

MASTER OF SCIENCE IN AUTONOMOUS SYSTEMS AND ROBOTICS

The master of science degree program advances knowledge through post-baccalaureate coursework. The program requires 32 credit hours. Students have the option of completing a thesis based on up to eight credit hours of research (MMAE 591) with the approval of a thesis adviser, or completing the program with courses, which may include up to six credit hours of projects (MMAE 594 or MMAE 597). In line with the department's approach to its graduate programs, a student has considerable flexibility, in consultation with their adviser, in formulating an M.S. program. Registration and 80%-class session attendance—required for a passing grade—in the Seminar course MMAE 593 is required of all M.S. graduate students (Non-thesis or Thesis) and Ph.D. students. A satisfactory grade is required, in each semester of full-time enrollment, to fulfill degree requirements.

Before completion of the first semester of graduate study, full-time students should select a permanent adviser. Graduate students pursuing the M.S. degree on a part-time basis should select a permanent adviser before registering for their twelfth credit hour. The student, in consultation with the adviser, prepares a program of study that reflects individual needs and interests. The adviser as well as the department's graduate studies committee and the department chair must approve this program. Students with the thesis option are required to pass an oral comprehensive examination on their thesis and related topics. The examination committee consists of at least three appropriate faculty members who are nominated by the thesis adviser and appointed by the department's graduate studies committee.

Admissions Requirements: GPA 3.0, GRE 300, TOEFL - according to university minimum standards and B.S. Degree in Mechanical Engineering, Aerospace Engineering, Electrical Engineering¹, Physics, Industrial Engineering¹, Computer Science¹ or Mathematics¹.

¹Requires the following course (or equivalent) to be taken prior to first term: MMAE 305 – Dynamics

Master of Science in Autonomous Systems and Robotics (Coursework Only Option)

| Requirement | Credits |
|--------------------------|---------|
| Minimum Credits Required | 32 |
| Maximum 400-Level Credit | 9 |
| Maximum 700-Level Credit | 6 |

| Code | Title | Credit Hours |
|---|------------------------|--------------|
| Required Courses (9) | | |
| MMAE 501 | Engineering Analysis I | 3 |
| MMAE 541 | Advanced Dynamics | 3 |
| MMAE 543 | Modern Control Systems | 3 |
| Autonomous Systems and Robotics (ASR) Electives (23) | | |
| Select 23 credit hours from the following: | | 23 |

| | | |
|---------------------------|--|-----------|
| MMAE 410 | Aircraft Flight Mechanics | 3 |
| MMAE 411 | Spacecraft Dynamics | 3 |
| MMAE 445 | Computer-Aided Design | 3 |
| MMAE 500 | Data Driven Modeling | 3 |
| MMAE 502 | Engineering Analysis II | 3 |
| MMAE 539 | Robotic Motion Planning | 3 |
| MMAE 540 | Robotics | 3 |
| MMAE 545 | Advanced CAD/CAM | 3 |
| MMAE 549 | Optimal Control | 3 |
| MMAE 550 | Optimal State Estimation | 3 |
| MMAE 552 | Introduction to the Space Environment | 3 |
| MMAE 555 | Introduction to Navigation Systems | 3 |
| MMAE 594 | Project for Master of Engineering Students | 1-3 |
| MMAE 597 | Special Topics | 1-3 |
| ECE 505 | Applied Optimization for Engineers | 3 |
| ECE 565 | Computer Vision and Image Processing | 3 |
| ECE 566 | Machine and Deep Learning | 3 |
| ECE 567 | Statistical Signal Processing | 3 |
| CS 557 | Cyber-Physical Systems Security and Design | 3 |
| CS 584 | Machine Learning | 3 |
| MATH 484 | Regression | 3 |
| MATH 545 | Stochastic Partial Differential Equations | 3 |
| MATH 554 | Modern Methods in Discrete Applied Mathematics | 3 |
| MATH 564 | Applied Statistics | 3 |
| MATH 574 | Bayesian Computational Statistics | 3 |
| MATH 574 | Bayesian Computational Statistics | 3 |
| Total Credit Hours | | 32 |

¹ A course may not be chosen if it is already being applied to the ASR elective course requirement.

Master of Science in Autonomous Systems and Robotics (Thesis Option)

| Requirement | Credits |
|--------------------------|---------|
| Minimum Credits Required | 32 |
| Maximum 400-Level Credit | 9 |
| Maximum 700-Level Credit | 6 |

| Code | Title | Credit Hours |
|-----------------------------|------------------------|--------------|
| Required Courses (9) | | |
| MMAE 501 | Engineering Analysis I | 3 |
| MMAE 541 | Advanced Dynamics | 3 |

| | | |
|--|--|----------------|
| MMAE 543 | Modern Control Systems | 3 |
| Autonomous Systems and Robotics (ASR) Electives | | (15-17) |
| Select 15-17 credit hours from the following: | | 15-17 |
| MMAE 410 | Aircraft Flight Mechanics | 3 |
| MMAE 411 | Spacecraft Dynamics | 3 |
| MMAE 445 | Computer-Aided Design | 3 |
| MMAE 500 | Data Driven Modeling | 3 |
| MMAE 502 | Engineering Analysis II | 3 |
| MMAE 539 | Robotic Motion Planning | 3 |
| MMAE 540 | Robotics | 3 |
| MMAE 545 | Advanced CAD/CAM | 3 |
| MMAE 549 | Optimal Control | 3 |
| MMAE 550 | Optimal State Estimation | 3 |
| MMAE 552 | Introduction to the Space Environment | 3 |
| MMAE 555 | Introduction to Navigation Systems | 3 |
| MMAE 597 | Special Topics | 1-3 |
| CS 584 | Machine Learning | 3 |
| ECE 505 | Applied Optimization for Engineers | 3 |
| CS 557 | Cyber-Physical Systems Security and Design | 3 |
| ECE 565 | Computer Vision and Image Processing | 3 |
| ECE 566 | Machine and Deep Learning | 3 |
| ECE 567 | Statistical Signal Processing | 3 |
| MATH 484 | Regression | 3 |
| MATH 564 | Applied Statistics | 3 |
| MATH 569 | Statistical Learning | 3 |
| MATH 574 | Bayesian Computational Statistics | 3 |
| Thesis Research | | (6-8) |
| MMAE 591 | Research and Thesis M.S. | 6-8 |

¹ A course may not be chosen if it is already being applied to the ASAR elective course requirements.