



Robotics

Master of Engineering: 30 Credits / 10 Courses

Students pursuing this option must successfully complete 4 core courses, at least 1 ENPM Robotics Programming elective, at least 2 ENPM Robotics specific electives and up to 3 technical electives from the approved list of courses. Students should consult with their advisor prior to registering and have pre-approval for all technical electives. There is no research or thesis required for this degree.

Robotics Core Courses (take four): <i>taken during your first two semesters of study</i>		
ENPM661	Planning for Autonomous Robots	(every spring)
ENPM662	Introduction to Robot Modeling*	(every fall)
ENPM667	Control of Robotic Systems*	(every fall)
ENPM673	Perception for Autonomous Robots	(every spring)

Robotics Programming Elective (take at least one): <i>recommended for your first year of study</i>		
ENPM809Y	Introductory Robot Programming*	(every fall)
ENPM809E	Python Applications for Robotics**	(every spring)
ENPM808X	Software Development for Robotics [ENPM809Y]	(every fall)

*ENPM809Y is a pre-requisite for ENPM808X, and cannot be taken concurrently or subsequently
 ** ENPM809E can't be taken after completion of ENPM808X

Note: Any taken over the 1 required count as other Robotics or technical electives

Robotics Electives (take at least two): <i>recommended for your first year of study</i>		
ENPM690	Robot Learning	(every spring)
ENPM640	Rehabilitation Robotics	(every fall)
ENPM645	Human Robot Interaction	(every fall)
ENPM692	Manufacturing and Automation	(every spring)
ENPM663	Building a Manufacturing Robot Software System	(every spring)
ENPM809T	Autonomous Robots	(every spring)

Note: Any taken over the 2 required count as technical electives

Pre-approved Technical Electives (Choose up to three): <i>recommended for consideration in your second year of study</i>	
Technical Elective Notes	
1. Additional ENPM Robotics Electives can also be counted as Technical Electives	
ENPM Electives	
ENPM808A Introduction to Machine Learning	ENPM809F Internet of Things
ENPM808W Data Science	ENPM809N Data Mining
ENPM808O AI-based Software Systems	ENPM691 Hacking of C programs and Unix Binaries
ENPM611 Software Engineering	ENPM808Y Fundamental Concepts of AI and Machine Learning, and their Applications
ENPM809K Fundamentals for Artificial Intelligence and Deep Learning Framework	ENPM808 (3 credits) Advanced Topics in Engineering

*NOTE: Any courses not listed above must be approved by the Senior Academic Advisor **PRIOR** to registration.*

KEY	
Online Option *	(offering information)
[Prerequisite course]	

Non-ENPM Technical Electives

NOTE: All offerings are tentative and subject to change.



Robotics

Non-ENPM Technical Elective Notes

1. For non-ENPM courses, permission must be obtained from the professor before enrolling to confirm the student has the appropriate background to be successful in the course
2. MAGE cannot guarantee a spot in a non-ENPM course. Students should have back-up courses prepared if they are interested in non-ENPM courses

Vision and Perception

CMSC733 Computer Processing of Pictorial Information

CMSC734 Information Visualization

ENEE631 Digital Image and Video Processing

ENEE633/CMSC828C Statistical Pattern Recognition

ENEE731 Image Understanding

*CMSC426 covers content very similar to ENPM673 and will not be approved towards the M.Eng. degree

Performance Analysis and Design Methods

ENME600 Engineering Design Methods

ENME695 Failure Mechanisms and Reliability

ENAE697 Space Human Factors and Life Support

ENSE621 Systems Engineering Concepts and Processes: A Model-Based Approach

Optimization and Algorithms

CMSC 651 Analysis of Algorithms

CMSC712 Distributed Algorithms and Verification

CMSC722 Artificial Intelligence Planning

ENAE681 / ENME610 Engineering Optimization

ENME607 Engineering Decision Making

ENEE662 Convex Optimization

Modeling, Systems and Control

ENME605 Advanced Systems Control

ENME664 Dynamics

ENME808T Network Control Systems

ENEE660 System Theory

ENEE661 Nonlinear Control Systems

ENEE664 Optimal Control

ENEE765 Adaptive Control

ENAE646 Advanced Dynamics

ENAE743 Applied Nonlinear Control

Specialty

ENME489L Bio-Inspired Robotics

ENME746 Medical Robotics

ENSE698E Sensor Systems

ENAE 692 Introduction to Space Robotics

ENAE788X Planetary Surface Robots

ENCE622 Construction Automation & Robotics