MAE Graduate Certificates

Graduate Certificates are a sequence of courses which culminate in earning a non-degree certification showing that the student has completed graduate-level coursework in a specialized discipline of study. **Courses cannot count concurrently toward multiple graduate certificates.** MAE Graduate Certificates include:

MAE GRADUATE CERTIFICATES

1. Advanced Manufacturing
2. Control Systems
3. Energy Management
4. Scientific Computing
5. Solar Energy
6. Sustainable and Resilient Energy Engineering

Admissions Questions:

GradAdmissions@mae.ufl.edu

Advising Questions:

GradAdvising@mae.ufl.edu

Note that students must apply for admission to the certificate program(s) they wish to pursue. See the following sections for more guidance.

Admission to Certificate Programs

Minimum Admissions Requirements:

1. Bachelor's degree in Engineering or a closely related STEM field with a 3.0 undergrade GPA **OR**
2. A minimum five years of professional experience in an engineering discipline

The Certificate Applications deadline is 4:00 pm on the last day of add/drop for same semester admissions. Students *should* apply for Certificate admission as soon as they decide to take classes toward the Certificate and no later than 4:00 pm on the last day of add/drop the semester *before* they intend to graduate (e.g. apply no later than Fall 2023 for anticipated Spring 2024 graduation).

DEADLINES NOTICE

- ***No Applications will be accepted after the add/drop deadline***
- ***Students may not submit duplicate applications***

All students must apply online at the Office of Admissions:

1) Complete the application
    a) Currently enrolled students should apply here.
    b) New applicants should apply here and select "New Student Application."
2) Receive admission to the certificate program(s)
3) Complete all coursework to satisfy the requirements of the certificate program(s)
4) Apply to earn/graduate the Certificate through ONE.UF. This **can** occur in a different term or the same term as when the student applies to certify their MAE MS or PhD degree. This **cannot** occur in the same term that they are admitted.

Certificate Offerings

All certificates require 9 credit hours to be completed in their respective subject areas and must earn a grade of "B" or higher in each course for certificate completion. Students must file an degree application for a certificate by the deadline with the Office of the University Registrar at ONE.UF during the final term of enrollment or the first term that they meet the requirements for the certificate, whichever comes first.

Advanced Manufacturing

Designed for manufacturing professionals and students interested in modern advanced manufacturing techniques. This certificate explores traditional manufacturing processes such as forming, machining, and welding; nontraditional manufacturing processes; and related engineering topics.

- Required Coursework:
    - EML 6324 Fundamentals of Production Engineering
    - EML 6323 Nontraditional Manufacturing
      or
      EML 6267 Advanced Manufacturing Processes and Analysis
- Elective Coursework, choose one:
    - EML 5045 Computational Methods for Design and Manufacturing
    - EML 5526 Finite Element Analysis and Application
    - EML 5318 Computer Control of Machines and Processes
    - EML 6323 or EML 6267 if not selected as a required course (see above)

For information on course content and professional development outcomes, contact Dr. John Schueller - Professor, Department of Mechanical & Aerospace Engineering **OR** Dr. Hitomi Greenslet – Professor & Graduate Academic Coordinator, Department of Mechanical & Aerospace Engineering

Control Systems

Designed to prepare students for careers related to control systems technologies. Areas of emphasis include advanced control engineering concepts, state-space representation of dynamic systems, advanced analytical techniques, linear, optimal, and nonlinear control design methodologies, state, and parameter estimation, as well as robust and adaptive control synthesis.

- Required Coursework:
  - EML 5311 Control System Theory
- Elecetive Coursework, choose two:
  - EML 6350 Introduction to Nonlinear Control
  - EML 6351 Nonlinear Control II: Adaptive Control
  - EML 6352 Optimal Estimation and Kalman Filtering
  - EML 6364 Optimal Control
  - EML 6573 Nonlinear Programming
  - EML 6048 Machine Learning and System Control

For information on course content and professional development outcomes, please contact: Dr. Warren Dixon – Professor & Department Chair, Department of Mechanical & Aerospace Engineering.

Energy Management

Designed for careers related to commercial energy technologies. Areas of emphasis include energy conversion, modeling thermal equipment, system simulation, optimization, design, building envelopes, mechanical systems, industrial processes, air-handling design, temperature and humidity control, economic analysis, vapor compression, adsorption, steam-jet, thermoelectric, and modern energy management methods.

- Required Coursework, choose three:
  - EML 6606 Advanced Air Conditioning
  - EML 5605 Advanced Refrigeration
  - EML 5516 Design of Thermal Systems
  - EML 5465 Energy Management for Mechanical Engineers
  - EML 6451 Energy Conversion

For information on course content and professional development outcomes, please contact: Dr. S.A. Sherif - Professor, Department of Mechanical & Aerospace Engineering.

Scientific Computing

Emphasizes areas of complex multiscale multi-disciplinary problems and their resolution by computation. The certificate program will allow modern engineers and scientists to simultaneously: learn how to effectively perform large-scale scientific simulations; manage and analyze voluminous datasets; identify key quantities of ultimate significance to final decision; reduce the voluminous data to focus on these key quantities; rigorously establish uncertainties in the prediction of the key quantities; evaluate probabilistic risks and rewards involved in the final decision making.

- Required Coursework:
  - EML 6577 Verification, Validation, and Uncertainty Quantification
- Elective Coursework, choose two:
  - CEN 5035 Software Engineering
  - CEN 6070 Software Testing and Verification
  - CES 5010 Probabilistic and Stochastic Methods in Civil Engineering
  - COP 5556 Programming Language Principles
  - COP 5618 Concurrent Programming
  - EEL 6533 Data Analytics and Decision Sciences
  - EEL 6763 Parallel Computer Architecture
  - EGM 6342 Fundamentals of Computational Fluid Dynamics
  - EGM 6352 Advanced Finite Element Methods
  - EMA 6804 Quantum Methods in Computational Materials Science
  - EMA 6808 Error Analysis & Optimization Methodologies in Materials Research
  - EML 5526 Finite Element Analysis and Application
  - EOC 6850 Numerical Simulation Techniques in Coastal and Ocean Engineering
  - ESI 6529 Digital Simulation Techniques
  - ESI 6546 Stochastic Modeling and Analysis
  - EGM 7819 Computational Fluid Dynamics
  - EMA 6803 Classical Methods in Computational Materials Science
  - EML 6386 Computational Nanomechanics and Nanomaterials

For information on course content and professional development outcomes, please contact: Dr. S. Balachandar – Newton C. Ebaugh Professor, Distinguished Professor, Department of Mechanical & Aerospace Engineering .

Solar Energy

Designed to prepare students for careers related to solar technologies. Areas of emphasis include solar energy characteristics, availability, collection, storage, conversion, use as heat, refrigeration, thermal electric, photovoltaic conversion, solar radiation heat transfer, advanced solar reactors, concentrated solar energy, solar-thermal-chemical conversion processes, and energy conversion.

- Required Coursework:
  - EML 5104 Classical and Statistical Thermodynamics
- Elective Coursework, choose two:
  - EML 6417 Solar Energy Utilization
  - EML 6451 Energy Conversion
  - EML 6157 Radiation Heat Transfer

For information on course content and professional development outcomes, please contact: Dr. Jonathan Scheffe – Associate Professor, Department of Mechanical & Aerospace Engineering.

Sustainable and Resilient Energy Engineering

This certificate provides a comprehensive educational experience for engineering students interested in advanced energy generation, storage, grid resiliency technologies, and end-use sectors. This is an important step for development of the energy workforce for this critical industry, and by working closely with industry partners this will ensure that the student experience reflects the future needs of energy. This program enables specialized experience for graduate students in College of Engineering that showcases their interest and enhances their educational experience. At the completion of this certificate program, students will demonstrate proficiency and improvement in their knowledge and understanding of sustainable and resilient energy systems, critical thinking skills, and communication, both written and oral.

Required Coursework, choose three:

- EML 5465 Energy Management for Mechanical Engineers
- EML 5605 Advanced Refrigeration
- EML 5516 Design of Thermal Systems
- EML 6451 Energy Conversion
- EML 6417 Solar Energy Utilization
- EML 6466 Industrial Energy Management
- EML 6606 Advanced Air Conditioning

For information on course content and professional development outcomes, please contact: Dr. Jonathan Scheffe – Associate Professor, Department of Mechanical & Aerospace Engineering.

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