether students will remain in the existing program to finish, and if so, when the completion date will be, whether students will be moved to another program, etc. Please provide a list of students where applicable.

| |
|---|
| |

Sample teach out plan: Enter the terms and courses that will be taught for each term throughout the last semester.

| Summer 2011 | Fall 2011 | Spring 2011 | Summer 2012 | Fall 2012 |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
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| | | | | |
| | | | | |

## Checklist of items to be provided:

☐ **Attach all appropriate course action requests that will be necessary to implement the changes. (required)**

☐ **Emails showing consultation with other units. (if applicable)**



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**Questions?** Contact Rhonda Nelson at rlnelson@mail.ucf.edu

UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

# Program Action Request Form

This form is to be used to revise, add, suspend, or inactivate degree programs, tracks, or certificate programs. A new form must be used for each program, track, or certificate.

**PLEASE NOTE:** The deadline for new tracks or certificates is **February 1 of each year**. Any proposal for new tracks or certificates received after this date will not be included in the next year's catalog. Revisions to existing programs, tracks, or certificates are **due by March 15**. Any proposals for revisions received after that date will not be included in the next year's catalog. Please include catalog copy (description, curriculum, contact information, application requirements, and application deadlines). For revisions – attach the catalog copy **showing changes (use Track Changes in Word)**.

College/Unit(s) Submitting Proposal: **College of Engineering and Computer Science**

Proposed Effective Term/Year: **Summer 2011**

Unit(s) Housing Program: **Industrial Engineering and Management Systems**

Name of program, track, and/or certificate: **Industrial Engineering MS Human Systems Engineering/Ergonomics Track**

**Description of program (this description will show up in the graduate catalog copy):**

## HUMAN SYSTEMS ENGINEERING/ERGONOMICS TRACK

### TRACK DESCRIPTION

As technology has become more sophisticated, the need to design for the human user has become more difficult, yet even more important. Human engineering and ergonomics assist in ensuring that as technology advances, the abilities, limitations, and needs of humans are considered in the system design. This not only supports the needs of the user, it also optimizes the efficiency and usability of the system designed. Traditionally, ergonomics has been associated with biomechanical issues and work measurement and performance issues in physical system design, as well as occupational and industrial safety. The broader focus of human engineering encompasses those issues as well as incorporating the reaction and effectiveness of human interaction with systems, both physical systems and virtual systems such as computer-based models.

The Human Engineering/Ergonomics track in the Industrial Engineering MS program is designed for students who have an undergraduate degree in Engineering or a closely related discipline. The program is designed to provide students with the necessary knowledge in human engineering and ergonomics to effectively design tasks, industrial systems, and work environments that maximize human performance, safety, and overall productivity.

The Industrial Engineering graduate programs are structured to support the emergence of Central Florida as a national center of high technology as well as supporting the diverse service industries in the region and throughout the nation.

Additional information can be found at www.iems.ucf.edu.

International students may only take one course per semester in a totally online format while attending UCF on a F-1 visa. Courses in this program can be taken in mixed mode for international students at UCF or fully online for international students who are not on visas. If you have questions, please consult the International Service Center at www.intl.ucf.edu.

## CURRICULUM

### Total Credit Hours Required:

30 Credit Hours Minimum beyond the Bachelor's Degree

The Human Engineering/Ergonomics track in the Industrial Engineering MS program requires an undergraduate degree in Engineering or a closely related discipline. A student with an undergraduate degree outside of industrial engineering may be required to take additional prerequisite courses.

The track offers both thesis and nonthesis options with each requiring 30 credit hours of courses beyond the bachelor's degree. The thesis option requires 12 credit hours of required MS core courses, 9 credit hours of concentration courses, 6 thesis credit hours, and 3 hours of electives. Students must also write and successfully defend their thesis. The nonthesis option requires 12 credit hours of required MS core courses, 9 credit hours of track courses, and 9 hours of electives. Students must also pass a comprehensive oral examination at the end of their program of study.

All programs of study must include 24 credit hours of required and elective courses, exclusive of thesis and research. At least one-half of the credit hours (including thesis hours) of all courses in a master's program of study must be at the 6000 level or higher.

Research studies are required in one or more courses. The research study and report will focus on reviewing and analyzing contemporary research in the profession in order to help students acquire knowledge and skills pertaining to research-based best practices. In addition, students may engage in directed independent studies, directed research or a research report during their studies.

A program of study must be developed with the graduate program director and meet with departmental approval. Students on assistantships must take 9 credit hours per semester to satisfy the university's requirement for full-time status. Most students working full time take 6 credit hours per semester. At that rate, the program can be completed in 6 semesters or less. However, students with more time available and with an early start on a thesis, if applicable, can finish the program in 3 semesters.

### Prerequisites

- Computer programming capability. Proficiency with MS Office expected. C++, Visual BASIC, or Java recommended.
- Mathematics through Calculus II (MAC 2312)
- STA 3032 or equivalent
- Others, as needed by specific courses
- For MSIE degree: BSIE degree is required

## Master Core Courses (12 Credit Hours)

- ESI 5219: Engineering Statistics
- EIN 5140: Project Engineering
- ESI 6551C: Systems Engineering
- EIN 6357: Advanced Engineering Economic Analysis

## Concentration Courses (9 Credit Hours)

Select three courses from the following courses.

- EIN 5248C Ergonomics
- EIN 6270C Work Physiology
- EIN 5251 Usability Engineering

Thesis Option—9 Credit Hours

All thesis students must complete an independent research project and successfully write and defend their thesis. Furthermore, they must take an additional 3 credit hours of electives beyond the 9 credit hours of restricted electives described above.

- EIN 6971 Thesis (6 credit hours)
- Elective (3 credit hours).

The College of Engineering and Computer Science requires that all thesis defense announcements be approved by the student's adviser and posted on the college's website and on the Events Calendar at the College of Graduate Studies website at least two weeks before the defense date.

Nonthesis Option—9 Credit Hours

All nonthesis students must take an additional 9 credit hours of electives beyond the 9 credit hours of restricted electives described above.

- Electives (9 credit hours)

## Comprehensive Examination

All nonthesis students must also pass a comprehensive examination prior to graduation. Please see the program director for details.

## Equipment Fee

Students in the Industrial Engineering MS program pay a $90 equipment fee each semester that they are enrolled. For part-time students, the equipment fee is $45 per semester.



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**Questions?** Contact Rhonda Nelson at rlnelson@mail.ucf.edu

## Independent Learning

The Independent Learning Requirement is met by successful completion of a master's thesis or comprehensive exam for nonthesis students.

## APPLICATION REQUIREMENTS

For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

The College of Engineering and Computer Science encourages prospective applicants to complete a pre-application form (www.cecs.ucf.edu/preapp) before completing the online application for graduate admission.

In addition to the general UCF graduate application requirements, applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended.
- A bachelor's degree in Engineering or a closely related discipline.
- Two letters of recommendation.
- Résumé.
- Statement of educational, research, and professional career objectives.

Faculty members may choose to conduct face-to-face or telephone interviews before accepting an applicant into their research program.

## FINANCIALS

Graduate students may receive financial assistance through fellowships, assistantships, tuition support, or loans. For more information, see Student Finances, which describes the types of financial assistance available at UCF and provides general guidance in planning your graduate finances. The Financial Information section of the Graduate Catalog is another key resource.

### Fellowships

Fellowships are awarded based on academic merit to highly qualified students. They are paid to students through the Office of Student Financial Assistance, based on instructions provided by the College of Graduate Studies. Fellowships are given to support a student's graduate study and do not have a work obligation. For more information, see Fellowships, which includes descriptions of UCF fellowships and what you should do to be considered for a fellowship.

## CONTACT INFO

Ahmad Elshennawy PhD
Professor
ahmade@mail.ucf.edu
Telephone: 407-823-2204
Engineering 2, Room 430

**DELIVERY - Will program be delivered:** ☐ Face to face ☐ Completely online x Mixed delivery

**Admissions deadlines**: (Please specify if you have a different deadline for the track than for the program?)

N/A

---

**Application requirements:** (Please specify if you have different application requirements for the track than for the program? Will you admit directly to the track?)

N/A

---

**Program Director(s) and contact information:** (name, email, phone, campus address, program website address)

Dr. Ahmad Elshennawy, ahmade@mail.ucf.edu, 312 Engineering 2, 407– 823-2204

---

**Please check one: This action affects a:** ☐ Program x Track ☐ Certificate

**Please check one: This action is a(n):**

☐ **Addition.** Please proceed to Part A.

x **Revision.** If a revision applies to multiple tracks, please list them here and then proceed to Part A:

---

☐ **Inactivation**

☐ **Temporary Suspension of Admissions. Give Length of Suspension:**

---

**Temporary suspension of admissions:** The program will be removed from the online application. A notation will be entered in the graduate catalog indicating the length of the suspension of admissions. Currently enrolled students will not experience any issues with continued enrollment.

**Inactivation:** Admissions will be suspended for new students and the program will be removed from the online application. Students active in the program are eligible to complete the program under the appropriate criteria and an appropriate teach-out plan is required. The program will be removed from the catalog as of the approved term.

## If you checked inactivation or you are temporarily suspending admissions, please go to Part B and complete it.

UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

## Signature Page

**RECOMMENDATIONS**

| | | | |
|---|---|---|---|
| ☐ Yes ☐ No | **Department Chair:** | **Date:** |
| ☐ Yes ☐ No | **College Curriculum Committee Chair:** | **Date:** |
| ☐ Yes ☐ No | **College Dean or Unit Head:** | **Date:** |
| ☐ Yes ☐ No | **Chair or GSC:** | **Date:** |
| ☐ Yes ☐ No | **Dean, College of Graduate Studies:** | **Date:** |

**APPROVAL**

**Provost and Vice President for Academic Affairs:** **Date:**

## Distribution: After approval is received from the Provost, distribution will be to:

Department(s); College; Registrar; Associate Registrar; Institutional Research; Academic Services; Faculty Senate;

University Analysis and Planning Support; College of Graduate Studies



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**Questions?** Contact Rhonda Nelson at rlnelson@mail.ucf.edu

UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

## Part A – For additions or revisions of programs, tracks or certificates

**Brief Statement of Program Change and rationale:** (Please indicate the change, the rationale for the change, how it affects the unit and faculty teaching in and students enrolled in the program, track or certificate. If there are changes to the credit hours of the program, required courses or other requirements, please state those changes. Remember to attach the catalog copy showing changes, using Track Changes in Word.)

**The Change:** Less required courses and more flexibility in offering electives
**Rationale:** Improving quality of course delivery and less restricted electives.
**Impact on Faculty:** More efficiency, more time to conduct research, seek external funding, and increase tha number and quality of publications.
**Impact on Students:** More concentration courses, better scheduling of courses for faster time to graduate.

**Will students be moved from an existing program, track, or certificate into this new program, track, or certificate?**

☐ Yes x No

If yes, state the name of the program or track where students are currently enrolled and provide a list of students if possible:

---

**Will students have the option to stay in their existing program, track, or certificate?** x Yes ☐ No

## Name Change

**Are you changing the name of an existing program, track, or certificate?** x Yes ☐ No

If yes, provide the new name of the program, track, or certificate: Human Systems Engineering/Ergonomics

Provide the name of the current program, track, or certificate: Human Engineering/Ergonomics

**When is the name change effective?** Please note: A name change will apply to the record of all students who are currently enrolled, readmitted or newly admitted into this program as of the effective date of this change. Fall 2011

**Will students have the option to stay in their existing program, track, or certificate?** x Yes ☐ No

**If you are requesting a CIP Code change for an existing program, track, or certificate, please provide:**

old CIP:

new CIP:

---

If a name change is your only revision, stop here. Otherwise, complete the rest of Part A.



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**Questions?** Contact Rhonda Nelson at rlnelson@mail.ucf.edu

## Part A - Continued

Specify the faculty who will participate in the program, track or certificate and their credentials to do so: (List faculty and a brief paragraph of their credentials.)

Waldemar Karwowski, Ph.D., Professor and Chair, Texas Tech: IE, Human System Integration, Ergonomics/Human Engineering
Lesia Crumpton-Young, Ph.D., Professor, Texas A&M: Human Engineering/Ergonomics, Industrial Engineering
Ahmad K. Elshennawy, Ph.D., Professor & Associate Chair, Penn State: IE, Quality and Reliability, Production Systems
Christopher Geiger, Ph.D., Assistant Professor, Purdue University: Production Systems, IE, Simulation, OR
Robert L. Hoekstra, Ph.D., Associate Professor, Cincinnati: Manufacturing Engineering, Engineering Management
Timothy G. Kotnour, Ph.D., Associate Professor, Virginia Tech: Engineering Management, IE
Gene C.H. Lee, Ph.D., P.E., Associate Professor, Texas Tech: Human Engineering/Ergonomics, IE, Safety Engineering/Management
Pamela R. McCauley-Bush, Ph.D., Associate Professor, University of Oklahoma: Engineering/Ergonomics, IE, Biomechanics
Mansooreh Mollaghasemi, Ph.D., Associate Professor, University of Louisville: IE, Simulation, OR, Decision Analysis
Dima Nazzal, Ph.D., Assistant Professor, Georgia Tech: OR, Industrial Engineering, Simulation & Modeling
Michael D. Proctor, Ph.D., Associate Professor, N. Carolina State: Interactive Simulation, Training System Design
Luis Rabelo, Ph.D., Associate Professor, University of Missouri: Production/Manufacturing Systems, IE, Management
Charles H. Reilly, Ph.D., Professor, Purdue University: OR, Industrial Engineering, Statistics
Serge Sala-Diakanda, Ph.D., Visiting Assistant Professor, UCF: Systems Engineering, Statistics, Simulation
José A. Sepúlveda, Ph.D., P.E., Associate Professor, University of Pittsburgh: Simulation, IE, OR, production Systems
William Thompson, Ph.D., Associate Professor, Arizona State: Engineering management, IE, Production Systems, Quality
Kent E. Williams, Ph.D., Associate Professor, University of Connecticut: Training Systems, Statistics, Interactive Simulation

**Impact of changes on students:** Will current students be impacted by the addition or revision of a program, track or certificate? If so, how?

If there will be a change, it will definitely be a better one. There will more flexibility that allows the students to select the courses that best suit their needs.

**If applicable**, provide a written agreement (email is fine) from all involved units that they are in support of, will provide courses to, or will participate in the program, track, or certificate. Please attach the correspondence and also list the units here.

N/A

**If an addition**, provide a statement of who is likely to enroll and why. Please state if there is licensure or certification that depends upon this education, etc. Also, complete the following table.

N/A

| | Year 1 | Year 2 | Year 3 |
|---|---|---|---|
| Headcount | | | |
| SCHs | | | |

**If an addition**, indicate likely career or student outcomes upon completion: (What will students do? What will their job titles be?)

## Part A - Continued

**If an addition or there are substantial REVISIONS** to existing tracks or certificates, please complete the following table on financial support: (Specify all forms of support – assistantships, fellowships, and tuition remission.)

| | No. assistantship students | Source of funds | No. fellowship students (specify fellowship) | No. tuition remissions | Source of funds |
|---|---|---|---|---|---|
| Year 1 | | | | | |
| Year 2 | | | | | |
| Year 3 | | | | | |

## Checklist of items to be provided:

x **Electronic graduate catalog copy for additions; track changes included if there are revisions. (required)**

☐ **Attach all appropriate course action requests that will be necessary to implement the changes. (required)**

☐ **Emails showing consultation with other units. (if applicable)**

☐ **If an addition, list of 1-3 students and 1-3 faculty for profiles in the graduate catalog (provide email address so Graduate Studies can contact them to write profiles and take photos). You may provide draft copy of profiles if you wish.**

☐ **If an addition, what disciplines does this program, track or certificate belong to? What other UCF graduate programs, tracks, or certificates are related to it? This information will be used to provide additional links for prospective students to search in the online graduate catalog.**

## Part B – For inactivations or suspensions of programs, tracks, or certificates

**Are students currently enrolled in the program?** ☐ Yes ☐ No

If yes, number of current students:

_____

**Please specify the intended time period of inactivation or suspension:**

_____

If program, track, or certificate is being inactivated or suspended, then attach a "teach out" plan for all current students specifying how they can finish the program or where students will be placed if moving to another program. The "teach out" plan should specify when courses will be offered to enable students to finish. Specify whether students will remain in the existing program to finish, and if so, when the completion date will be, whether students will be moved to another program, etc. Please provide a list of students where applicable.

| |
|---|
| |

Sample teach out plan: Enter the terms and courses that will be taught for each term throughout the last semester.

| Summer 2011 | Fall 2011 | Spring 2011 | Summer 2012 | Fall 2012 |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
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| | | | | |
| | | | | |

## Checklist of items to be provided:

☐ **Attach all appropriate course action requests that will be necessary to implement the changes. (required)**

☐ **Emails showing consultation with other units. (if applicable)**



UCF College of Graduate Studies – P.O. Box 160112, Orlando, FL 32816-0112
**Questions?** Contact Rhonda Nelson at rlnelson@mail.ucf.edu

UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

# Program Action Request Form

This form is to be used to revise, add, suspend, or inactivate degree programs, tracks, or certificate programs. A new form must be used for each program, track, or certificate.

**PLEASE NOTE:** The deadline for new tracks or certificates is **February 1 of each year**. Any proposal for new tracks or certificates received after this date will not be included in the next year's catalog. Revisions to existing programs, tracks, or certificates are **due by March 15**. Any proposals for revisions received after that date will not be included in the next year's catalog. Please include catalog copy (description, curriculum, contact information, application requirements, and application deadlines). For revisions – attach the catalog copy **showing changes (use Track Changes in Word)**.

College/Unit(s) Submitting Proposal: **College of Engineering and Computer Science**

Proposed Effective Term/Year: **Summer 2011**

Unit(s) Housing Program: **Industrial Engineering and Management Systems**

Name of program, track, and/or certificate: **Industrial Engineering MS Interactive Simulation and Training Systems Track**

**Description of program (this description will show up in the graduate catalog copy):**

## INTERACTIVE SIMULATION AND TRAINING SYSTEMS TRACK

### TRACK DESCRIPTION

The Interactive Simulation and Training Systems track in the Industrial Engineering MS program focuses on providing a fundamental understanding of significant topics relative to simulation systems and the requirements, design, development, and use of such systems for knowledge transfer in the technical environment. Additionally, the program addresses the evolving and multiple discipline application of interactive simulation by providing a wealth of electives to support development of individual student interests and talents. In conjunction with UCF's Institute for Simulation and Training, industrial organizations involved in simulation in the Central Florida region, military organizations, and other governmental organizations, the program provides exposure to both military and commercial interactive simulation and training systems.

The program's emphasis is on the application and development of interactive simulation and training systems to meet various requirements including, but not limited to: simulators, skill trainers, organizational learning systems, computer and web-based interactive simulation systems and other novel interactive simulation efforts. The interactive simulation and training systems curriculum prepares individuals with an undergraduate degree in engineering, science, education, psychology, mathematics or other related disciplines for careers in simulation, focusing particularly on the interactive simulation and training systems industries.

The Industrial Engineering graduate programs are structured to support the emergence of Central Florida as a national center of high technology as well as supporting the diverse service industries in the region and throughout the nation.

Additional information can be found at www.iems.ucf.edu.

## CURRICULUM

### Total Credit Hours Required:

30 Credit Hours Minimum beyond the Bachelor's Degree

The Interactive Simulation and Training Systems track in the Industrial Engineering MS program requires an undergraduate degree in Engineering or a closely related discipline. Students with undergraduate degrees outside of industrial engineering may be required to take additional prerequisite courses.

The track offers both a thesis option and a nonthesis option with each requiring 30 credit hours of courses beyond the bachelor's degree. Thesis option students take 12 credit hours of required Master Core courses, 9 credit hours of concentration courses, 6 thesis credit hours, and 3 credit hours of electives. They must also complete an independent research project and write and successfully defend their thesis. Nonthesis option students take 12 credit hours of required Master Core courses, 9 credit hours of track courses, and 9 credit hours of electives. They must also pass a comprehensive oral examination at the end of their program of study. Research studies are required in one or more courses. The research study and report will focus on reviewing and analyzing contemporary research the profession in order to help students acquire knowledge and skills pertaining to research-based best practices. In addition, students may engage in directed independent studies, directed research or a research report during their studies.

An approved program of study must be developed in consultation with the graduate program director. At least one-half of the credit hours (including thesis hours) required in a master's program of study must be at the 6000 level or higher. All programs of study must have at least 24 hours of required and elective courses exclusive of thesis and research.

Students on assistantships must take 9 credit hours per semester to satisfy the university's requirement for full-time status. Most students working full time take 6 credit hours per semester. At that rate, the program can be completed in 6 semesters or less. However, students with more time available and with an early start on a thesis, if applicable, can finish the program in 3 semesters.

### Prerequisites

- Computer programming capability. Proficiency with MS Office expected. C++ , Visual BASIC, or Java recommended.
- Mathematics through Calculus II (MAC 2312)
- STA 3032 or equivalent
- Others, as needed by specific courses
- For MSIE degree: BSIE degree is required

### Master Core Courses (12 Credit hours))

- ESI 5219: Engineering Statistics
- EIN 5140 Project Engineering
- ESI 6551C: Systems Engineering
- EIN 6357: Advanced Engineering Economic Analysis

Concentration Courses (9 credit hours)

All students, both thesis and nonthesis, must select three courses from the following list:

- EIN 5255C Interactive Simulation
- EIN 5317 Training Systems Design
- EIN 6645C Real-Time Simulation Agents
- EIN 6649C Intelligent Tutoring Training System Design
- EIN 6647 Intelligent Simulation
- EIN 6528 Simulation-based Life Cycle Engineering

Thesis Option—9 Credit Hours

Thesis students must complete an additional elective beyond the 9 credit hours of concentration courses described above. They must also complete an independent research project and write and defend a thesis according to program guidelines.

- EIN 6971 Thesis (6 credit hours)
- Elective (3 credit hours)

The College of Engineering and Computer Science requires that all thesis defense announcements be approved by the student's adviser and posted on the college's website and on the Events Calendar at the College of Graduate Studies website at least two weeks before the defense date.

Nonthesis Option—9 Credit Hours

Nonthesis students must take 9 additional credit hours of electives beyond the 9 credit hours of concentration courses described above.

- Electives (9 credit hours)

Comprehensive Examination

Nonthesis students who do not take EIN 6647 must successfully pass an oral comprehensive examination over their graduate course work. Please see the program director for further details.

## Equipment Fee

Students in the Industrial Engineering MS program pay a $90 equipment fee each semester that they are enrolled. For part-time students, the equipment fee is $45 per semester.

## Independent Learning

The Independent Learning Requirement is met by successful completion of a master's thesis. Nonthesis students must

pass an oral comprehensive exam or EIN 6647 Intelligent Simulation.

## APPLICATION REQUIREMENTS

For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

The College of Engineering and Computer Science encourages prospective applicants to complete a pre-application form (www.cecs.ucf.edu/preapp) before completing the online application for graduate admission.

In addition to the general UCF graduate application requirements, applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended.
- A bachelor's degree in Engineering or a closely related discipline.
- Two letters of recommendation.
- Résumé.
- Statement of educational, research, and professional career objectives.

Faculty members may choose to conduct face-to-face or telephone interviews before accepting an applicant into their research program.

## FINANCIALS

Graduate students may receive financial assistance through fellowships, assistantships, tuition support, or loans. For more information, see Student Finances, which describes the types of financial assistance available at UCF and provides general guidance in planning your graduate finances. The Financial Information section of the Graduate Catalog is another key resource.

### Fellowships

Fellowships are awarded based on academic merit to highly qualified students. They are paid to students through the Office of Student Financial Assistance, based on instructions provided by the College of Graduate Studies. Fellowships are given to support a student's graduate study and do not have a work obligation. For more information, see Fellowships, which includes descriptions of UCF fellowships and what you should do to be considered for a fellowship.

## CONTACT INFO

Ahmad Elshennawy PhD
Professor
ahmade@mail.ucf.edu
Telephone: 407-823-2204
Engineering 2, Room 430

**DELIVERY - Will program be delivered:** ☐ Face to face ☐ Completely online x Mixed delivery

**Admissions deadlines**: (Please specify if you have a different deadline for the track than for the program?)

N/A

---

**Application requirements:** (Please specify if you have different application requirements for the track than for the program? Will you admit directly to the track?)

N/A

---

**Program Director(s) and contact information:** (name, email, phone, campus address, program website address)

Dr. Ahmad Elshennawy, ahmade@mail.ucf.edu, 312 Engineering 2, 407– 823-2204

---

**Please check one: This action affects a:** ☐ Program x Track ☐ Certificate

**Please check one: This action is a(n):**

☐ **Addition.** Please proceed to Part A.

x **Revision.** If a revision applies to multiple tracks, please list them here and then proceed to Part A:

---

☐ **Inactivation**

☐ **Temporary Suspension of Admissions. Give Length of Suspension:**

---

**Temporary suspension of admissions:** The program will be removed from the online application. A notation will be entered in the graduate catalog indicating the length of the suspension of admissions. Currently enrolled students will not experience any issues with continued enrollment.

**Inactivation:** Admissions will be suspended for new students and the program will be removed from the online application. Students active in the program are eligible to complete the program under the appropriate criteria and an appropriate teach-out plan is required. The program will be removed from the catalog as of the approved term.

## If you checked inactivation or you are temporarily suspending admissions, please go to Part B and complete it.

UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

## Signature Page

**RECOMMENDATIONS**

| | | | |
|---|---|---|---|
| ☐ Yes ☐ No | **Department Chair:** | **Date:** |
| ☐ Yes ☐ No | **College Curriculum Committee Chair:** | **Date:** |
| ☐ Yes ☐ No | **College Dean or Unit Head:** | **Date:** |
| ☐ Yes ☐ No | **Chair or GSC:** | **Date:** |
| ☐ Yes ☐ No | **Dean, College of Graduate Studies:** | **Date:** |

**APPROVAL**

**Provost and Vice President for Academic Affairs:** **Date:**

## Distribution: After approval is received from the Provost, distribution will be to:

Department(s); College; Registrar; Associate Registrar; Institutional Research; Academic Services; Faculty Senate;

University Analysis and Planning Support; College of Graduate Studies



UCF College of Graduate Studies – P.O. Box 160112, Orlando, FL 32816-0112
**Questions?** Contact Rhonda Nelson at rlnelson@mail.ucf.edu

UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

## Part A – For additions or revisions of programs, tracks or certificates

**Brief Statement of Program Change and rationale:** (Please indicate the change, the rationale for the change, how it affects the unit and faculty teaching in and students enrolled in the program, track or certificate. If there are changes to the credit hours of the program, required courses or other requirements, please state those changes. Remember to attach the catalog copy showing changes, using Track Changes in Word.)

**The Change:** Less required courses and more flexibility in offering electives
**Rationale:** Improving quality of course delivery and less restricted electives.
**Impact on Faculty:** More efficiency, more time to conduct research, seek external funding, and increase tha number and quality of publications.
**Impact on Students:** More concentration courses, better scheduling of courses for faster time to graduate.

**Will students be moved from an existing program, track, or certificate into this new program, track, or certificate?**

☐ Yes x No

If yes, state the name of the program or track where students are currently enrolled and provide a list of students if possible:

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**Will students have the option to stay in their existing program, track, or certificate?** x Yes ☐ No

## Name Change

**Are you changing the name of an existing program, track, or certificate?** ☐ Yes **x** No

If yes, provide the new name of the program, track, or certificate:

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Provide the name of the current program, track, or certificate:

---

**When is the name change effective?** Please note: A name change will apply to the record of all students who are currently enrolled, readmitted or newly admitted into this program as of the effective date of this change.

---

**Will students have the option to stay in their existing program, track, or certificate?** x Yes ☐ No

**If you are requesting a CIP Code change for an existing program, track, or certificate, please provide:**

old CIP:

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new CIP:

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If a name change is your only revision, stop here. Otherwise, complete the rest of Part A.



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**Questions?** Contact Rhonda Nelson at rlnelson@mail.ucf.edu

## Part A - Continued

Specify the faculty who will participate in the program, track or certificate and their credentials to do so: (List faculty and a brief paragraph of their credentials.)

Waldemar Karwowski, Ph.D., Professor and Chair, Texas Tech: IE, Human System Integration, Ergonomics/Human Engineering
Lesia Crumpton-Young, Ph.D., Professor, Texas A&M: Human Engineering/Ergonomics, Industrial Engineering
Ahmad K. Elshennawy, Ph.D., Professor & Associate Chair, Penn State: IE, Quality and Reliability, Production Systems
Christopher Geiger, Ph.D., Assistant Professor, Purdue University: Production Systems, IE, Simulation, OR
Robert L. Hoekstra, Ph.D., Associate Professor, Cincinnati: Manufacturing Engineering, Engineering Management
Timothy G. Kotnour, Ph.D., Associate Professor, Virginia Tech: Engineering Management, IE
Gene C.H. Lee, Ph.D., P.E., Associate Professor, Texas Tech: Human Engineering/Ergonomics, IE, Safety Engineering/Management
Pamela R. McCauley-Bush, Ph.D., Associate Professor, University of Oklahoma: Engineering/Ergonomics, IE, Biomechanics
Mansooreh Mollaghasemi, Ph.D., Associate Professor, University of Louisville: IE, Simulation, OR, Decision Analysis
Dima Nazzal, Ph.D., Assistant Professor, Georgia Tech: OR, Industrial Engineering, Simulation & Modeling
Michael D. Proctor, Ph.D., Associate Professor, N. Carolina State: Interactive Simulation, Training System Design
Luis Rabelo, Ph.D., Associate Professor, University of Missouri: Production/Manufacturing Systems, IE, Management
Charles H. Reilly, Ph.D., Professor, Purdue University: OR, Industrial Engineering, Statistics
Serge Sala-Diakanda, Ph.D., Visiting Assistant Professor, UCF: Systems Engineering, Statistics, Simulation
José A. Sepúlveda, Ph.D., P.E., Associate Professor, University of Pittsburgh: Simulation, IE, OR, production Systems
William Thompson, Ph.D., Associate Professor, Arizona State: Engineering management, IE, Production Systems, Quality
Kent E. Williams, Ph.D., Associate Professor, University of Connecticut: Training Systems, Statistics, Interactive Simulation

**Impact of changes on students:** Will current students be impacted by the addition or revision of a program, track or certificate? If so, how?

If there will be a change, it will definitely be a better one. There will more flexibility that allows the students to select the courses that best suit their needs.

**If applicable**, provide a written agreement (email is fine) from all involved units that they are in support of, will provide courses to, or will participate in the program, track, or certificate. Please attach the correspondence and also list the units here.

N/A

**If an addition**, provide a statement of who is likely to enroll and why. Please state if there is licensure or certification that depends upon this education, etc. Also, complete the following table.

N/A

| |
|---|
| |

| | Year 1 | Year 2 | Year 3 |
|---|---|---|---|
| Headcount | | | |
| SCHs | | | |

**If an addition**, indicate likely career or student outcomes upon completion: (What will students do? What will their job titles be?)

| |
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| |

## Part A - Continued

**If an addition or there are substantial REVISIONS** to existing tracks or certificates, please complete the following table on financial support: (Specify all forms of support – assistantships, fellowships, and tuition remission.)

| | No. assistantship students | Source of funds | No. fellowship students (specify fellowship) | No. tuition remissions | Source of funds |
|---|---|---|---|---|---|
| Year 1 | | | | | |
| Year 2 | | | | | |
| Year 3 | | | | | |

## Checklist of items to be provided:

x **Electronic graduate catalog copy for additions; track changes included if there are revisions. (required)**

☐ **Attach all appropriate course action requests that will be necessary to implement the changes. (required)**

☐ **Emails showing consultation with other units. (if applicable)**

☐ **If an addition, list of 1-3 students and 1-3 faculty for profiles in the graduate catalog (provide email address so Graduate Studies can contact them to write profiles and take photos). You may provide draft copy of profiles if you wish.**

☐ **If an addition, what disciplines does this program, track or certificate belong to? What other UCF graduate programs, tracks, or certificates are related to it? This information will be used to provide additional links for prospective students to search in the online graduate catalog.**

UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

## Part B – For inactivations or suspensions of programs, tracks, or certificates

**Are students currently enrolled in the program?** ☐ Yes ☐ No

If yes, number of current students:

_____

**Please specify the intended time period of inactivation or suspension:**

_____

If program, track, or certificate is being inactivated or suspended, then attach a "teach out" plan for all current students specifying how they can finish the program or where students will be placed if moving to another program. The "teach out" plan should specify when courses will be offered to enable students to finish. Specify whether students will remain in the existing program to finish, and if so, when the completion date will be, whether students will be moved to another program, etc. Please provide a list of students where applicable.

| |
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| |

Sample teach out plan: Enter the terms and courses that will be taught for each term throughout the last semester.

| Summer 2011 | Fall 2011 | Spring 2011 | Summer 2012 | Fall 2012 |
|---|---|---|---|---|
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## Checklist of items to be provided:

☐ **Attach all appropriate course action requests that will be necessary to implement the changes. (required)**

☐ **Emails showing consultation with other units. (if applicable)**



UCF College of Graduate Studies – P.O. Box 160112, Orlando, FL 32816-0112
**Questions?** Contact Rhonda Nelson at rlnelson@mail.ucf.edu

UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

# Program Action Request Form

This form is to be used to revise, add, suspend, or inactivate degree programs, tracks, or certificate programs. A new form must be used for each program, track, or certificate.

**PLEASE NOTE:** The deadline for new tracks or certificates is **February 1 of each year**. Any proposal for new tracks or certificates received after this date will not be included in the next year's catalog. Revisions to existing programs, tracks, or certificates are **due by March 15**. Any proposals for revisions received after that date will not be included in the next year's catalog. Please include catalog copy (description, curriculum, contact information, application requirements, and application deadlines). For revisions – attach the catalog copy **showing changes (use Track Changes in Word)**.

College/Unit(s) Submitting Proposal: **College of Engineering and Computer Science**

Proposed Effective Term/Year: **Summer 2011**

Unit(s) Housing Program: **Industrial Engineering and Management Systems**

Name of program, track, and/or certificate: **Industrial Engineering MS Manufacturing Engineering Track**

**Description of program (this description will show up in the graduate catalog copy):**

**DELIVERY - Will program be delivered:** ☐ Face to face ☐ Completely online x Mixed delivery

**Admissions deadlines**: (Please specify if you have a different deadline for the track than for the program?)

N/A

**Application requirements:** (Please specify if you have different application requirements for the track than for the program? Will you admit directly to the track?)

N/A

**Program Director(s) and contact information:** (name, email, phone, campus address, program website address)

Dr. Ahmad Elshennawy, ahmade@mail.ucf.edu, 312 Engineering 2, 407– 823-2204

**Please check one: This action affects a:** ☐ Program x Track ☐ Certificate

**Please check one: This action is a(n):**

UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

☐ **Addition.** Please proceed to Part A.

☐ **Revision.** If a revision applies to multiple tracks, please list them here and then proceed to Part A:

---

x **Inactivation**

☐ **Temporary Suspension of Admissions. Give Length of Suspension:**

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**Temporary suspension of admissions:** The program will be removed from the online application. A notation will be entered in the graduate catalog indicating the length of the suspension of admissions. Currently enrolled students will not experience any issues with continued enrollment.

**Inactivation:** Admissions will be suspended for new students and the program will be removed from the online application. Students active in the program are eligible to complete the program under the appropriate criteria and an appropriate teach-out plan is required. The program will be removed from the catalog as of the approved term.

## If you checked inactivation or you are temporarily suspending admissions, please go to Part B and complete it.



UCF College of Graduate Studies – P.O. Box 160112, Orlando, FL 32816-0112
**Questions?** Contact Rhonda Nelson at rlnelson@mail.ucf.edu

UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

## Signature Page

**RECOMMENDATIONS**

| | | | |
|---|---|---|---|
| ☐ Yes ☐ No | **Department Chair:** | **Date:** |
| ☐ Yes ☐ No | **College Curriculum Committee Chair:** | **Date:** |
| ☐ Yes ☐ No | **College Dean or Unit Head:** | **Date:** |
| ☐ Yes ☐ No | **Chair or GSC:** | **Date:** |
| ☐ Yes ☐ No | **Dean, College of Graduate Studies:** | **Date:** |

**APPROVAL**

**Provost and Vice President for Academic Affairs:** **Date:**

## Distribution: After approval is received from the Provost, distribution will be to:

Department(s); College; Registrar; Associate Registrar; Institutional Research; Academic Services; Faculty Senate;

University Analysis and Planning Support; College of Graduate Studies



UCF College of Graduate Studies – P.O. Box 160112, Orlando, FL 32816-0112
**Questions?** Contact Rhonda Nelson at rlnelson@mail.ucf.edu

## Part A – For additions or revisions of programs, tracks or certificates

**Brief Statement of Program Change and rationale:** (Please indicate the change, the rationale for the change, how it affects the unit and faculty teaching in and students enrolled in the program, track or certificate. If there are changes to the credit hours of the program, required courses or other requirements, please state those changes. Remember to attach the catalog copy showing changes, using Track Changes in Word.)

**Will students be moved from an existing program, track, or certificate into this new program, track, or certificate?**

☐ Yes ☐ No

If yes, state the name of the program or track where students are currently enrolled and provide a list of students if possible:

**Will students have the option to stay in their existing program, track, or certificate?** ☐ Yes ☐ No

### Name Change

**Are you changing the name of an existing program, track, or certificate?** ☐ Yes ☐ No

If yes, provide the new name of the program, track, or certificate:

Provide the name of the current program, track, or certificate:

**When is the name change effective?** Please note: A name change will apply to the record of all students who are currently enrolled, readmitted or newly admitted into this program as of the effective date of this change.

**Will students have the option to stay in their existing program, track, or certificate?** ☐ Yes ☐ No

**If you are requesting a CIP Code change for an existing program, track, or certificate, please provide:**

old CIP:

new CIP:

If a name change is your only revision, stop here. Otherwise, complete the rest of Part A.



UCF College of Graduate Studies – P.O. Box 160112, Orlando, FL 32816-0112
**Questions?** Contact Rhonda Nelson at rlnelson@mail.ucf.edu

## Part A - Continued

Specify the faculty who will participate in the program, track or certificate and their credentials to do so: (List faculty and a brief paragraph of their credentials.)

**Impact of changes on students:** Will current students be impacted by the addition or revision of a program, track or certificate? If so, how?

**If applicable**, provide a written agreement (email is fine) from all involved units that they are in support of, will provide courses to, or will participate in the program, track, or certificate. Please attach the correspondence and also list the units here.

**If an addition**, provide a statement of who is likely to enroll and why. Please state if there is licensure or certification that depends upon this education, etc. Also, complete the following table.

| | Year 1 | Year 2 | Year 3 |
|---|---|---|---|
| Headcount | | | |
| SCHs | | | |

**If an addition**, indicate likely career or student outcomes upon completion: (What will students do? What will their job titles be?)

## Part A - Continued

**If an addition or there are substantial REVISIONS** to existing tracks or certificates, please complete the following table on financial support: (Specify all forms of support – assistantships, fellowships, and tuition remission.)

| | No. assistantship students | Source of funds | No. fellowship students (specify fellowship) | No. tuition remissions | Source of funds |
|---|---|---|---|---|---|
| Year 1 | | | | | |
| Year 2 | | | | | |
| Year 3 | | | | | |

## Checklist of items to be provided:

☐ **Electronic graduate catalog copy for additions; track changes included if there are revisions. (required)**

☐ **Attach all appropriate course action requests that will be necessary to implement the changes. (required)**

☐ **Emails showing consultation with other units. (if applicable)**

☐ **If an addition, list of 1-3 students and 1-3 faculty for profiles in the graduate catalog (provide email address so Graduate Studies can contact them to write profiles and take photos). You may provide draft copy of profiles if you wish.**

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**Questions?** Contact Rhonda Nelson at rlnelson@mail.ucf.edu

## Part B – For inactivations or suspensions of programs, tracks, or certificates

**Are students currently enrolled in the program?** x Yes ☐ No

If yes, number of current students: **3**

**Please specify the intended time period of inactivation or suspension:**

If program, track, or certificate is being inactivated or suspended, then attach a "teach out" plan for all current students specifying how they can finish the program or where students will be placed if moving to another program. The "teach out" plan should specify when courses will be offered to enable students to finish. Specify whether students will remain in the existing program to finish, and if so, when the completion date will be, whether students will be moved to another program, etc. Please provide a list of students where applicable.

1. [redacted]
2. [redacted]
3. [redacted]

Sample teach out plan: Enter the terms and courses that will be taught for each term throughout the last semester.

| | | | | |
|---|---|---|---|---|
| ESI 5219 | ESI 5219 | EIN 6336 | ESI 5219 | ESI 5219 |
| EIN 5108 | EIN 6459 | ESI 5219 | EIN 5108 | EIN 6459 |
| ESI 6224 | EIN 6339 | EGN 5858 | | EIN 6339 |
| ESI 6357 | EIN 5140 | ESI 6225 | | EIN 5140 |
| | ESI 5236 | EIN 6215 | | ESI 5236 |
| | ESI 6215 | | | ESI 6215 |

### Checklist of items to be provided:

☐ **Attach all appropriate course action requests that will be necessary to implement the changes. (required)**

☐ **Emails showing consultation with other units. (if applicable)**

UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

# Program Action Request Form

This form is to be used to revise, add, suspend, or inactivate degree programs, tracks, or certificate programs. A new form must be used for each program, track, or certificate.

**PLEASE NOTE:** The deadline for new tracks or certificates is **February 1 of each year**. Any proposal for new tracks or certificates received after this date will not be included in the next year's catalog. Revisions to existing programs, tracks, or certificates are **due by March 15**. Any proposals for revisions received after that date will not be included in the next year's catalog. Please include catalog copy (description, curriculum, contact information, application requirements, and application deadlines). For revisions – attach the catalog copy **showing changes (use Track Changes in Word)**.

College/Unit(s) Submitting Proposal: **College of Engineering and Computer Science**

Proposed Effective Term/Year: **Summer 2011**

Unit(s) Housing Program: **Industrial Engineering and Management Systems**

Name of program, track, and/or certificate: **Industrial Engineering MS Professional Engineering Management Track**

**Description of program (this description will show up in the graduate catalog copy):**

## PROFESSIONAL ENGINEERING MANAGEMENT TRACK

### TRACK DESCRIPTION

The Professional Engineering Management option is a cohort-based program where specific cohorts are established periodically based upon needs of industry. For information about the start of the next cohort please contact the IEMS Graduate Coordinator Dr. Elshennawy (ahmade@mail.ucf.edu) or the Program Director Dr. Kotnour (tkotnour@mail.ucf.edu).

The Professional Engineering Management (PEM) track in the Industrial Engineering MS 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.

### CURRICULUM

#### Total Credit Hours Required:

30 Credit Hours Minimum beyond the Bachelor's Degree

The Professional Engineering Management (PEM) track in the Industrial Engineering MS program requires an undergraduate degree in Engineering or a closely related discipline. Students with undergraduate degrees outside of industrial engineering may be required to take additional prerequisites. The program is designed to be a lock-step, cohort-based program that can be completed in approximately 15 to 18 months. It is available only in a nonthesis

format that requires 12 credit hours of required courses and 18 credit hours of restricted electives.

Research studies are required in one or more courses. The research study and report will focus on reviewing and analyzing contemporary research in the profession in order to help students acquire knowledge and skills pertaining to research-based best practices.

A program of study must be developed with the graduate program director and meet with departmental approval. At least one-half of the credit hours required in a master's program of study must be taken in courses at the 6000 level or higher.

Prerequisites

- Mathematics through Calculus II (MAC 2312)

Required Courses—12 Credit Hours

- EIN 5108 The Environment of Technical Organizations
- EIN 5140 Project Engineering
- EIN 6182 Engineering Management
- ESI 5219 Engineering Statistics

Restricted Electives—18 Credit Hours

For each PEM cohort, six of the following courses will be offered.

- EIN 5117 Management Information Systems I (3 credit hours)
- EIN 5251 Usability Engineering (3 credit hours)
- EIN 6357 Advanced Engineering Economic Analysis (3 credit hours)
- EIN 6339 Operations Engineering (3 credit hours)
- ESI 6224 Quality Management (3 credit hours)
- ESI 6358 Decision Analysis (3 credit hours)
- EIN 6528 Simulation-based Life Cycle Engineering (3 credit hours)
- EIN 5356 Cost Engineering (3 credit hours)
- EIN 6326 Technology Strategy (3 credit hours)
- EIN 6459 Concurrent Engineering (3 credit hours)
- EIN 6936 Seminar in Advanced Industrial Engineering (3 credit hours)
- ESI 6551C Systems Engineering (3 credit hours)

## Equipment Fee

Full-time students in the Industrial Engineering MS program pay a $90 equipment fee each semester that they are enrolled. For part-time students, the equipment fee is $45 per semester.

## Independent Learning

The Independent Learning Requirement is met by successful completion of the research studies required in individual

courses, EIN 6182 Engineering Management, and the capstone project that requires that students integrate material from all the courses in their program.

## APPLICATION REQUIREMENTS

For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

In addition to the general UCF graduate application requirements, applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended.
- A bachelor's degree in Engineering or a closely related discipline.
- Two letters of recommendation.
- Résumé.
- Statement of educational, research, and professional career objectives.
- Applicants applying to this program who have attended a college/university outside the United States must provide a course-by-course credential evaluation with GPA calculation. Credential evaluations are accepted from World Education Services (WES) or Josef Silny and Associates, Inc. only.

## FINANCIALS

Graduate students may receive financial assistance through fellowships, assistantships, tuition support, or loans. For more information, see Student Finances, which describes the types of financial assistance available at UCF and provides general guidance in planning your graduate finances. The Financial Information section of the Graduate Catalog is another key resource.

### Fellowships

Fellowships are awarded based on academic merit to highly qualified students. They are paid to students through the Office of Student Financial Assistance, based on instructions provided by the College of Graduate Studies. Fellowships are given to support a student's graduate study and do not have a work obligation. For more information, see Fellowships, which includes descriptions of UCF fellowships and what you should do to be considered for a fellowship.

## CONTACT INFO

Ahmad Elshennawy PhD
Professor
ahmade@mail.ucf.edu
Telephone: 407-823-2204
Engineering 2, Room 430

**DELIVERY - Will program be delivered:** ☐ Face to face ☐ Completely online x Mixed delivery

**Admissions deadlines**: (Please specify if you have a different deadline for the track than for the program?)

N/A

---

**Application requirements:** (Please specify if you have different application requirements for the track than for the program? Will you admit directly to the track?)

N/A

---

**Program Director(s) and contact information:** (name, email, phone, campus address, program website address)

Dr. Ahmad Elshennawy, ahmade@mail.ucf.edu, 312 Engineering 2, 407– 823-2204

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**Please check one: This action affects a:** ☐ Program x Track ☐ Certificate

**Please check one: This action is a(n):**

☐ **Addition.** Please proceed to Part A.

x **Revision.** If a revision applies to multiple tracks, please list them here and then proceed to Part A:

---

☐ **Inactivation**

☐ **Temporary Suspension of Admissions. Give Length of Suspension:**

---

**Temporary suspension of admissions:** The program will be removed from the online application. A notation will be entered in the graduate catalog indicating the length of the suspension of admissions. Currently enrolled students will not experience any issues with continued enrollment.

**Inactivation:** Admissions will be suspended for new students and the program will be removed from the online application. Students active in the program are eligible to complete the program under the appropriate criteria and an appropriate teach-out plan is required. The program will be removed from the catalog as of the approved term.

## If you checked inactivation or you are temporarily suspending admissions, please go to Part B and complete it.

UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

## Signature Page

**RECOMMENDATIONS**

| | | | |
|---|---|---|---|
| ☐ Yes ☐ No | **Department Chair:** | **Date:** |
| ☐ Yes ☐ No | **College Curriculum Committee Chair:** | **Date:** |
| ☐ Yes ☐ No | **College Dean or Unit Head:** | **Date:** |
| ☐ Yes ☐ No | **Chair or GSC:** | **Date:** |
| ☐ Yes ☐ No | **Dean, College of Graduate Studies:** | **Date:** |

**APPROVAL**

**Provost and Vice President for Academic Affairs:** **Date:**

## Distribution: After approval is received from the Provost, distribution will be to:

Department(s); College; Registrar; Associate Registrar; Institutional Research; Academic Services; Faculty Senate;

University Analysis and Planning Support; College of Graduate Studies



UCF College of Graduate Studies – P.O. Box 160112, Orlando, FL 32816-0112
**Questions?** Contact Rhonda Nelson at rlnelson@mail.ucf.edu

UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

## Part A – For additions or revisions of programs, tracks or certificates

**Brief Statement of Program Change and rationale:** (Please indicate the change, the rationale for the change, how it affects the unit and faculty teaching in and students enrolled in the program, track or certificate. If there are changes to the credit hours of the program, required courses or other requirements, please state those changes. Remember to attach the catalog copy showing changes, using Track Changes in Word.)

**The Change:** Less required courses and more flexibility in offering electives
**Rationale:** Improving quality of course delivery and less restricted electives.
**Impact on Faculty:** More efficiency, more time to conduct research, seek external funding, and increase tha number and quality of publications.
**Impact on Students:** More concentration courses, better scheduling of courses for faster time to graduate.

**Will students be moved from an existing program, track, or certificate into this new program, track, or certificate?**

☐ Yes x No

If yes, state the name of the program or track where students are currently enrolled and provide a list of students if possible:

---

**Will students have the option to stay in their existing program, track, or certificate?** x Yes ☐ No

## Name Change

**Are you changing the name of an existing program, track, or certificate?** ☐ Yes x No

If yes, provide the new name of the program, track, or certificate:

Provide the name of the current program, track, or certificate:

**When is the name change effective?** Please note: A name change will apply to the record of all students who are currently enrolled, readmitted or newly admitted into this program as of the effective date of this change.

**Will students have the option to stay in their existing program, track, or certificate?** ☐ Yes ☐ No

**If you are requesting a CIP Code change for an existing program, track, or certificate, please provide:**

old CIP:

new CIP:

If a name change is your only revision, stop here. Otherwise, complete the rest of Part A.



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**Questions?** Contact Rhonda Nelson at rlnelson@mail.ucf.edu

## Part A - Continued

Specify the faculty who will participate in the program, track or certificate and their credentials to do so: (List faculty and a brief paragraph of their credentials.)

Waldemar Karwowski, Ph.D., Professor and Chair, Texas Tech: IE, Human System Integration, Ergonomics/Human Engineering
Lesia Crumpton-Young, Ph.D., Professor, Texas A&M: Human Engineering/Ergonomics, Industrial Engineering
Ahmad K. Elshennawy, Ph.D., Professor & Associate Chair, Penn State: IE, Quality and Reliability, Production Systems
Christopher Geiger, Ph.D., Assistant Professor, Purdue University: Production Systems, IE, Simulation, OR
Robert L. Hoekstra, Ph.D., Associate Professor, Cincinnati: Manufacturing Engineering, Engineering Management
Timothy G. Kotnour, Ph.D., Associate Professor, Virginia Tech: Engineering Management, IE
Gene C.H. Lee, Ph.D., P.E., Associate Professor, Texas Tech: Human Engineering/Ergonomics, IE, Safety Engineering/Management
Pamela R. McCauley-Bush, Ph.D., Associate Professor, University of Oklahoma: Engineering/Ergonomics, IE, Biomechanics
Mansooreh Mollaghasemi, Ph.D., Associate Professor, University of Louisville: IE, Simulation, OR, Decision Analysis
Dima Nazzal, Ph.D., Assistant Professor, Georgia Tech: OR, Industrial Engineering, Simulation & Modeling
Michael D. Proctor, Ph.D., Associate Professor, N. Carolina State: Interactive Simulation, Training System Design
Luis Rabelo, Ph.D., Associate Professor, University of Missouri: Production/Manufacturing Systems, IE, Management
Charles H. Reilly, Ph.D., Professor, Purdue University: OR, Industrial Engineering, Statistics
Serge Sala-Diakanda, Ph.D., Visiting Assistant Professor, UCF: Systems Engineering, Statistics, Simulation
José A. Sepúlveda, Ph.D., P.E., Associate Professor, University of Pittsburgh: Simulation, IE, OR, production Systems
William Thompson, Ph.D., Associate Professor, Arizona State: Engineering management, IE, Production Systems, Quality
Kent E. Williams, Ph.D., Associate Professor, University of Connecticut: Training Systems, Statistics, Interactive Simulation

**Impact of changes on students:** Will current students be impacted by the addition or revision of a program, track or certificate? If so, how?

If there will be a change, it will definitely be a better one. There will more flexibility that allows the students to select the courses that best suit their needs.

**If applicable**, provide a written agreement (email is fine) from all involved units that they are in support of, will provide courses to, or will participate in the program, track, or certificate. Please attach the correspondence and also list the units here.

N/A

**If an addition**, provide a statement of who is likely to enroll and why. Please state if there is licensure or certification that depends upon this education, etc. Also, complete the following table.

N/A

| |
|---|
| |

| | Year 1 | Year 2 | Year 3 |
|---|---|---|---|
| Headcount | | | |
| SCHs | | | |

**If an addition**, indicate likely career or student outcomes upon completion: (What will students do? What will their job titles be?)

| |
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| |

## Part A - Continued

**If an addition or there are substantial REVISIONS** to existing tracks or certificates, please complete the following table on financial support: (Specify all forms of support – assistantships, fellowships, and tuition remission.)

| | No. assistantship students | Source of funds | No. fellowship students (specify fellowship) | No. tuition remissions | Source of funds |
|---|---|---|---|---|---|
| Year 1 | | | | | |
| Year 2 | | | | | |
| Year 3 | | | | | |

## Checklist of items to be provided:

x **Electronic graduate catalog copy for additions; track changes included if there are revisions. (required)**

☐ **Attach all appropriate course action requests that will be necessary to implement the changes. (required)**

☐ **Emails showing consultation with other units. (if applicable)**

☐ **If an addition, list of 1-3 students and 1-3 faculty for profiles in the graduate catalog (provide email address so Graduate Studies can contact them to write profiles and take photos). You may provide draft copy of profiles if you wish.**

☐ **If an addition, what disciplines does this program, track or certificate belong to? What other UCF graduate programs, tracks, or certificates are related to it? This information will be used to provide additional links for prospective students to search in the online graduate catalog.**

UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

## Part B – For inactivations or suspensions of programs, tracks, or certificates

**Are students currently enrolled in the program?** ☐ Yes ☐ No

If yes, number of current students:

**Please specify the intended time period of inactivation or suspension:**

If program, track, or certificate is being inactivated or suspended, then attach a "teach out" plan for all current students specifying how they can finish the program or where students will be placed if moving to another program. The "teach out" plan should specify when courses will be offered to enable students to finish. Specify whether students will remain in the existing program to finish, and if so, when the completion date will be, whether students will be moved to another program, etc. Please provide a list of students where applicable.

Sample teach out plan: Enter the terms and courses that will be taught for each term throughout the last semester.

| Summer 2011 | Fall 2011 | Spring 2011 | Summer 2012 | Fall 2012 |
|---|---|---|---|---|
| | | | | |
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## Checklist of items to be provided:

☐ **Attach all appropriate course action requests that will be necessary to implement the changes. (required)**

☐ **Emails showing consultation with other units. (if applicable)**



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**Questions?** Contact Rhonda Nelson at rlnelson@mail.ucf.edu

UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

# Program Action Request Form

This form is to be used to revise, add, suspend, or inactivate degree programs, tracks, or certificate programs. A new form must be used for each program, track, or certificate.

**PLEASE NOTE:** The deadline for new tracks or certificates is **February 1 of each year**. Any proposal for new tracks or certificates received after this date will not be included in the next year's catalog. Revisions to existing programs, tracks, or certificates are **due by March 15**. Any proposals for revisions received after that date will not be included in the next year's catalog. Please include catalog copy (description, curriculum, contact information, application requirements, and application deadlines). For revisions – attach the catalog copy **showing changes (use Track Changes in Word)**.

College/Unit(s) Submitting Proposal: **College of Engineering and Computer Science**

Proposed Effective Term/Year: **Summer 2011**

Unit(s) Housing Program: **Industrial Engineering and Management Systems**

Name of program, track, and/or certificate: **Industrial Engineering MS Quality Systems Engineering Track**

**Description of program (this description will show up in the graduate catalog copy):**

## QUALITY SYSTEMS ENGINEERING TRACK

### TRACK DESCRIPTION

The Quality Engineering track in the Industrial Engineering MS program focuses on providing the knowledge for improving product and process quality in manufacturing and service industries. Quality Engineering provides both the quantitative tools for measuring quality and the managerial focus and organizational insight required to implement effective continuous improvement programs and incorporate the voice of the customer. The Quality Engineering curriculum builds on an undergraduate degree in Engineering, Science, Mathematics, or a closely related discipline to provide the necessary knowledge to plan, control, and improve the product assurance function in government, military, service, or manufacturing organizations.

The Industrial Engineering graduate programs are structured to support the emergence of Central Florida as a national center of high technology as well as supporting the diverse service industries in the region and throughout the nation.

Additional information can be found at www.iems.ucf.edu.

International students may only take one course per semester in a totally online format while attending UCF on a F-1 visa. Courses in this program can be taken in mixed mode for international students at UCF or fully online for international students who are not on visas. If you have questions, please consult the International Service Center at www.intl.ucf.edu.



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**Questions?** Contact Rhonda Nelson at rlnelson@mail.ucf.edu

## CURRICULUM

### Total Credit Hours Required:

30 Credit Hours Minimum beyond the Bachelor's Degree

This program can be taken entirely through the Florida Engineering Educational Delivery System (FEEDS), which provides video-streamed versions of classes over the Internet.

The Quality Engineering track in the Industrial Engineering MS program requires an undergraduate degree in Engineering or a closely related discipline. Students with undergraduate degrees outside of industrial engineering may be required to take additional prerequisites.

The track offers both thesis or nonthesis options with each requiring 30 credit hours of courses. The thesis option requires 12 credit hours of required courses, 12 credit hours of electives and 6 thesis credit hours. Students must also conduct an independent research study and write and successfully defend a thesis. The nonthesis option requires 12 credit hours of required courses and 18 credit hours of electives. Students must also pass a comprehensive oral examination at the end of their program of study.

Research studies are required in one or more courses. The research study and report will focus on reviewing and analyzing contemporary research in the profession in order to help students acquire knowledge and skills pertaining to research-based best practices. In addition, students may engage in directed independent studies, directed research or a research report during their studies.

A program of study must be developed with the graduate program director and meet with departmental approval. All programs of study must consist of 24 hours of required and elective courses, exclusive of thesis and research. At least one-half of the credit hours (including thesis hours) required in a master's program of study must be at the 6000 level or higher.

Students on assistantships must take 9 credit hours per semester to satisfy the university's requirement for full-time status. Most students working full time take 6 credit hours per semester. At that rate, the program can be completed in 6 semesters or less. However, students with more time available and with an early start on a thesis, if applicable, can finish the program in 3 semesters.

### Prerequisites

- Computer programming capability. Proficiency with MS Office expected. C++ , Visual BASIC, or Java recommended.
- Mathematics through Calculus II (MAC 2312)
- STA 3032 or equivalent
- Others, as needed by specific courses
- For MSIE degree: BSIE degree is required

### Master Core Courses (12 Credit Hours)

- ESI 5219: Engineering Statistics
- EIN 5140 Project Engineering

- ESI 6551C: Systems Engineering
- EIN 357: Advanced Engineering Economic Analysis

Concentration Courses (9 credit hours)

- ESI 5236 Reliability Engineering
- ESI 6224 Quality Management
- ESI 6225 Quality Design and Control

Thesis Option—9 Credit Hours

Thesis students must complete an additional elective beyond the 9 credit hours of concentration courses described above. They must also complete an independent research study and write and successfully defend a thesis according to program guidelines.

- EIN 6971 Thesis (6 credit hours)
- Elective (3 credit hours)

The College of Engineering and Computer Science requires that all thesis defense announcements be approved by the student's adviser and posted on the college's website and on the university-wide Events Calendar at the College of Graduate Studies website at least two weeks before the defense date.

Nonthesis Option—9 Credit Hours

Nonthesis students must take 9 additional credit hours of electives beyond the 9 credit hours of concentration courses described above.

- Electives (9 credit hours)

Comprehensive Examination

Nonthesis students must also successfully pass an oral comprehensive examination at the completion of their studies to fulfill degree requirements. Please see the program director for further details.

## Equipment Fee

Students in the Industrial Engineering MS program pay a $90 equipment fee each semester that they are enrolled. For part-time students, the equipment fee is $45 per semester.

## Independent Learning

The Independent Learning requirement is met by successful completion of a master's thesis or comprehensive exam.

## APPLICATION REQUIREMENTS

For information on general UCF graduate admissions requirements that apply to all prospective students, please visit

the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

The College of Engineering and Computer Science encourages prospective applicants to complete a pre-application form (www.cecs.ucf.edu/preapp) before completing the online application for graduate admission.

In addition to the general UCF graduate application requirements, applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended.
- A bachelor's degree in Engineering or a closely related discipline.
- Two letters of recommendation.
- Résumé.
- Statement of educational, research, and professional career objectives.

Faculty members may choose to conduct face-to-face or telephone interviews before accepting an applicant into their research program.

## FINANCIALS

Graduate students may receive financial assistance through fellowships, assistantships, tuition support, or loans. For more information, see Student Finances, which describes the types of financial assistance available at UCF and provides general guidance in planning your graduate finances. The Financial Information section of the Graduate Catalog is another key resource.

### Fellowships

Fellowships are awarded based on academic merit to highly qualified students. They are paid to students through the Office of Student Financial Assistance, based on instructions provided by the College of Graduate Studies. Fellowships are given to support a student's graduate study and do not have a work obligation. For more information, see Fellowships, which includes descriptions of UCF fellowships and what you should do to be considered for a fellowship.

## CONTACT INFO

Ahmad Elshennawy PhD
Professor
ahmade@mail.ucf.edu
Telephone: 407-823-2204
Engineering 2, Room 430

**DELIVERY - Will program be delivered:** ☐ Face to face ☐ Completely online x Mixed delivery

**Admissions deadlines**: (Please specify if you have a different deadline for the track than for the program?)

N/A

**Application requirements:** (Please specify if you have different application requirements for the track than for the program? Will you admit directly to the track?)

N/A

**Program Director(s) and contact information:** (name, email, phone, campus address, program website address)

Dr. Ahmad Elshennawy, ahmade@mail.ucf.edu, 312 Engineering 2, 407– 823-2204

**Please check one: This action affects a:** ☐ Program x Track ☐ Certificate

**Please check one: This action is a(n):**

☐ **Addition.** Please proceed to Part A.

x **Revision.** If a revision applies to multiple tracks, please list them here and then proceed to Part A:

☐ **Inactivation**

☐ **Temporary Suspension of Admissions. Give Length of Suspension:**

**Temporary suspension of admissions:** The program will be removed from the online application. A notation will be entered in the graduate catalog indicating the length of the suspension of admissions. Currently enrolled students will not experience any issues with continued enrollment.

**Inactivation:** Admissions will be suspended for new students and the program will be removed from the online application. Students active in the program are eligible to complete the program under the appropriate criteria and an appropriate teach-out plan is required. The program will be removed from the catalog as of the approved term.

## If you checked inactivation or you are temporarily suspending admissions, please go to Part B and complete it.

## Signature Page

**RECOMMENDATIONS**

| | | | |
|---|---|---|---|
| ☐ Yes ☐ No | **Department Chair:** | **Date:** |
| ☐ Yes ☐ No | **College Curriculum Committee Chair:** | **Date:** |
| ☐ Yes ☐ No | **College Dean or Unit Head:** | **Date:** |
| ☐ Yes ☐ No | **Chair or GSC:** | **Date:** |
| ☐ Yes ☐ No | **Dean, College of Graduate Studies:** | **Date:** |

**APPROVAL**

**Provost and Vice President for Academic Affairs:** **Date:**

## Distribution: After approval is received from the Provost, distribution will be to:

Department(s); College; Registrar; Associate Registrar; Institutional Research; Academic Services; Faculty Senate;

University Analysis and Planning Support; College of Graduate Studies



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**Questions?** Contact Rhonda Nelson at rlnelson@mail.ucf.edu

UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

## Part A – For additions or revisions of programs, tracks or certificates

**Brief Statement of Program Change and rationale:** (Please indicate the change, the rationale for the change, how it affects the unit and faculty teaching in and students enrolled in the program, track or certificate. If there are changes to the credit hours of the program, required courses or other requirements, please state those changes. Remember to attach the catalog copy showing changes, using Track Changes in Word.)

**The Change:** Less required courses and more flexibility in offering electives
**Rationale:** Improving quality of course delivery and less restricted electives.
**Impact on Faculty:** More efficiency, more time to conduct research, seek external funding, and increase tha number and quality of publications.
**Impact on Students:** More concentration courses, better scheduling of courses for faster time to graduate.

**Will students be moved from an existing program, track, or certificate into this new program, track, or certificate?**

☐ Yes x No

If yes, state the name of the program or track where students are currently enrolled and provide a list of students if possible:

---

**Will students have the option to stay in their existing program, track, or certificate?** x Yes ☐ No

## Name Change

**Are you changing the name of an existing program, track, or certificate?** x Yes ☐ No

If yes, provide the new name of the program, track, or certificate: Quality Systems Engineering

Provide the name of the current program, track, or certificate: Quality Engineering

**When is the name change effective?** Please note: A name change will apply to the record of all students who are currently enrolled, readmitted or newly admitted into this program as of the effective date of this change. Fall 2011

**Will students have the option to stay in their existing program, track, or certificate?** x Yes ☐ No

**If you are requesting a CIP Code change for an existing program, track, or certificate, please provide:**

old CIP:

new CIP:

---

If a name change is your only revision, stop here. Otherwise, complete the rest of Part A.

## Part A - Continued

Specify the faculty who will participate in the program, track or certificate and their credentials to do so: (List faculty and a brief paragraph of their credentials.)

Waldemar Karwowski, Ph.D., Professor and Chair, Texas Tech: IE, Human System Integration, Ergonomics/Human Engineering
Lesia Crumpton-Young, Ph.D., Professor, Texas A&M: Human Engineering/Ergonomics, Industrial Engineering
Ahmad K. Elshennawy, Ph.D., Professor & Associate Chair, Penn State: IE, Quality and Reliability, Production Systems
Christopher Geiger, Ph.D., Assistant Professor, Purdue University: Production Systems, IE, Simulation, OR
Robert L. Hoekstra, Ph.D., Associate Professor, Cincinnati: Manufacturing Engineering, Engineering Management
Timothy G. Kotnour, Ph.D., Associate Professor, Virginia Tech: Engineering Management, IE
Gene C.H. Lee, Ph.D., P.E., Associate Professor, Texas Tech: Human Engineering/Ergonomics, IE, Safety Engineering/Management
Pamela R. McCauley-Bush, Ph.D., Associate Professor, University of Oklahoma: Engineering/Ergonomics, IE, Biomechanics
Mansooreh Mollaghasemi, Ph.D., Associate Professor, University of Louisville: IE, Simulation, OR, Decision Analysis
Dima Nazzal, Ph.D., Assistant Professor, Georgia Tech: OR, Industrial Engineering, Simulation & Modeling
Michael D. Proctor, Ph.D., Associate Professor, N. Carolina State: Interactive Simulation, Training System Design
Luis Rabelo, Ph.D., Associate Professor, University of Missouri: Production/Manufacturing Systems, IE, Management
Charles H. Reilly, Ph.D., Professor, Purdue University: OR, Industrial Engineering, Statistics
Serge Sala-Diakanda, Ph.D., Visiting Assistant Professor, UCF: Systems Engineering, Statistics, Simulation
José A. Sepúlveda, Ph.D., P.E., Associate Professor, University of Pittsburgh: Simulation, IE, OR, production Systems
William Thompson, Ph.D., Associate Professor, Arizona State: Engineering management, IE, Production Systems, Quality
Kent E. Williams, Ph.D., Associate Professor, University of Connecticut: Training Systems, Statistics, Interactive Simulation

**Impact of changes on students:** Will current students be impacted by the addition or revision of a program, track or certificate? If so, how?

If there will be a change, it will definitely be a better one. There will more flexibility that allows the students to select the courses that best suit their needs.

**If applicable**, provide a written agreement (email is fine) from all involved units that they are in support of, will provide courses to, or will participate in the program, track, or certificate. Please attach the correspondence and also list the units here.

N/A

**If an addition**, provide a statement of who is likely to enroll and why. Please state if there is licensure or certification that depends upon this education, etc. Also, complete the following table.

N/A

| | Year 1 | Year 2 | Year 3 |
|---|---|---|---|
| Headcount | | | |
| SCHs | | | |

**If an addition**, indicate likely career or student outcomes upon completion: (What will students do? What will their job titles be?)

## Part A - Continued

**If an addition or there are substantial REVISIONS** to existing tracks or certificates, please complete the following table on financial support: (Specify all forms of support – assistantships, fellowships, and tuition remission.)

| | No. assistantship students | Source of funds | No. fellowship students (specify fellowship) | No. tuition remissions | Source of funds |
|---|---|---|---|---|---|
| Year 1 | | | | | |
| Year 2 | | | | | |
| Year 3 | | | | | |

## Checklist of items to be provided:

x **Electronic graduate catalog copy for additions; track changes included if there are revisions. (required)**

☐ **Attach all appropriate course action requests that will be necessary to implement the changes. (required)**

☐ **Emails showing consultation with other units. (if applicable)**

☐ **If an addition, list of 1-3 students and 1-3 faculty for profiles in the graduate catalog (provide email address so Graduate Studies can contact them to write profiles and take photos). You may provide draft copy of profiles if you wish.**

☐ **If an addition, what disciplines does this program, track or certificate belong to? What other UCF graduate programs, tracks, or certificates are related to it? This information will be used to provide additional links for prospective students to search in the online graduate catalog.**

## Part B – For inactivations or suspensions of programs, tracks, or certificates

**Are students currently enrolled in the program?** ☐ Yes ☐ No

If yes, number of current students:

_____

**Please specify the intended time period of inactivation or suspension:**

_____

If program, track, or certificate is being inactivated or suspended, then attach a "teach out" plan for all current students specifying how they can finish the program or where students will be placed if moving to another program. The "teach out" plan should specify when courses will be offered to enable students to finish. Specify whether students will remain in the existing program to finish, and if so, when the completion date will be, whether students will be moved to another program, etc. Please provide a list of students where applicable.

| |
|---|
| |

Sample teach out plan: Enter the terms and courses that will be taught for each term throughout the last semester.

| Summer 2011 | Fall 2011 | Spring 2011 | Summer 2012 | Fall 2012 |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

## Checklist of items to be provided:

☐ **Attach all appropriate course action requests that will be necessary to implement the changes. (required)**

☐ **Emails showing consultation with other units. (if applicable)**



UCF College of Graduate Studies – P.O. Box 160112, Orlando, FL 32816-0112
**Questions?** Contact Rhonda Nelson at rlnelson@mail.ucf.edu

UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

# Program Action Request Form

This form is to be used to revise, add, suspend, or inactivate degree programs, tracks, or certificate programs. A new form must be used for each program, track, or certificate.

**PLEASE NOTE:** The deadline for new tracks or certificates is **February 1 of each year**. Any proposal for new tracks or certificates received after this date will not be included in the next year's catalog. Revisions to existing programs, tracks, or certificates are **due by March 15**. Any proposals for revisions received after that date will not be included in the next year's catalog. Please include catalog copy (description, curriculum, contact information, application requirements, and application deadlines). For revisions – attach the catalog copy **showing changes (use Track Changes in Word)**.

College/Unit(s) Submitting Proposal: **College of Engineering and Computer Science**

Proposed Effective Term/Year: **Summer 2011**

Unit(s) Housing Program: **Industrial Engineering and Management Systems**

Name of program, track, and/or certificate: **Industrial Engineering MS Systems Operations and Modeling Track**

**Description of program (this description will show up in the graduate catalog copy):**

## SYSTEMS OPERATION AND MODELING TRACK

### TRACK DESCRIPTION

The Systems Operation and Modeling track in the Industrial Engineering MS program uses mathematics and computer-based systems to model operational processes and decisions in order to develop and evaluate alternatives that will lead to gains in efficiency and effectiveness. Drawing on probability, statistics, simulation, optimization, and stochastic processes, Operations Research provides many of the analytic tools used by industrial engineers as well as by other analysts to improve processes, decision-making, and management by individuals and organizations. The track also provides fundamental understanding of the functional and technical design requirements for simulation in manufacturing and service industries. The program is based on a systems modeling paradigm and provides coding and development capability in the context of a broader systems framework. Significant exposure to design and analysis aspects is a core element of the track.

The curriculum builds on an undergraduate Engineering, Mathematics, or Science degree to develop a strong modeling and analytical capability to improve processes and decision-making and using simulation as an analysis and design tool for the manufacturing and service industries.

The Industrial Engineering graduate programs are structured to support the emergence of Central Florida as a national center of high technology as well as supporting the diverse service industries in the region and throughout the nation.

Additional information can be found at www.iems.ucf.edu.



UCF College of Graduate Studies – P.O. Box 160112, Orlando, FL 32816-0112
**Questions?** Contact Rhonda Nelson at rlnelson@mail.ucf.edu

International students may only take one course per semester in a totally online format while attending UCF on a F-1 visa. Courses in this program can be taken in mixed mode for international students at UCF or fully online for international students who are not on visas. If you have questions, please consult the International Service Center at www.intl.ucf.edu.

CURRICULUM

Total Credit Hours Required:

30 Credit Hours Minimum beyond the Bachelor's Degree

This program can be taken entirely through the Florida Engineering Educational Delivery System (FEEDS), which provides video-streamed versions of classes over the Internet.

The Systems Operation and Modeling track in the Industrial Engineering MS program requires an undergraduate degree in Engineering or a closely related discipline. Students with undergraduate degrees outside of industrial engineering may be required to take additional prerequisite courses.

The track offers both thesis and nonthesis options with each requiring 30 credit hours of courses. Thesis students take 12 credit hours of required core courses, 9 credit hours of concentration courses, 6 thesis credit hours, and 3 hours of electives. They must also complete an independent research study and write and successfully defend their thesis. Nonthesis option students will take 12 credit hours of required core, 9 credit hours of concentration courses, and 9 credit hours of electives. They must also pass a comprehensive oral examination at the end of their program of study.

Research studies are required in one or more courses. The research study and report will focus on reviewing and analyzing contemporary research in the profession in order to help students acquire knowledge and skills pertaining to research-based best practices. In addition, students may engage in directed independent studies, directed research or a research report during their studies.

A approved program of study must be developed in consultation with the graduate program director. All programs of study must have 24 hours of required and elective course work, exclusive of thesis and research. At least one-half of the credit hours (including thesis hours) required in a master's program of study must be taken in courses at the 6000 level or higher.

Students on assistantships must take 9 credit hours per semester to satisfy the university's requirement for full-time status. Most students working full time take 6 credit hours per semester. At that rate, the program can be completed in 6 semesters or less. However, students with more time available and with an early start on a thesis, if applicable, can finish the program in 3 semesters.

Prerequisites

- Computer programming capability. Proficiency with MS Office expected. C++, Visual BASIC, or Java recommended.
- Mathematics through Calculus II (MAC 2312)
- STA 3032 or equivalent
- Others, as needed by specific courses

- For MSIE degree: BSIE degree is required

Required Core Courses—12 Credit Hours

- ESI 5219: Engineering Statistics
- EIN 5140 Project Engineering
- ESI 6551C: Systems Engineering
- EIN 6357 Advanced Engineering Economic Analysis

Concentration Courses (9 Credit Hours)

All students, both thesis and nonthesis, must take the following two courses:

- ESI 5531 Discrete System Simulation*
- ESI 5306 Operations Research**

Also take at least one of the following courses (for a total of at least 9 credit hours):

- EIN 6336 Production and Inventory Control
- EIN 6425 Scheduling and Sequencing
- ESI 6217 Statistical Aspects of Digital Simulation
- ESI 6358 Decision Analysis
- ESI 6336 Queuing Systems
- ESI 6418 Linear Programming and Extensions
- ESI 6532 Object Oriented Simulation

* Not open to students who have taken an UG course in simulation.
** Not open to students who have taken an UG course in Operations Research.

Thesis Option—9 Credit Hours

Thesis students must take an additional 3 credit hour elective beyond the 9 credit hours of restricted electives described above. They must also complete an independent research study and write and defend their thesis according to program guidelines.

- EIN 6971 Thesis (6 credit hours)
- Elective (3 credit hours)

The College of Engineering and Computer Science requires that all thesis defense announcements be approved by the student's adviser and posted on the college's website and on the university-wide Events Calendar at the College of Graduate Studies website at least two weeks before the defense date.

Nonthesis Option—9 Credit Hours

Nonthesis students take 9 additional credit hours of electives beyond the 9 credit hours of restricted electives

described above.

- Electives (9 credit hours)

Comprehensive Examination

Nonthesis students must also successfully pass an oral comprehensive examination to fulfill degree requirements. Please see the program director for further details.

### Equipment Fee

Students in the Industrial Engineering MS program pay a $90 equipment fee each semester that they are enrolled. For part-time students, the equipment fee is $45 per semester.

### Independent Learning

The Independent Learning Requirement is met by successful completion of a master's thesis or comprehensive exam for nonthesis students.

## APPLICATION REQUIREMENTS

For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

The College of Engineering and Computer Science encourages prospective applicants to complete a pre-application form (www.cecs.ucf.edu/preapp) before completing the online application for graduate admission.

In addition to the general UCF graduate application requirements, applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended.
- A bachelor's degree in Engineering or a closely related discipline.
- Two letters of recommendation.
- Résumé.
- Statement of educational, research, and professional career objectives.

Faculty members may choose to conduct face-to-face or telephone interviews before accepting an applicant into their research program.

## FINANCIALS

Graduate students may receive financial assistance through fellowships, assistantships, tuition support, or loans. For more information, see Student Finances, which describes the types of financial assistance available at UCF and provides general guidance in planning your graduate finances. The Financial Information section of the Graduate Catalog is another key resource.

## Fellowships

Fellowships are awarded based on academic merit to highly qualified students. They are paid to students through the Office of Student Financial Assistance, based on instructions provided by the College of Graduate Studies. Fellowships are given to support a student's graduate study and do not have a work obligation. For more information, see Fellowships, which includes descriptions of UCF fellowships and what you should do to be considered for a fellowship.

### CONTACT INFO

Ahmad Elshennawy PhD
Professor
ahmade@mail.ucf.edu
Telephone: 407-823-2204
Engineering 2, Room 430

**DELIVERY - Will program be delivered:** ☐ Face to face ☐ Completely online x Mixed delivery

**Admissions deadlines**: (Please specify if you have a different deadline for the track than for the program?)

N/A

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**Application requirements:** (Please specify if you have different application requirements for the track than for the program? Will you admit directly to the track?)

N/A

---

**Program Director(s) and contact information:** (name, email, phone, campus address, program website address)

Dr. Ahmad Elshennawy, ahmade@mail.ucf.edu, 312 Engineering 2, 407– 823-2204

---

**Please check one: This action affects a:** ☐ Program x Track ☐ Certificate

**Please check one: This action is a(n):**

☐ **Addition.** Please proceed to Part A.

x **Revision.** If a revision applies to multiple tracks, please list them here and then proceed to Part A:

---

☐ **Inactivation**

☐ **Temporary Suspension of Admissions. Give Length of Suspension:**

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**Temporary suspension of admissions:** The program will be removed from the online application. A notation will be entered in the graduate catalog indicating the length of the suspension of admissions. Currently enrolled students will not experience any issues with continued enrollment.

**Inactivation:** Admissions will be suspended for new students and the program will be removed from the online application. Students active in the program are eligible to complete the program under the appropriate criteria and an appropriate teach-out plan is required. The program will be removed from the catalog as of the approved term.

## If you checked inactivation or you are temporarily suspending admissions, please go to Part B and complete it.



UCF College of Graduate Studies – P.O. Box 160112, Orlando, FL 32816-0112
**Questions?** Contact Rhonda Nelson at rlnelson@mail.ucf.edu

## Signature Page

**RECOMMENDATIONS**

| | | | |
|---|---|---|---|
| ☐ Yes ☐ No | **Department Chair:** | **Date:** |
| ☐ Yes ☐ No | **College Curriculum Committee Chair:** | **Date:** |
| ☐ Yes ☐ No | **College Dean or Unit Head:** | **Date:** |
| ☐ Yes ☐ No | **Chair or GSC:** | **Date:** |
| ☐ Yes ☐ No | **Dean, College of Graduate Studies:** | **Date:** |

**APPROVAL**

**Provost and Vice President for Academic Affairs:** **Date:**

## Distribution: After approval is received from the Provost, distribution will be to:

Department(s); College; Registrar; Associate Registrar; Institutional Research; Academic Services; Faculty Senate;

University Analysis and Planning Support; College of Graduate Studies



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**Questions?** Contact Rhonda Nelson at rlnelson@mail.ucf.edu

UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

## Part A – For additions or revisions of programs, tracks or certificates

**Brief Statement of Program Change and rationale:** (Please indicate the change, the rationale for the change, how it affects the unit and faculty teaching in and students enrolled in the program, track or certificate. If there are changes to the credit hours of the program, required courses or other requirements, please state those changes. Remember to attach the catalog copy showing changes, using Track Changes in Word.)

**The Change:** Less required courses and more flexibility in offering electives
**Rationale:** Improving quality of course delivery and less restricted electives.
**Impact on Faculty:** More efficiency, more time to conduct research, seek external funding, and increase tha number and quality of publications.
**Impact on Students:** More concentration courses, better scheduling of courses for faster time to graduate.

**Will students be moved from an existing program, track, or certificate into this new program, track, or certificate?**

☐ Yes x No

If yes, state the name of the program or track where students are currently enrolled and provide a list of students if possible:

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**Will students have the option to stay in their existing program, track, or certificate?** x Yes ☐ No

## Name Change

**Are you changing the name of an existing program, track, or certificate?** x Yes ☐ No

If yes, provide the new name of the program, track, or certificate: Systems Operations and Modeling

Provide the name of the current program, track, or certificate: Simulation Modeling and Analysis

**When is the name change effective?** Please note: A name change will apply to the record of all students who are currently enrolled, readmitted or newly admitted into this program as of the effective date of this change. Fall 2011

**Will students have the option to stay in their existing program, track, or certificate?** x Yes ☐ No

**If you are requesting a CIP Code change for an existing program, track, or certificate, please provide:**

old CIP:

new CIP:

---

If a name change is your only revision, stop here. Otherwise, complete the rest of Part A.



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**Questions?** Contact Rhonda Nelson at rlnelson@mail.ucf.edu

## Part A - Continued

Specify the faculty who will participate in the program, track or certificate and their credentials to do so: (List faculty and a brief paragraph of their credentials.)

Waldemar Karwowski, Ph.D., Professor and Chair, Texas Tech: IE, Human System Integration, Ergonomics/Human Engineering
Lesia Crumpton-Young, Ph.D., Professor, Texas A&M: Human Engineering/Ergonomics, Industrial Engineering
Ahmad K. Elshennawy, Ph.D., Professor & Associate Chair, Penn State: IE, Quality and Reliability, Production Systems
Christopher Geiger, Ph.D., Assistant Professor, Purdue University: Production Systems, IE, Simulation, OR
Robert L. Hoekstra, Ph.D., Associate Professor, Cincinnati: Manufacturing Engineering, Engineering Management
Timothy G. Kotnour, Ph.D., Associate Professor, Virginia Tech: Engineering Management, IE
Gene C.H. Lee, Ph.D., P.E., Associate Professor, Texas Tech: Human Engineering/Ergonomics, IE, Safety Engineering/Management
Pamela R. McCauley-Bush, Ph.D., Associate Professor, University of Oklahoma: Engineering/Ergonomics, IE, Biomechanics
Mansooreh Mollaghasemi, Ph.D., Associate Professor, University of Louisville: IE, Simulation, OR, Decision Analysis
Dima Nazzal, Ph.D., Assistant Professor, Georgia Tech: OR, Industrial Engineering, Simulation & Modeling
Michael D. Proctor, Ph.D., Associate Professor, N. Carolina State: Interactive Simulation, Training System Design
Luis Rabelo, Ph.D., Associate Professor, University of Missouri: Production/Manufacturing Systems, IE, Management
Charles H. Reilly, Ph.D., Professor, Purdue University: OR, Industrial Engineering, Statistics
Serge Sala-Diakanda, Ph.D., Visiting Assistant Professor, UCF: Systems Engineering, Statistics, Simulation
José A. Sepúlveda, Ph.D., P.E., Associate Professor, University of Pittsburgh: Simulation, IE, OR, production Systems
William Thompson, Ph.D., Associate Professor, Arizona State: Engineering management, IE, Production Systems, Quality
Kent E. Williams, Ph.D., Associate Professor, University of Connecticut: Training Systems, Statistics, Interactive Simulation

**Impact of changes on students:** Will current students be impacted by the addition or revision of a program, track or certificate? If so, how?

If there will be a change, it will definitely be a better one. There will more flexibility that allows the students to select the courses that best suit their needs.

**If applicable**, provide a written agreement (email is fine) from all involved units that they are in support of, will provide courses to, or will participate in the program, track, or certificate. Please attach the correspondence and also list the units here.

N/A

**If an addition**, provide a statement of who is likely to enroll and why. Please state if there is licensure or certification that depends upon this education, etc. Also, complete the following table.

N/A

| |
|---|
| |

| | Year 1 | Year 2 | Year 3 |
|---|---|---|---|
| Headcount | | | |
| SCHs | | | |

**If an addition**, indicate likely career or student outcomes upon completion: (What will students do? What will their job titles be?)

| |
|---|
| |

## Part A - Continued

**If an addition or there are substantial REVISIONS** to existing tracks or certificates, please complete the following table on financial support: (Specify all forms of support – assistantships, fellowships, and tuition remission.)

| | No. assistantship students | Source of funds | No. fellowship students (specify fellowship) | No. tuition remissions | Source of funds |
|---|---|---|---|---|---|
| Year 1 | | | | | |
| Year 2 | | | | | |
| Year 3 | | | | | |

## Checklist of items to be provided:

x **Electronic graduate catalog copy for additions; track changes included if there are revisions. (required)**

☐ **Attach all appropriate course action requests that will be necessary to implement the changes. (required)**

☐ **Emails showing consultation with other units. (if applicable)**

☐ **If an addition, list of 1-3 students and 1-3 faculty for profiles in the graduate catalog (provide email address so Graduate Studies can contact them to write profiles and take photos). You may provide draft copy of profiles if you wish.**

☐ **If an addition, what disciplines does this program, track or certificate belong to? What other UCF graduate programs, tracks, or certificates are related to it? This information will be used to provide additional links for prospective students to search in the online graduate catalog.**

UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

## Part B – For inactivations or suspensions of programs, tracks, or certificates

**Are students currently enrolled in the program?** ☐ Yes ☐ No

If yes, number of current students:

**Please specify the intended time period of inactivation or suspension:**

If program, track, or certificate is being inactivated or suspended, then attach a "teach out" plan for all current students specifying how they can finish the program or where students will be placed if moving to another program. The "teach out" plan should specify when courses will be offered to enable students to finish. Specify whether students will remain in the existing program to finish, and if so, when the completion date will be, whether students will be moved to another program, etc. Please provide a list of students where applicable.

Sample teach out plan: Enter the terms and courses that will be taught for each term throughout the last semester.

| Summer 2011 | Fall 2011 | Spring 2011 | Summer 2012 | Fall 2012 |
|---|---|---|---|---|
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## Checklist of items to be provided:

☐ **Attach all appropriate course action requests that will be necessary to implement the changes. (required)**

☐ **Emails showing consultation with other units. (if applicable)**



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**Questions?** Contact Rhonda Nelson at rlnelson@mail.ucf.edu

UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

# Program Action Request Form

This form is to be used to revise, add, suspend, or inactivate degree programs, tracks, or certificate programs. A new form must be used for each program, track, or certificate.

**PLEASE NOTE:** The deadline for new tracks or certificates is **February 1 of each year**. Any proposal for new tracks or certificates received after this date will not be included in the next year's catalog. Revisions to existing programs, tracks, or certificates are **due by March 15**. Any proposals for revisions received after that date will not be included in the next year's catalog. Please include catalog copy (description, curriculum, contact information, application requirements, and application deadlines). For revisions – attach the catalog copy **showing changes (use Track Changes in Word)**.

College/Unit(s) Submitting Proposal: **College of Engineering and Computer Science**

Proposed Effective Term/Year: **Summer 2011**

Unit(s) Housing Program: **Industrial Engineering and Management Systems**

Name of program, track, and/or certificate: **Industrial Engineering MS Systems Engineering Track**

**Description of program (this description will show up in the graduate catalog copy):**

## SYSTEMS ENGINEERING

### TRACK DESCRIPTION

The Systems Engineering track in the Industrial Engineering MS program is intended for engineers of all engineering disciplines. The program focuses on a systems view of engineering problems related to the management of complex industrial, military, government, and social systems. The MS is flexible by design to accommodate engineers of varied backgrounds, interests, and goals.

The Industrial Engineering graduate programs are structured to support the emergence of Central Florida as a national center of high technology as well as supporting the diverse service industries in the region and throughout the nation.

Additional information can be found at www.iems.ucf.edu.

International students may only take one course per semester in a totally online format while attending UCF on a F-1 visa. Courses in this program can be taken in mixed mode for international students at UCF or fully online for international students who are not on visas. If you have questions, please consult the International Service Center at www.intl.ucf.edu.

### CURRICULUM

Total Credit Hours Required:

30 Credit Hours Minimum beyond the Bachelor's Degree

This program can be taken entirely through the Florida Engineering Educational Delivery System (FEEDS), which provides video-streamed versions of classes over the Internet.

The Systems Engineering track in the Industrial Engineering MS program requires an undergraduate degree in Engineering or a closely related discipline. Students with undergraduate degrees outside of industrial engineering may be required to take additional prerequisite courses.

The track offers both thesis and nonthesis options with each requiring 30 credit hours of courses.
Thesis students take 12 credit hours of master core courses, 9 credit hours of concentration courses, 6 thesis credit hours and 3 credit hours of electives. They must also complete an independent research project and write and successfully defend their thesis. Nonthesis option students take 12 credit hours of master core courses, 9 credit hours of concentration courses, and 9 credit hours of electives. They must also pass a comprehensive oral examination at the end of their program of study.

Research studies are required in one or more courses. The research study and report will focus on reviewing and analyzing contemporary research in the profession in order to help students acquire knowledge and skills pertaining to research-based best practices. In addition, students may engage in directed independent studies, directed research or a research report during their studies.

An approved program of study must be developed in consultation with the graduate program director. At least 24 credit hours of the program of study must consist of required and elective courses, exclusive of thesis and research. At least one-half of the credit hours (including thesis hours) required in a master's program of study must be taken in courses at the 6000 level or higher.

Students on assistantships must take 9 credit hours per semester to satisfy the university's requirement for full-time status. Most students working full time take 6 credit hours per semester. At that rate, the program can be completed in 6 semesters or less. However, students with more time available and with an early start on a thesis, if applicable, can finish the program in 3 semesters.

## Prerequisites

- Computer programming capability. Proficiency with MS Office expected. C++ , Visual BASIC, or Java recommended.
- Mathematics through Calculus II (MAC 2312)
- STA 3032 or equivalent
- Others, as needed by specific courses
- For MSIE degree: BSIE degree is required

## Master Core Courses (12 Credit Hours)

- ESI 5219: Engineering Statistics
- EIN 5140 Project Engineering
- ESI 6551C: Systems Engineering
- EIN 6357 Advanced Engineering Economic Analysis

Concentration Courses (9 Credit Hours)

- EIN 6215: System Safety Engineering and Management
- ESI 5359: Risk Assessment and Management
- ESI 6358: Decision Analysis

Thesis Option—9 Credit Hours

Thesis students must take an additional 3 credit hour elective beyond the 9 credit hours of concentration courses described above. They must also complete an independent research project and write and successfully defend their thesis according to program guidelines.

- EIN 6971 Thesis (6 credit hours)
- Elective (3 credit hours)

The College of Engineering and Computer Science requires that all thesis defense announcements be approved by the student's adviser and posted on the college's website and on the university-wide Events Calendar at the College of Graduate Studies website at least two weeks before the defense date.

Nonthesis Option—9 Credit Hours

Nonthesis students must take 9 credit hours of additional electives beyond the 9 credit hours of concentration courses described above.

- Electives (9 credit hours)

Comprehensive Examination

Nonthesis students must also successfully pass an oral comprehensive examination to fulfill degree requirements. For further details, please see the program director.

## Equipment Fee

Students in the Industrial Engineering MS program pay a $90 equipment fee each semester that they are enrolled. For part-time students, the equipment fee is $45 per semester.

## Independent Learning

The Independent Learning requirement is met by successful completion of a master's thesis or comprehensive exam.

## APPLICATION REQUIREMENTS

For information on general UCF graduate admissions requirements that apply to all prospective students, please visit the Admissions section of the Graduate Catalog. Applicants must apply online. All requested materials must be submitted by the established deadline.

The College of Engineering and Computer Science encourages prospective applicants to complete a pre-application form (www.cecs.ucf.edu/preapp) before completing the online application for graduate admission.

In addition to the general UCF graduate application requirements, applicants to this program must provide:

- One official transcript (in a sealed envelope) from each college/university attended.
- A bachelor's degree in Engineering or a closely related discipline.
- Two letters of recommendation.
- Résumé.
- Statement of educational, research, and professional career objectives.

Faculty members may choose to conduct face-to-face or telephone interviews before accepting an applicant into their research program.

## FINANCIALS

Graduate students may receive financial assistance through fellowships, assistantships, tuition support, or loans. For more information, see Student Finances, which describes the types of financial assistance available at UCF and provides general guidance in planning your graduate finances. The Financial Information section of the Graduate Catalog is another key resource.

### Fellowships

Fellowships are awarded based on academic merit to highly qualified students. They are paid to students through the Office of Student Financial Assistance, based on instructions provided by the College of Graduate Studies. Fellowships are given to support a student's graduate study and do not have a work obligation. For more information, see Fellowships, which includes descriptions of UCF fellowships and what you should do to be considered for a fellowship.

## CONTACT INFO

Ahmad Elshennawy PhD
Professor
ahmade@mail.ucf.edu
Telephone: 407-823-2204
Engineering 2, Room 430

**DELIVERY - Will program be delivered:** ☐ Face to face ☐ Completely online x Mixed delivery

**Admissions deadlines**: (Please specify if you have a different deadline for the track than for the program?)

N/A

**Application requirements:** (Please specify if you have different application requirements for the track than for the

program? Will you admit directly to the track?)

N/A

**Program Director(s) and contact information:** (name, email, phone, campus address, program website address)

Dr. Ahmad Elshennawy, ahmade@mail.ucf.edu, 312 Engineering 2, 407– 823-2204

**Please check one: This action affects a:** ☐ Program x Track ☐ Certificate

**Please check one: This action is a(n):**

☐ **Addition.** Please proceed to Part A.

x **Revision.** If a revision applies to multiple tracks, please list them here and then proceed to Part A:

☐ **Inactivation**

☐ **Temporary Suspension of Admissions. Give Length of Suspension:**

**Temporary suspension of admissions:** The program will be removed from the online application. A notation will be entered in the graduate catalog indicating the length of the suspension of admissions. Currently enrolled students will not experience any issues with continued enrollment.

**Inactivation:** Admissions will be suspended for new students and the program will be removed from the online application. Students active in the program are eligible to complete the program under the appropriate criteria and an appropriate teach-out plan is required. The program will be removed from the catalog as of the approved term.

**If you checked inactivation or you are temporarily suspending admissions, please go to Part B and complete it.**

## Signature Page

**RECOMMENDATIONS**

| | | | |
|---|---|---|---|
| ☐ Yes ☐ No | **Department Chair:** | **Date:** |
| ☐ Yes ☐ No | **College Curriculum Committee Chair:** | **Date:** |
| ☐ Yes ☐ No | **College Dean or Unit Head:** | **Date:** |
| ☐ Yes ☐ No | **Chair or GSC:** | **Date:** |
| ☐ Yes ☐ No | **Dean, College of Graduate Studies:** | **Date:** |

**APPROVAL**

**Provost and Vice President for Academic Affairs:** **Date:**

## Distribution: After approval is received from the Provost, distribution will be to:

Department(s); College; Registrar; Associate Registrar; Institutional Research; Academic Services; Faculty Senate;

University Analysis and Planning Support; College of Graduate Studies



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**Questions?** Contact Rhonda Nelson at rlnelson@mail.ucf.edu

UNIVERSITY OF CENTRAL FLORIDA
COLLEGE OF GRADUATE STUDIES

## Part A – For additions or revisions of programs, tracks or certificates

**Brief Statement of Program Change and rationale:** (Please indicate the change, the rationale for the change, how it affects the unit and faculty teaching in and students enrolled in the program, track or certificate. If there are changes to the credit hours of the program, required courses or other requirements, please state those changes. Remember to attach the catalog copy showing changes, using Track Changes in Word.)

**The Change:** Less required courses and more flexibility in offering electives
**Rationale:** Improving quality of course delivery and less restricted electives.
**Impact on Faculty:** More efficiency, more time to conduct research, seek external funding, and increase tha number and quality of publications.
**Impact on Students:** More concentration courses, better scheduling of courses for faster time to graduate.

**Will students be moved from an existing program, track, or certificate into this new program, track, or certificate?**

☐ Yes x No

If yes, state the name of the program or track where students are currently enrolled and provide a list of students if possible:

---

**Will students have the option to stay in their existing program, track, or certificate?** x Yes ☐ No

## Name Change

**Are you changing the name of an existing program, track, or certificate?** ☐ Yes x No

If yes, provide the new name of the program, track, or certificate:

---

Provide the name of the current program, track, or certificate:

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**When is the name change effective?** Please note: A name change will apply to the record of all students who are currently enrolled, readmitted or newly admitted into this program as of the effective date of this change. Fall 2011

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**Will students have the option to stay in their existing program, track, or certificate?** x Yes ☐ No

**If you are requesting a CIP Code change for an existing program, track, or certificate, please provide:**

old CIP:

---

new CIP:

---

If a name change is your only revision, stop here. Otherwise, complete the rest of Part A.



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**Questions?** Contact Rhonda Nelson at rlnelson@mail.ucf.edu

## Part A - Continued

Specify the faculty who will participate in the program, track or certificate and their credentials to do so: (List faculty and a brief paragraph of their credentials.)

Waldemar Karwowski, Ph.D., Professor and Chair, Texas Tech: IE, Human System Integration, Ergonomics/Human Engineering
Lesia Crumpton-Young, Ph.D., Professor, Texas A&M: Human Engineering/Ergonomics, Industrial Engineering
Ahmad K. Elshennawy, Ph.D., Professor & Associate Chair, Penn State: IE, Quality and Reliability, Production Systems
Christopher Geiger, Ph.D., Assistant Professor, Purdue University: Production Systems, IE, Simulation, OR
Robert L. Hoekstra, Ph.D., Associate Professor, Cincinnati: Manufacturing Engineering, Engineering Management
Timothy G. Kotnour, Ph.D., Associate Professor, Virginia Tech: Engineering Management, IE
Gene C.H. Lee, Ph.D., P.E., Associate Professor, Texas Tech: Human Engineering/Ergonomics, IE, Safety Engineering/Management
Pamela R. McCauley-Bush, Ph.D., Associate Professor, University of Oklahoma: Engineering/Ergonomics, IE, Biomechanics
Mansooreh Mollaghasemi, Ph.D., Associate Professor, University of Louisville: IE, Simulation, OR, Decision Analysis
Dima Nazzal, Ph.D., Assistant Professor, Georgia Tech: OR, Industrial Engineering, Simulation & Modeling
Michael D. Proctor, Ph.D., Associate Professor, N. Carolina State: Interactive Simulation, Training System Design
Luis Rabelo, Ph.D., Associate Professor, University of Missouri: Production/Manufacturing Systems, IE, Management
Charles H. Reilly, Ph.D., Professor, Purdue University: OR, Industrial Engineering, Statistics
Serge Sala-Diakanda, Ph.D., Visiting Assistant Professor, UCF: Systems Engineering, Statistics, Simulation
José A. Sepúlveda, Ph.D., P.E., Associate Professor, University of Pittsburgh: Simulation, IE, OR, production Systems
William Thompson, Ph.D., Associate Professor, Arizona State: Engineering management, IE, Production Systems, Quality
Kent E. Williams, Ph.D., Associate Professor, University of Connecticut: Training Systems, Statistics, Interactive Simulation

**Impact of changes on students:** Will current students be impacted by the addition or revision of a program, track or certificate? If so, how?

If there will be a change, it will definitely be a better one. There will more flexibility that allows the students to select the courses that best suit their needs.

**If applicable**, provide a written agreement (email is fine) from all involved units that they are in support of, will provide courses to, or will participate in the program, track, or certificate. Please attach the correspondence and also list the units here.

N/A

**If an addition**, provide a statement of who is likely to enroll and why. Please state if there is licensure or certification that depends upon this education, etc. Also, complete the following table.

N/A

| |
|---|
| |

| | Year 1 | Year 2 | Year 3 |
|---|---|---|---|
| Headcount | | | |
| SCHs | | | |

**If an addition**, indicate likely career or student outcomes upon completion: (What will students do? What will their job titles be?)

| |
|---|
| |

## Part A - Continued

**If an addition or there are substantial REVISIONS** to existing tracks or certificates, please complete the following table on financial support: (Specify all forms of support – assistantships, fellowships, and tuition remission.)

| | No. assistantship students | Source of funds | No. fellowship students (specify fellowship) | No. tuition remissions | Source of funds |
|---|---|---|---|---|---|
| Year 1 | | | | | |
| Year 2 | | | | | |
| Year 3 | | | | | |

## Checklist of items to be provided:

x **Electronic graduate catalog copy for additions; track changes included if there are revisions. (required)**

☐ **Attach all appropriate course action requests that will be necessary to implement the changes. (required)**

☐ **Emails showing consultation with other units. (if applicable)**

☐ **If an addition, list of 1-3 students and 1-3 faculty for profiles in the graduate catalog (provide email address so Graduate Studies can contact them to write profiles and take photos). You may provide draft copy of profiles if you wish.**

☐ **If an addition, what disciplines does this program, track or certificate belong to? What other UCF graduate programs, tracks, or certificates are related to it? This information will be used to provide additional links for prospective students to search in the online graduate catalog.**

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## Part B – For inactivations or suspensions of programs, tracks, or certificates

**Are students currently enrolled in the program?** ☐ Yes ☐ No

If yes, number of current students:

**Please specify the intended time period of inactivation or suspension:**

If program, track, or certificate is being inactivated or suspended, then attach a "teach out" plan for all current students specifying how they can finish the program or where students will be placed if moving to another program. The "teach out" plan should specify when courses will be offered to enable students to finish. Specify whether students will remain in the existing program to finish, and if so, when the completion date will be, whether students will be moved to another program, etc. Please provide a list of students where applicable.

Sample teach out plan: Enter the terms and courses that will be taught for each term throughout the last semester.

| Summer 2011 | Fall 2011 | Spring 2011 | Summer 2012 | Fall 2012 |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

## Checklist of items to be provided:

☐ **Attach all appropriate course action requests that will be necessary to implement the changes. (required)**

☐ **Emails showing consultation with other units. (if applicable)**



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