

1. EM451 Design of Robotic Elements
2. 3 Credit Hours / 4 Contact Hours
3. Course Director: Prof. Stephen M. Graham
4. Text book: none
5. Specific course information
 - a. This course addresses practical issues concerning the design, fabrication and operation of wheel-driven mobile robots. The objectives of the course are to: (a) Design and fabricate wheel-driven mobile robots to accomplish particular performance objectives, (2) Select typical elements used in robot construction such as electric motors, drive train components, pneumatic components, and sensors, and (3) Develop and test code for a programmable robot controller to incorporate various sensors and enable autonomous operation. The course utilizes a hands-on, project-based approach to learning about robotics.
 - b. Prerequisites: EM371 or ER371 or permission of instructor.
 - c. This course is an elective for the School of Engineering and Weapons
6. Educational objectives for the course
 - a. Design and fabricate wheel-driven mobile robots to accomplish particular performance objectives
 - b. Select typical elements used in robot construction such as electric motors, servo-motors, drive train components, and pneumatic components
 - c. Select the appropriate sensor to provide feedback in a robotic system
 - d. Develop and test code for a programmable robot controller to incorporate various sensors and enable autonomous operation
 - e. Work with a team to design and build a robotic system
7. Specific program outcomes addressed by this course

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Introduced							
Reinforced		X					X
Mastered	X	X			X		

8. Brief list of topics to be covered
 - a. Chassis design and steering
 - b. Power and stability
 - c. States and behaviors
 - d. C-Programming
 - e. Debugging and troubleshooting
 - f. Sensor characteristics
 - g. Drive trains
 - h. pneumatics