

Focus Area in Mechanical Engineering

Robotics and Autonomous Systems

Revised on March 22, 2022

Autonomy is a multidisciplinary field encompassing robotics, dynamic systems, cyber-physical systems, sensing, control, and network science. Applications include self-driving cars, medical and assistive robots for surgery and rehabilitation, industrial co-robots for human-robot collaboration, unmanned aerial, ground, and underwater vehicles, and among others. Due to its broad applications, and recent advances in technology that allow its adoption in a broad range of consumer, industrial, and research products and applications, autonomy is rapidly becoming a core subject of academic study and is being widely adopted in industrial manufacturing systems and autonomous vehicles. Industries have also invested substantially in funding for the development of connected and autonomous vehicles (CAV) technologies.

Semester	Course	Session	SH	Pre-/Co-Requisites
4 (Spring)	ME:4111 Scientific Computing and Machine Learning	F,S	3	MATH:2560
6 (Spring)	ME:4120 Advanced Linear Control Systems	S	3	ME:3600 or (MATH:2550, MATH:2560, and ENGR:2710)
6 (Spring)	Elective		3	
7 (Fall)	Elective		3	
7 (Fall)	Elective		3	
8 (Spring)	Elective		3	
8 (Spring)	Elective		3	

Autonomy Electives (minimum of 2 required)	Session	SH	Pre-/Co-Requisites
ME:4116 Manufacturing Processes, Simulations and Automation	F	3	ME:2300 or ENGR:2760
ME:4140 Modern Robotics and Automation	S	3	ENGR:2710
ME:4145 Industrial Internet of Things	F	3	ME:3351
ME:4150 Artificial Intelligence in Engineering	F	3	ME:4111
ME:4175 Computational Naval Hydrodynamics	S	3	ENGR:2510
ME:4176 Experimental Naval Hydrodynamics	S	3	ENGR:2510
ME:5114 Nonlinear Control in Robotic Systems	S	3	Any of ME:3600, ME:4113, ME:4120, CBE:4105, ECE:3600
ME:6115 Cooperative Autonomous Systems	F	3	Any of ME:3600, ME:4113, ME:4120, CBE:4105, ECE:3600
ME:5120 Vehicle System Dynamics	S ¹	3	ENGR:2710
ME:5170 Data-driven Analysis in Engineering Mechanics	F ²	3	ENGR:2750 & ME:4111
General Electives	Session	SH	Pre-/Co-Requisites
ENGR:2730 Computers in Engineering	F,S	3	ENGR:1300
ME:4024 Product Design and Realization	S	3	ME:2200 or ENGR:2760, ENGR:2750
ME:4110 Computer Aided Engineering	S	3	ENGR:2750, ME:3052
ME:4125 Biomimetic Fluid Dynamics	S ²	3	ENGR:2510
ME:4153 Fundamentals of Vibrations	F	3	ENGR:2750
ME:4186 Enhanced Design Experience	S	3	ME:4086
ME:5150 Intermediate Mechanics of Deformable Bodies	F	3	ENGR:2750
ME:5154 Intermediate Kinematics and Dynamics	F	3	ENGR:2710
ME:5300 Uncertainty Quantification and Design Optimization	F ¹	3	ENGR:2750 & STAT:2020/ME:3052
ECE:5550 Internet of Things	S	3	ENGR:2730

For further information, please contact: Venanzio Cichella (venanzio-cichella@uiowa.edu), Department of Mechanical Engineering, the University of Iowa, Iowa City, IA 52242.

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<p>Flexible Elective – At most, one general elective may be selected from:</p> <ul style="list-style-type: none"> (i) engineering courses that are required in another (non-ME) program, (ii) engineering courses at an upper level (e.g. ME courses numbered 4100 and above), (iii) mathematics, physics or chemistry courses at a more advanced level than those required in the ME curriculum, except MATH:3800 (iv) independent investigation in a mechanical engineering subject area, or (v) courses that appear on a list of approved courses found at engineering.uiowa.edu/mechanical-engineering-undergraduate-program/focus-areas 	Any	3	
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¹offered in even years only.

²offered in odd years only.

Substitutions are discouraged and will only be approved under exceptional circumstances requiring the approval of the advisor, FA coordinator and DEO.

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