Course Outline

1. Document Information

Degree Program	Computer Science
Course Number	CS 404
Course Title	Autonomous Mobile robots
Semester Hours	3
Course Coordinator	Henry Hexmoor
Revision Term	Fall 2020
Latest Revision	Fall 2020

2. 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.

3. Textbooks

- Hexmoor, H. (2013). Essential Principles for Autonomous Robotics, Morgan and Claypool. ISBN: 9781627050586.

4. References

5. Course Learning Outcomes

- To understand the robotic platforms and their limitations.
- To learn to program mobile robots.
- To design automations solutions using mobile robots.

6. Assessment of the Contribution to Student Outcomes

Outcome	1	2	3	4	5	6	7
Assessed	X	X	X				X

7. Prerequisites by Topic

CS 330 with a grade of C or better or graduate standing.

8. 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}

NOTE: When course is taken as 500-level credit (CS 591 “Special Topics”), there will be additional requirements such as a research project.