

Dept Number	CS 404	Course Title	Autonomous Mobile Robots							
Semester Hours	3	Course Coordinator	Henry Hexmoor							
Catalog Description	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.									
Textbooks										
SP17										
<i>Principles Of Robot Motion: Theory, Algorithms & Implementations</i> , Choset , Lynch, Hutchinson, Kantor, Burgard, Kavraki & Thrun, 1 st Edition, 2005, MIT Press Publisher, ISBN: 9780262033275.										
References										
<ul style="list-style-type: none"> • <i>Probabilistic Robotics</i>, Thrun, S., W. Burgard and D. Fox. MIT Press, 2005. • <i>Planning Algorithms</i>, LaValle, S. Cambridge University Press, 2006. • <i>Behavior-Based Robotics</i>, Arkin, RMIT Press, 1998. • <i>Autonomous Robots</i>, Bekey, G MIT press, 2005. • <i>Computational Principles of Mobile Robotics</i>, Dudek, G. Cambridge University Press, 2005. • <i>Mobile Robots: Inspiration to Implementation</i>, Jones, Flynn. AK Peters, 1998. 										
Course Learning Outcomes										
<ul style="list-style-type: none"> • To understand the robotic platforms and their limitations. • To learn to program mobile robots. • To design automations solutions using mobile robots. 										
Assessment of the Contribution to Student Outcomes										
Outcome →	1	2	3	4	5	6	7	8	9	10
Assessed →	X	X	X				X			
Prerequisites by Topic										
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}