

Kennesaw State University
MTRE 4400 – Directed Research – Mechatronics
Course Syllabus – Fall 2019

I. Identifying information

Student(s): xxxxxxxxx
Course: MTRE 4400 Drive-by-wire Electric Vehicle, 1 credit
Instructor: Kevin McFall, PhD.

II. Course Description

The Department owns a Wheego LiFE electric automobile which has in the past been used in remote and self-driving vehicle applications. The electronic systems were altered to enable drive-by-wire control of the vehicle, but they have not been used in some time. This course will confirm all the electrical connections and confirm computer control of steering, acceleration, and braking.

III. Objective of the Course

This directed research will result in a working drive-by-wire capable electric Wheego LiFE vehicle. The existing hardware in the LiFE will be updated and configured to be more easily used for students in future projects.

IV. Detailed Schedule

Week 1: Familiarize with LiFE and take inventory of its modified hardware
Week 2: Study previous documentation for modified hardware
Week 3: Study CAN bus communication
Week 4: Test data collection from LiFE systems via CAN
Week 5: Test sending messages to control steering
Week 6: Develop code to control steering
Week 7: Test sending messages to control acceleration
Week 8: Develop code to control acceleration
Week 9: Test sending messages to control braking
Week 10: Develop code to control braking
Week 11: Test limits of regenerative braking
Week 12: Develop code to collect and log data via CAN (speed, steering angle, etc.)
Week 13: Final troubleshooting
Week 14: Draft user manual for drive-by-wire systems
Week 15: Finalize user manual for drive-by-wire systems

The student is expected to work independently on this project, of course under direction of the instructor. Meeting with the instructor is expected at least once weekly, demonstrating completion of the week's task. A minimum total of 50 hours of time is required on this project. The student is expected to follow all safety guidelines when interacting with equipment as directed by instructors and laboratory technicians.

V. Basis for Evaluation

The primary deliverable for this course is a working drive-by-wire automobile. The student will be evaluated on satisfactory operation vehicle (40%), compilation of a logbook documenting the progress made and time spent (20%), and preparation of a user manual (40%). Grades will be assigned for each component according to the following rubric:

- A (90-100): Exceptional deliverable quality and/or completion of extended topics
- B (80-89): Satisfactory completion of deliverables
- C (70-79): Incomplete completion of deliverables
- D (60-69): Partial completion of deliverables
- F (0-59): Little or no completion of deliverables

Federal, BOR, & KSU Course Syllabus Policies

Information contained in the links below constitutes the Federal, BOR, and KSU course syllabus policies and procedures and may be referenced by faculty members in their course syllabi. These policies are updated on the Academic Affairs Website annually.

[Academic Affairs - Federal, BOR, & KSU Policies](#)

[Academic Affairs - KSU Student Resources for Syllabus](#)

Note to Faculty: The KSU faculty handbook requires the Academic Integrity Policy in the course syllabus.

Note to Faculty and Students: The Office of the Provost will work to keep the policies and links in this document as accurate as possible.

Academic Integrity Statement

Every KSU student is responsible for upholding the provisions of the Student Code of Conduct, as published in the Undergraduate and Graduate Catalogs. Section 5c of the Student Code of Conduct addresses the university's policy on academic honesty, including provisions regarding plagiarism and cheating, unauthorized access to university materials, misrepresentation/falsification of university records or academic work, malicious removal, retention, or destruction of library materials, malicious/intentional misuse of computer facilities and/or services, and misuse of student identification cards. Incidents of alleged academic misconduct will be handled through the established procedures of the Department of Student Conduct and Academic Integrity (SCAI), which includes either an "informal" resolution by a faculty member, resulting in a grade adjustment, or a formal hearing procedure, which may subject a student to the Code of Conduct's minimum one semester suspension requirement. See also [KSU Student Code of Conduct](#).

Electronic Communication

The University provides all KSU students with an "official" email account with the address "students.kennesaw.edu" or "kennesaw.view.usg.edu" (in D2L). As a result of federal laws protecting educational information and other data, this is the sole email account you should use to communicate with your instructor or other University officials.