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1/27/21: CE-451/CE-651 INTRODUCTION TO AUTONOMOUS DRIVING

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INTRODUCTION TO AUTONOMOUS DRIVING

DEPARTMENT	Electrical & Computer Engineering
COORDINATOR	Mehrdad H. Zadeh, Associate Professor of Computer Engineering
CATALOG DESCRIPTION	This course provides an overview of theoretical and practical background regarding the design and development of autonomous vehicle systems. Topics include an overview of autonomous vehicle systems, autonomous vehicle localization technologies, perception in autonomous driving, decision and planning, and control for autonomous driving. This course aims to cover the basics of autonomous driving through lectures, discussion, assignments, and readings on current topics in automated driving. CE-651 students will be required to complete additional projects or independent review of research topics with approval of the instructor.
PREREQUISITES	For CE-451: CS-101 or ECE-101 or IME-211 or MECH-330/331 For CE-651: Graduate standing with basic programming skills
CLASS/LAB SCHEDULE	Three 60-minute class periods and one 120-minute laboratory session per week. (3-2-4)
TEXTBOOK	Course Notes
REFERENCE	Creating Autonomous Vehicle Systems By: Shaoshan Liu, Liyun Li, Jie Tang, Shuang Wu, and Jean-Luc Gaudiot
CREDITS	Engineering: 4 credits

INTRODUCTION TO AUTONOMOUS DRIVING

Course Learning Outcomes

Each student who receives credit for CE-451/CE-651 will have demonstrated the ability to do all of the tasks listed below:

1. Explain essentials for creating autonomous vehicles
2. Demonstrate familiarity with the several current hardware/software of autonomous vehicles
3. Use simulation to model and develop basic scenarios for automated driving
4. Read and discuss papers relevant to current autonomous vehicles
5. Identify and recognize important aspects of autonomous vehicles
6. Work in teams and manage an open-ended project with strict deadlines
7. Use written, oral, and graphical communication skills effectively

In addition to the above tasks, CE-651 students will have demonstrated the ability to do the following tasks:

8. Review the prior work presented in the literature
9. Abstract ideas from research work in the literature and independently form their own research hypotheses

Topics

1. Overview of autonomous vehicle systems
2. Autonomous vehicle localization technologies
3. Perception in autonomous driving
4. Decision and planning
5. Control for autonomous driving
6. Client Systems for Autonomous Driving

This syllabus was last revised by Mehrdad H. Zadeh on January 2021.