

<b>Dept Number</b>	<b>CS 404</b>	<b>Course Title</b>	<b>Autonomous Mobile Robots</b>							
<b>Semester Hours</b>	<b>3</b>	<b>Course Coordinator</b>	<b>Henry Hexmoor</b>							
<b>Catalog Description</b>	This course is a comprehensive introduction to modern robotics with an emphasis on autonomous mobile robotics. Fundamental of sensors and actuators as well as algorithms for top level control are discussed. Multi-robotics and human-robot interaction issues are explored. A group project is an integral part of this course.									
<b>Textbooks</b>										
Author: Hexmoor, Henry; Title: <i>Essential Autonomous Mobile Robotics</i> ; Edition: 2013; Publishers: Morgan and Claypool; ISBN: 9781627050586										
<b>References</b>										
<ul style="list-style-type: none"> <li>• Thrun, S., W. Burgard and D. Fox. <i>Probabilistic Robotics</i>. MIT Press, 2005.</li> <li>• LaValle, S. <i>Planning Algorithms</i>. Cambridge University Press, 2006.</li> <li>• Arkin, R. <i>Behavior-Based Robotics</i>. MIT Press, 1998.</li> <li>• Bekey, G. <i>Autonomous Robots</i>. MIT press, 2005.</li> <li>• Dudek, G. <i>Computational Principles of Mobile Robotics</i>. Cambridge University Press, 2005.</li> <li>• Jones, Flynn. <i>Mobile Robots: Inspiration to Implementation</i>. AK Peters, 1998.</li> </ul>										
<b>Course Learning Outcomes</b>										
<ul style="list-style-type: none"> <li>• To understand the robotic platforms and their limitations.</li> <li>• To learn to program mobile robots.</li> <li>• To design automations solutions using mobile robots.</li> </ul>										
<b>Assessment of the Contribution to Program Outcomes</b>										
<b>Outcome →</b>	1	2	3	4	5	6	7	8	9	10
<b>Assessed →</b>	X	X	X				X			
<b>Prerequisites by Topic</b>										
CS 330 with a grade of C or better.										

**Major Topics Covered in the Course**

1. Introduction {2 classes}
2. Robot body {4 classes}
3. Autonomy {2 classes}
4. Sensing and Perception {6 classes}
5. Control Loop {4 classes}
6. Locomotion, and Kinematics and mapping {6 classes}
7. Advanced control loop {4 classes}
8. Human-robot interaction {2 classes}
9. Multi-robotics: Formations, self-organization, collaboration {10 classes}