ENGINEERING: AUTONOMY AND ROBOTICS, MENG

for the degree of Master of Engineering in Engineering, Autonomy and Robotics Concentration

The Master of Engineering (MEng) in Engineering, Autonomy and Robotics Concentration is a professionally oriented degree program for students whose primary intent is a career in industry or government.   This degree differs from the Master of Science (MS) degree in that it is a professionally oriented master's degree that is not a pathway to a doctoral program. The Major in Engineering for the M.Eng. degree requires the selection of an interdisciplinary concentration, which must be identified at the time of application.

Available concentrations are:

- Aerospace Systems Engineering (http://catalog.illinois.edu/graduate/engineering/engineering-meng/aerospace-systems/)
- Autonomy and Robotics (p. 1)
- Digital Agriculture (http://catalog.illinois.edu/graduate/engineering/engineering-meng/digital-agriculture/)
- Energy Systems (http://catalog.illinois.edu/graduate/engineering/engineering-meng/energy-systems/)
- Instrumentation and Applied Physics (http://catalog.illinois.edu/graduate/engineering/engineering-meng/instrumentation-applied-physics/)
- Plasma Engineering (http://catalog.illinois.edu/graduate/engineering/engineering-meng/plasma-engineering/)

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For additional details and requirements, refer to the department's website (https://autonomyandrobotics.grainger.illinois.edu/) and the Graduate College Handbook (https://grad.illinois.edu/gradhandbook/).

Code	Title	Hours
Core Coursework		**12**
ME 445	Introduction to Robotics	
ECE 484	Principles of Safe Autonomy	
CS 588	Autonomous Vehicle System Engineering	
Select one of the following:		4
Control and Dynamics		
ECE 486	Control Systems	
SE 422	Robot Dynamics and Control	
Optimization		
AE 504	Optimal Aerospace Systems	
ECE 490	Introduction to Optimization	
Hardware Systems		
ME 451	Computer-Aided Mfg Systems	
Artificial Intelligence and Perception		
CS 440	Artificial Intelligence	
CS 543	Computer Vision	
ECE 544	Topics in Signal Processing	
Design and Applications		
CS 465	User Interface Design	
Professional Development Course		**4**
ENG 573	Capstone Project	
ENG 572	Professional Practicum	
Other advisor-approved courses.		
Additional Coursework		
Electives may be selected from the course list, with advisor approval. This list includes courses in Control and Dynamics, Optimization, Hardware Systems, Artificial Intelligence and Perception, Design and Applications.		12
Total Hours		**32**

Other Requirements and Conditions (may overlap)

Requirement	Description
A minimum of 20 credit hours must be taken from the University of Illinois Urbana-Champaign campus.	
A minimum of 12 500-level credit hours. ENG 572 and ENG 573 may not be used to satisfy this requirement.	
No courses used to fulfill any degree requirement may be taken using the "Credit/No Credit" option.	
Minimum GPA: 3.0	

Elective Course List

Enrollment in these courses depends on course availability.

Code	Title	Hours
ARTIFICIAL INTELLIGENCE & PERCEPTION		
CS 440/ECE 448	Artificial Intelligence	3 or 4
CS 446/ECE 449	Machine Learning	3 or 4
CS 447	Natural Language Processing	3 or 4
CS 543	Computer Vision	4
CS 546	Advanced Topics in Natural Language Processing	4
ECE 534	Random Processes	4
ECE 543	Statistical Learning Theory	4
ECE 561	Statistical Inference for Engineers and Data Scientists	4
ECE 566	Computational Inference and Learning	4
IE 534/CS 547	Deep Learning	4
SE 524	Data-Based Systems Modeling	4
CONTROL & DYNAMICS		
AE 454	Systems Dynamics & Control	4
AE 554/TAM 516	Dynamical Systems Theory	4
AE 555/SE 521	Multivariable Control Design	4
AE 556	Robust Control	4
ECE 486	Control Systems	4
ECE 515/ME 540	Control System Theory & Design	4

ECE 517	Nonlinear & Adaptive Control	4
ECE 528/ME 546/ SE 520	Analysis of Nonlinear Systems	4
ECE 553	Optimum Control Systems	4
ECE 555	Control of Stochastic Systems	4
ECE 557	Geometric Control Theory	4
ECE 568	Model & Cntrl Electromech Syst	4
ECE 573	Power System Control	4
ME 460	Industrial Control Systems	4
ME 561	Convex Methods in Control	4
ME 562	Robust Adaptive Control	4
SE 422/ECE 489/ ME 446	Robot Dynamics and Control	4
SE 424	State Space Design for Control	3
SE 525	Control of Complex Systems	4
TAM 412	Intermediate Dynamics	4
DESIGN & APPLICATIONS		
CS 465	User Interface Design	4
CS 565	Human-Computer Interaction	4
SE 400	Engineering Law	3 or 4
HARDWARE SYSTEMS		
CS 431	Embedded Systems	3 or 4
ECE 437	Sensors and Instrumentation	3
ME 451	Computer-Aided Mfg Systems	3 or 4
ME 452	Num Control of Mfg Processes	3 or 4
ME 455	Micromanufacturing Process & Automation	4
ME 461	Computer Cntrl of Mech Systems	0 to 4
SE 420	Digital Control Systems	4
SE 423	Mechatronics	3
OPTIMIZATION		
AE 504	Optimal Aerospace Systems	4
CS 544	Optimiz in Computer Vision	4
ECE 490	Introduction to Optimization	4
ECE 580	Optimiz by Vector Space Methds	4
IE 411	Optimization of Large Systems	3 or 4
IE 519/CS 586	Combinatorial Optimization	4
IE 521	Convex Optimization	4
SOFTWARE SYSTEMS		
CS 424	Real-Time Systems	3 or 4
CS 425/ECE 428	Distributed Systems	3 or 4
CS 427/CSE 426	Software Engineering I	3 or 4
CS 428/CSE 429	Software Engineering II	3 or 4
CS/ECE 438	Communication Networks	3 or 4
CS 461/ECE 422	Computer Security I	4
CS 476	Program Verification	3 or 4
CS 477/ECE 478/ CSE 408	Formal Software Development Methods	3 or 4
CS 484	Parallel Programming	3 or 4
ECE 408	Applied Parallel Programming	4

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The learning objectives of the proposed Concentration in Autonomy and Robotics include professionally-oriented competence in the application of software systems, electronics, tools for algorithm design and machine learning, and physics-based dynamics, control and sensor systems to the integration of autonomy in robotic systems.

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Admission

Students with bachelor's or master's degrees in engineering or related fields will be considered for admission if they have a grade point average of at least 3.00 (A = 4.00) for the last two years of undergraduate study. Admissions are considered for the fall term only. Full details of admission requirements are on the Autonomy and Robotics (https://autonomy.illinois.edu/meng/) concentration website.

All applicants whose native language is not English are required to submit TOEFL (http://www.toefl.org/) or International English Language Testing System (IELTS) (http://www.ielts.org/) scores as evidence of English proficiency. Minimum admission requirements (https://grad.illinois.edu/admissions/instructions/04c/) are set by the Graduate College.

Financial Aid

Students in concentrations under the MEng in Engineering major are not eligible for Board of Trustees (BOT) tuition-waiver generating assistantships at the University of Illinois.

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Autonomy MEng Program

Program Director: Geir E. Dullerud
Autonomy Center website (https://autonomy.illinois.edu/)

Admissions Contact: Laura Reiter (lreite2@illinois.edu)

403-A2 Engineering Hall, 1308 W Green St, Urbana, Illinois 61801
(217) 300-6574

Advising Contact: Pat Grenda (jpgrenda@illinois.edu)

1308 W. Main Street, Urbana, Illinois 61801
(217) 265-6265

Grainger College of Engineering

Grainger College of Engineering website (https://grainger.illinois.edu/)

Admissions

Overview of Autonomy and Robotics MEng Admissions & Requirements Graduate College Admissions & Requirements (https://grad.illinois.edu/admissions/apply/)