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Course	Instructor(s)	Credits	Robotics Requirement	Enforced Prerequisites	Advisory Prerequisites	Typically Offered	Enrollment Notes
ENGR 100.850: Robot Mechanisms	Yeo, Derrick	4	CoE Core: Introduction to Engineering			Fall, Winter	
ROB 101: Computational Linear Algebra	Kathuria, Tribhi Tian, Yulun	4	Linear Algebra			Fall, Winter	Section 012 is reserved for first and second-year students. Section 011 is open for juniors and seniors. Once seats in 011 have been filled, interested students should join the Wolverine Access waitlist. After all students have had a chance to enroll via their orientation appointment, we will begin issuing permissions to students from the waitlist (likely mid-August).
ROB 201: Calculus for the Modern Engineer	Grizzle, Jessy	4	Student-dependent, speak with an academic advisor	ROB 101 or MATH 214 or MATH 217; (No OP/F). Minimum grade requirement of “C” for enforced prerequisite.		Fall, Winter	
ROB 204: Intro to Human-Robot Systems	Mavrogiannis, Christoforos	4	Teamwork in Robotics	(ROB 102 or ENGR 101 or EECS 183 or ENGR 151 or EECS 180); and ENGR 100; and preceded or accompanied by: (ROB 101 or MATH 214 or MATH 217 or MATH 417 or MATH 419). Minimum grade requirement of “C-” for enforced prerequisite.		Fall, Winter	All seats are reserved for robotics majors. Remaining seats will become available at 8AM on Monday, April 14th.
ROB 311: How to Build Robots and Make Them Move	Rouse, Elliott	4	Robotics Undergrad Core	MECHENG 240 or BIOMEDE 231 or ROB 215 or EECS 216. Minimum grade requirement of “C-” for enforced prerequisite.	(PHYSICS 240 or PHYSICS 260) and (EECS 215 or EECS 270 or BIOMEDE 211)	Fall	All seats are reserved for robotics majors. Remaining seats will become available at 8AM on Friday, April 10th.
ROB 314: Introduction to Robot Controls	Barton, Kira	4	Robotics Undergrad Core	ROB 215 or MECHENG 240; No OP/F. Minimum grade requirement of “C” for enforced prerequisite. Students who have completed ROB 415 or ROB 498: Robot Controls will not be eligible to receive credit in ROB 314.		Fall	All seats are reserved for robotics majors. Remaining seats will become available at 8AM on Friday, April 10th.
ROB 320: Robot Operating Systems	Kathuria, Tribhi	4	Robotics Undergrad Core	EECS 280, (MATH 116 or ROB 201), and (ROB 101 or MATH 214 or MATH 217 or MATH 417 or MATH 419). Minimum grade requirement of “C-” for enforced prerequisite. Credit Exclusions: Student may only receive credit for one course, ROB 320 or ROB 380 (EECS 367) or ROB 511	EECS 201, (EECS 370 or EECS 281), and (MATH 215 or MATH 216)	Winter	All seats are reserved for robotics majors. Remaining seats will become available at 8AM on Friday, April 10th.
ROB 330: Localization, Mapping, and Navigation	Skinner, Katie	4	Robotics Undergrad Core	EECS 280 and (IOE 265 or EECS 301 or BIOMEDE 241) and (ROB 101 or MATH 214 or MATH 217 or MATH 417 or MATH 419). Minimum grade requirement of “C-” for enforced prerequisite.		Fall	All seats are reserved for robotics majors. Remaining seats will become available at 8AM on Friday, April 10th.
ROB 340: Human-Robot Interaction	Du, Xiaoxiao	4	Robotics Undergrad Core	ROB 204. Minimum grade requirement of “C-” for enforced prerequisite.	IOE 265 or BIOMEDE 241 or EECS 301	Second offering	All seats are reserved for robotics majors. Remaining seats will become available at 8AM on Friday, April 10th. Requests for enrolling in ROB 204 and ROB 340 concurrently will not be approved.
ROB 380 / EECS 367: Introduction to Autonomous Robotics	Jenkins, Chad	4	Does not fulfill an undergraduate requirement ROB majors should enroll in ROB 320	EECS 281 and (MATH 214 or MATH 217 or MATH 296 or MATH 417 or MATH 419 or ROB 101); No OP/F. Enrollment in one minor elective allowed for Computer Science Minors. Minimum grade requirement of “C” for enforced prerequisite. Credit Exclusions: Only 1 course may earn credit from ROB 320, ROB 380, ROB 511, and EECS 367.		Winter	
ROB 450: Robotics Capstone	Formosa, Greg	4	Major Design Elective	Junior standing or senior standing and TCHNCLCM 350 and (ONE of ROB 310 or ROB 311 or ROB 320 or ROB 330 or ROB 340); No OP/F. Minimum grade requirement of “C” for enforced prerequisites.		Fall, Winter	
ROB 474 / AEROSP 495.004: Uncrewed Aerial Systems	Gaskell, Peter	4	Upper Level Elective	[ROB 310 or ({EECS 215 or BIOMEDE 211} & EECS 280)] and (ROB 215 or MECHENG 240 or BIOMEDE 231) and (ROB 320 or ROB 330); No OP/F. Minimum grade requirement of “C” for enforced prerequisite. Credit Exclusions: Only one course may earn credit from ROB 474 and ROB 574.	Students should have prior coursework in control theory.	Fall	

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ROB 490: Directed Study	Variable	1-6	General Elective, Flexible Techical Elective by Petition Only			Fall, Winter	Students interested in enrolling in ROB 490: Directed Study will need to complete the ROB 490 Proposal Form. Students will automatically receive an email with their submitted responses and will be instructed, via the submission confirmation page, to forward that email to the faculty member who will be supervising their work. Once confirmed, students will send the email thread to robotics-sso@umich.edu. We will confirm and issue the student a permission to enroll.
ROB 498.002: 3D Robot Perception	Bucher, Bernadette	3	Upper Level Elective		No prior computer vision experience is required, and many components will be redundant with any standard introduction to computer vision course. Students are expected to be (or become on their own time) proficient in Python. Prior courses in linear algebra, calculus, and probability theory are highly recommended.	Winter	Undergraduate offering, Graduate students should enroll in ROB 599 offering
ROB 498.005/006: Design HRI	Alves-Oliveira,Patricia	4	Upper Level Elective		There are no formal prerequisites but knowledge on human-robot systems (e.g., ROB204) are recommended. Basic knowledge on programming (e.g., ROB 102), and fabrication (e.g., ROB 330) are good to have but not necessary.		Undergraduate offering, Graduate students should enroll in ROB 599 offering
ROB 498.009/010: Intro to Milli-, Micro-, and Nanorobotics	Ceron,Steven	4	Upper Level Elective		PHYSICS 240. Useful but not required: mechatronics, programming.		Only open to undergraduate students
ROB 498.411/412: Advanced Fabrication and Design	Aubin,Cameron Formosa,Greg	4	Upper Level Elective		None for this inaugural semester, but some expectation of some proficiency in hands-on building/designing of robots, mechatronics, circuits, controls. Except, should be Junior standing or higher!		Only open to undergraduate students
ROB 501: Mathematics for Robotics	Vasudevan, Ram	4	Robotics Grad Core	Graduate standing or permission of instructor.	Differential equations and matrix algebra recommended.	Fall	
ROB 502: Programming for Robotics	Corso, Jason	3	Elective			Fall	If you are interested in enrolling, please add yourself to the waitlist. Cannot be taken concurrently with ROB 550. Cannot be taken after ROB 550.
ROB 510 / EECS 567 / MFG 567 / MECHENG 567: Robot Kinematics and Dynamics	Gregg, Robert	3	Acting		Graduate standing or permission of instructor	Winter	
ROB 511: Mobile Manipulation Systems	Jenkins, Chad	3	Acting; Reasoning	Credit exclusions: Only 1 course may earn credit from ROB 320, ROB 380, ROB 511, and EECS 367.	Linear Algebra (Math 214, MATH 217, MATH 417, MATH 419 or equivalent) and Programming (EECS 280, EECS 402, ROB 502 or equivalent)	Winter	
ROB 535: Self Driving Cars: Perception and Control	Papalia, Alan	3	Upper Level Elective Acting; Sensing		Students are recommended to have a background in linear algebra & Differential equations. Programming skills in Python & MATLAB, Some C++	Fall	Cross-listed with NAVARCH 565, Enrollment through NAME Department
ROB 550: Robotic Systems Laboratory	Gaskell, Peter Ding, Yanran	4	Robotics Grad Core	Graduate standing or permission of instructor.		Fall, Winter	If you are interested in enrolling, please add yourself to the waitlist. Incoming robotics graduate students will be prioritized for enrollment.
ROB 560: Bio-Inspired Robotic Design	Moore, Talia	4	Upper Level Elective Acting		ROB 550	Winter	
ROB 574 / AEROSP 495.004: Uncrewed Aerial Systems	Gaskell, Peter	4	Acting; Sensing	Graduate standing Credit Exclusions: Only one course may earn credit from ROB 474 and ROB 574.	Students should have prior coursework in control theory.	Fall	Graduate offering, Undergraduate students should enroll in ROB 474
ROB 590: Directed Study	Variable	3	A minimum of 3 credits (and a maximum of 6 credits) of ROB 590 is required to fulfill the Robotics MS degree requirements.				A ROB 590 directed study project is research supervised by a robotics faculty member (core or affiliate). You must have your research advisor's permission (verbal or written) before registering for ROB 590. The Proposal Form should be submitted by the drop/add deadline. More details here.
ROB 599.002: 3D Robot Perception	Bucher, Bernadette	3	Sensing		No prior computer vision experience is required, and many components will be redundant with any standard introduction to computer vision course. Students are expected to be (or become on their own time) proficient in Python. Prior courses in linear algebra, calculus, and probability theory are highly recommended.		Graduate offering, Undergraduate students should enroll in ROB 498 offering
ROB 599.005/006: Design HRI	Alves-Oliveira,Patricia	4	Elective		There are no formal prerequisites but knowledge on human-robot systems (e.g., ROB204) are recommended. Basic knowledge on programming (e.g., ROB 102), and fabrication (e.g., ROB 330) are good to have but not necessary.		Graduate offering, Undergraduate students should enroll in ROB 498 offering

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ROB 599.003: Advanced Topics in Robot Perception	Corso, Jason	3			Students are expected to have a strong background in machine learning, computer vision, artificial intelligence, and related topics		The course has a special application process and you will only be able to enroll to the waitlist at the moment. Please proceed to https://forms.gle/qzWEw7SJxyLaBsfm8 for the application process
ROB 599.013: Computational Symmetry in AI & Robotics	Ghaffari, Maani	3	Sensing or reasoning		NA 500/ROB 501/EECS 501 or ECE 560, or equivalent graduate-level math courses for CoE students. Mathematical maturity and Python programming.	Meet-together with NAVARCH 599, MATH 559, PHYSICS 590, second ROB offering	Students who cannot register should reach out to the instructor for a permisison to enroll.
ROB 690: Master's Advanced Research	Variable						A ROB 690 directed study project is faculty-supervised research that culminates in a submitted and graded document based on the student's advanced research that builds on earlier research completed in six credits of ROB 590. The research advisor should email their approval for the student to register for ROB 690 to robotics-sso@umich.edu at which time the Student Services Office (SSO) will issue the student permission to enroll. The Proposal Form should be submitted by the drop/add deadline. More details here.