MARYLAND APPLIED GRADUATE ENGINEERING

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): *taken during your first two semesters of study*	
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): *recommended for your first year of study*	
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 is not recommended to 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): *recommended for your first year of study*	
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)
ENPM808Z Cognitive Robotics	(Spring 2024, varies)

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

Pre-approved Technical Electives (Choose up to three): *recommended for consideration in your second year of study*
Technical Elective Notes
1.   Additional ENPM Robotics Electives can also be counted as Technical Electives

ENPM Electives

ENPM808A Introduction to Machine Learning* (every fall)
ENPM808W Data Science* (every fall)
ENPM808O AI-based Software Systems* (every other fall)
ENPM611 Software Engineering* (every fall and spring)
ENPM809K Fundamentals for Artificial Intelligence and Deep Learning Framework* (every fall)
ENPM809F Internet of Things* (varies)

ENPM691 Hacking of C programs and Unix Binaries* (every fall and spring)
ENPM808E Underwater Robot Perception [ENPM673] (Spring 2024 - varies)
ENPM808Y Fundamental Concepts of AI and Machine Learning, and their Applications* (TBD, varies)
ENPM808 (3 credits) Advanced Topics in Engineering*

*NOTE: Any courses not listed above must be approved by the Senior Academic Advisor **PRIOR** to registration.*
ENPM808 eligibility and application information can be found at https://mage.umd.edu/enpm808-advanced-topics-engineering

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

Non-ENPM Technical Electives
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

NOTE: All offerings are tentative and subject to change.

Robotics

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[ENEE620]/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
CMSC818B Decision-Making Robotics
CMSC828I Advanced Techniques in Visual Learning and Recognition
ENME413 Bio-Inspired Robotics
ENME746 Medical Robotics
ENSE698E Sensor Systems
ENAE692 Introduction to Space Robotics
ENAE788X Planetary Surface Robots
ENCE622 Construction Automation & Robotics

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