Robotics MS Requirements

Minimum total of 30 credits

21 course credits (12 required, 6 elective, 3 remaining)

2-3 seminar credits (2 for project or mixed option, 3 for thesis students)

6 credits of thesis *or* project *or* "mixed option" (combination of project-intensive courses, internship, or project)

	Course Number	Course Title	Cross-listings	Offered
	CORE COURSE REQUIREMENT (Complete at least one course from each core area):			
	Robot Mechanics Core Area (Required):			
	ROBOT 6000	Robotics I: Mechanics (formerly Intro to Robotics)	CS 6310, ECE 6650, ME EN 6220	Fall
	Robot Control Core Area (Required):			
	ROBOT 6100	Robotics II: Control (formerly Intro to Robot Control)	CS 6330, ECE 6651, ME EN 6230	Spring
	Cognition Core Area (Pick one):			
	ROBOT 6200	Motion Planning	CS 6370, ME EN 6225	Spring
	CS 6300	Artificial Intelligence		Fall
	Perception Core Area (Pick one):			
	CS 6640	Image Processing	BME 6640, ECE 6532	Fall
	CS 6320	Computer Vision		Fall
	ELECTIVE COURSE REQUIREMENT: Select 2 classes total from at least two different categories; core courses listed above that are not used to fulfill a core area requirement may also be considered.	**Course Title**	**Cross-listings**	**Offered**
	Robot Mechanics Category Electives:			
	ROBOT 7000	Manipulation and Mobility	ME EN 7230, CS 7310	Spring, odd years
	ROBOT 7010	System ID for Robotics	CS 7320, ME EN 7220	Fall, odd years
	Robot Control Category Electives:			
	ME EN 6200 or ECE 6615	Classical Control Systems		Fall
	ECE 6670	Control of Electric Motors		Spring
	ME EN 6210 or ECE 6652 or CH EN 6203	State Space Control		Spring
	ME EN 7200	Nonlinear Control		Fall, even years
	ME EN 7210	Optimal Control		Spring, even years
	ECE 6570	Adaptive Control		Varies
	Cognition Category:			
	CS 6350	Machine Learning		Fall, Spring
	CS 6958	Robot Learning (currently special topics)		Varies
	Perception Category:			
	CS 7640	Advanced Image Processing		Varies

	CS 6353	Deep Learning for Image Analysis		Fall
	ECE 6530	Digital Signal Processing		Fall
	Human-Robot Interaction Category:			
	CS 6360	Virtual Reality		Fall
	ROBOT 7400	Haptics for VR, Teleoperation, Physical Human-Robot Interaction	ME EN 7240	Fall, odd years
	ROBOT 6400	Neuro-Robotics (will be cross listed with BME 6440)	BME 6440, ECE 6654	Fall
	Robot Design Category:			
	ROBOT 6500	Advanced Mechatronics	ME EN 6240	Spring, even years
	ROBOT 6510	Wearable Robotics		Fall, even years
	ECE 6780 or CS 6780	Embedded System Design		Spring
	ECE 6960	Robotic Millisystems		Fall, odd years
	CS 6956	Medical Robotics (currently special topics)		Spring, even years
	Allied courses (3-4 credits) to reach the 30-credit hour minimum requirement may be chosen from core courses, pre- approved electives, supporting electives, lecture-based engineering/science courses (e.g., excluding seminars, projects, thesis), or approved non-engineering/science courses. Subject to supervisory committee approval.	**Course Title**	**Cross-listings**	**Offered**
	Supporting Elective Category:			
	ME EN 6035	Design of Experiments		Spring
	ME EN 6100	Ergonomics		Fall
	ECE 6540	Estimation Theory		Spring, even years
	CS 6540	Human-Computer Interaction		Fall
	ME EN 6410	Intermediate Dynamics		Spring, even years
	CS 6340	Natural language processing		Fall
	ME EN 6205	System Dynamics		Fall
	SEMINAR REQUIREMENT	**Course Title**	**Cross-listings**	**Offered**
	ME EN 6890, ECE 6900 or CS 7930 (thesis students	Department seminar—Enroll in the department graduate seminar 1 associated with your thesis advis		Fall, Spring
	ROBOT 6800	Robotics Seminar (enroll two semesters for 1 credit each seme	CS 7942, ECE 6868, ME EN 6892	Fall, Spring
	ROBOT 6800	Robotics Seminar (enroll two semesters for 1 credit each seme	CS 7942, ECE 6868, ME EN 6892	Fall, Spring
	THESIS, PROJECT or MIXED OPTION	**(Pick 1 option to equal 6 credits)**		
	ROBOT 6970	Master's Thesis		
	ROBOT 6920	Gradute Project		
	ROBOT 6920 +	Gradute Project + Course Projects or Internship		