

New Course EFD Template



College of Engineering

Engineering Faculty Document

No.: 58-24

October 23, 2023

TO: The Engineering Faculty

FROM: The Faculty of the Lyles School of Civil Engineering

RE: New graduate course – CE 56201 Vehicular Cyber-Physical Systems

The Faculty of the Lyles School of Civil Engineering has approved the following new graduate course. This action is now submitted to the Engineering Faculty with a recommendation for approval.

FROM:

CE 59700 Vehicular Cyber – Physical Systems, 3 credits

Spring 2023 (7)

No Prerequisites

TO:

CE 56201 Vehicular Cyber-Physical Systems

Spring

Three total credits

No Prerequisites

Cyber-physical systems (CPS) are a new frontier for computational systems that transform the way people interact with engineered systems, which benefit applications in fields like transportation, aerospace, manufacturing, and health care. This course introduces students to the theoretical and practical foundations of CPS, with an emphasis on their usage in connected and automated vehicles (CAV).

RATIONALE:

There is currently no course at Purdue Engineering that is relevant to the topic of connected and automated vehicles, which is an emerging domain that needs to be studied by students who are interested in pursuing a future career in the automotive/transportation industry.

Head/Director of the Lyles School of Civil Engineering

Link to Curriculog entry: <https://purdue.curriculog.com/proposal:25713/form>

Proposed Course Number: CE 569

Long Title: Vehicular Cyber-Physical Systems

Short Title (max 30 characters): Vehicular Cyber-Physical Systems

Proposed Credit hours: 3

Proposed Schedule Type: Lecture

Pre-requisite or Co-requisite: N/A

Course Description: Cyber-physical systems (CPS) are a new frontier for computational systems that transform the way people interact with engineered systems, which benefit applications in fields like transportation, aerospace, manufacturing, and health care. This course introduces students to the theoretical and practical foundations of CPS, with an emphasis on their usage in connected and automated vehicles (CAV).

Justification of Need for Course: There is currently no course at Purdue Engineering that is relevant to the topic of connected and automated vehicles, which is an emerging domain that needs to be studied by students who are interested in pursuing a future career in the automotive/transportation industry.

Justification for Teaching at Graduate Level: This course requires a basic understanding of autonomous systems, robotics, and the Internet of Things, so graduate students are more suitable to enroll.

Anticipated Enrollment: 30

Justification for Online Delivery: This course will benefit students who are enrolled in online programs, especially those who are currently working in the automotive/transportation industry and can directly apply the knowledge learned from this course to their work.

Learning Outcomes: Upon finishing the course, students are expected to obtain the basic knowledge of CPS and CAV, and know how to develop an autonomous system to be applied to the transportation system.

Assessment Methods: Course project.

Description of Assessment Methods: The course project aims to introduce the students to CPS and CAV technologies, and to encourage the students to conduct in-depth research into a particular topic. There will be four tasks for the course project:

1. Project proposal elevator pitch: 10%
 - a. The presentation should be delivered within 3 minutes on a single slide (same for single and group projects)
 - b. Concisely state the introduction (what), motivation (why), technical contribution (how), and expected outcome of the proposed project
2. Mid-term project report: 10%
 - a. This report should reflect the status of the ongoing project by showing the introduction, motivation, proposed method, planned next steps, and expected outcome (no less than 1.5 pages excluding references)
3. Final project presentation: 40%

- a. The presentation should be delivered within 15 minutes (30 minutes for a group project)
 - b. Present the whole pipeline of the project with details
4. Final project report: 40%
 - a. Submission should be in PDF format, with 6-8 pages in length (including references at the end)

Final Grading Criteria:

Exams and Quizzes 0%
Papers and Projects 100%
Homework 0%
Lab Exercises 0%
Class Preparation 0%
Other 0%

Course Instructor: Ziran Wang

Library Resources: Already in library resources. Names of journals and proceedings include: IEEE Transactions on Intelligent Vehicles, IEEE Transactions on Intelligent Transportation Systems, IEEE Intelligent Transportation Systems Magazine, IEEE International Conference on Intelligent Transportation Systems, and IEEE Intelligent Vehicles Symposium.

Course Syllabus (include as separate attachment)