

# 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 Engineering<sup>1</sup>, Physics<sup>2</sup>, Industrial Engineering<sup>1,2</sup>, or Mathematics<sup>1,2</sup>.

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

<sup>2</sup>Requires the following course (or equivalent) to be taken prior to or in the first term: MMAE 443 – System Analysis and Control

## 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
<b>Required Courses (9)</b>		
MMAE 501	Engineering Analysis I	3
MMAE 541	Advanced Dynamics	3
MMAE 543	Modern Control Systems	3
<b>Autonomous Systems and Robotics (ASR) Electives (23)</b>		
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	Intro to the Space Environment	3
MMAE 555	Intro to Navigation Systems	3
MMAE 594	Proj for Master of Engg Stud	1-3
MMAE 597	Special Topics	1-3
ECE 505	Applied Optimization Engrgs	3
ECE 565	Compt Vision Image Processing	3
ECE 566	Machine and Deep Learning	3
ECE 567	Statistical Signal Processing	3
CS 557	Cyber-Physical Sys Sec/Dsgn	3
CS 584	Machine Learning	3
MATH 484	Regression	3
MATH 545	Stochastic Partial Diff Equatn	3
MATH 554	Discrete Applied Math II	3
MATH 564	Applied Statistics	3
MATH 574	Bayesian Computational Stats	3
MATH 574	Bayesian Computational Stats	3

**Total Credit Hours 32**

<sup>1</sup> 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
<b>Required Courses (9)</b>		
MMAE 501	Engineering Analysis I	3
MMAE 541	Advanced Dynamics	3
MMAE 543	Modern Control Systems	3
<b>Autonomous Systems and Robotics (ASR) Electives (15-17)</b>		
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	Intro to the Space Environment	3
MMAE 555	Intro to Navigation Systems	3
MMAE 597	Special Topics	1-3
CS 584	Machine Learning	3
ECE 505	Applied Optimization Engrgs	3
CS 557	Cyber-Physical Sys Sec/Dsgn	3
ECE 565	Compt Vision 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 Stats	3
<b>Thesis Research</b>		<b>(6-8)</b>
MMAE 591	Research and Thesis M.S.	6-8

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