

Kennesaw State University
EE 4400 – Directed Study in Electrical Engineering
Course Syllabus – Spring 2016 – 3 credits

I. Identifying information

Students: xxxxxxxxxxxxxxxxxxxxxxxx

Course: EE 4400 Directed Study in Electrical Engineering – 3 credits

Instructor: Kevin McFall, Phd.

II. Course Description

This directed study will explore and implement strategies for autonomous control of steering, braking, and acceleration of a KIA automobile which has been modified to be drive-by-wire capable. Emphasis will be placed on communicating with the vehicle's electronic systems to obtain sensor data and electronically control actuation systems.

III. Objective of the Course

The primary course objective is to design closed-loop control systems for maintaining speed and directing steering. This will require speedometer feedback from the vehicle and position control of external actuators for braking, acceleration, and steering. The result will be stable control of the vehicle given arbitrary time profiles for speed and turn radius. If time allows, the following topics will be pursued: full electronic drive-by-wire control of acceleration, specifying a trajectory rather than turn radius profile using Ackermann steering geometry, and obstacle avoidance using a laser range finder.

IV. Detailed Schedule

- Week 1-2: Familiarization with existing system
- Week 3-4: Research and literature review
- Week 5-6: Simulation of speed and steering control
- Week 7-8: Implementation of control systems
- Week 9-10: Test and evaluation of control systems
- Week 11: Draft manuscript preparation
- Week 12: Submission to the *Kennesaw Journal of Undergraduate Research*
- Week 13-15: Exploration of extension topics

V. Description of Expected Roles

Students are expected to work independently on this project, of course under direction of the instructor. Weekly meetings will be established for students to report progress and seek advice and guidance from the instructor on how to proceed. Students are expected to follow all safety guidelines when interacting with the vehicle as directed by the instructor.

VI. Basis for Evaluation

Primary deliverables for the project are a complete control system (60%) and submission of a manuscript for publication in the *Kennesaw Journal of Undergraduate Research* (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

University Policies

Academic Honesty

Every KSU student is responsible for upholding the provisions of the Student Code of Conduct, as published in the Undergraduate and Graduate Catalogs. Section II 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 University Judiciary Program, 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.

Plagiarism Policy

No student shall receive, attempt to receive, knowingly give or attempt to give unauthorized assistance in the preparation of any work required to be submitted for credit as part of a course (including examinations, laboratory reports, essays, themes, term papers, etc.). When direct quotations are used, they should be indicated, and when the ideas, theories, data, figures, graphs, programs, electronic based information or illustrations of someone other than the student are incorporated into a paper or used in a project, they should be duly acknowledged.

Disability Statement

Kennesaw State University provides program accessibility and reasonable accommodations for persons defined as disabled under Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990. Kennesaw State University does not deny admission or subject to discrimination in admission any qualified disabled student.

A number of services are available to help students with disabilities with their academic work. In order to make arrangements for special services, students must visit the Office for Student Disability Services and make an appointment to arrange an individual assistance plan. In most cases, certification of disability is required.

Special services are based on

- medical and/or psychological certification of disability,
- eligibility for services by outside agencies, and
- ability to complete tasks required in courses.

ADA Position Statement

Kennesaw State University, a member of the University System of Georgia, does not discriminate on the basis of race, color, religion, age, sex, national origin or disability in employment or provision of services. Kennesaw State University does not discriminate on the basis of disability in the admission or access to, or treatment or employment in, its programs or activities.

The Americans with Disabilities Act (ADA), Public Law 101-336, gives civil rights protections to individuals with disabilities. This statute guarantees equal opportunity for this protected group in the areas of public accommodations, employment, transportation, state and local government services and telecommunications.

The following individuals have been designated by the President of the University to provide assistance and ensure compliance with the ADA. Should you require assistance or have further questions about the ADA, please contact:

- ADA Compliance Officer for Students
470-578-6443
- ADA Compliance Officer for Facilities
470-578-6224
- ADA Compliance Officer for Employees
470-578-6030

For more information, go to: http://www.kennesaw.edu/stu_dev/dsss.