14:650:451 Vehicle Dynamics

Part 1: Course Information

Instructor Information

Instructor: Laurent Burlion, Ph.D., Assistant Professor
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Office Hours: by appointment (on zoom)

Course Description

The goal of this course is to develop an understanding of the fundamentals of the dynamics and control of vehicles. The topics to be covered include:

Part I) Conventional cars

(i) Basic loads and longitudinal motions (Baruh, Chap. 12),

(ii) Tire and aerodynamic forces (Baruh, Chap. 13),

(iii) Lateral stability (Baruh, Chap. 14),

(iv) Suspension systems (Baruh, Chap 5)

Part II) Autonomous cars

(iv) Dynamic modeling

(v) Visual Servoing

(vi) Multiple vehicle coordination

Prerequisite

- (14:440:222 Engineering Mech. or 14:440:292 Honors Eng. Mech.-Dyna) and (01:640:421 Adv. Calc. for Engineering).

Textbook & Course Materials

Required Text

"*Applied Dynamics*" by Haim Baruh, CRC Press, 2015.

Recommended Texts & Other Readings

- "*Vehicle Dynamics and Control",* by Rajesh Rajamani, 2nd edition, Springer, 2017.
- "*Vehicle Dynamics*", by Reza N. Jazar, 3rd edition, Springer, 2011.

Course Requirements

- An electronic calculator (no other electronic device is permitted to be used during any quiz or exam).

Part 2: Grading Policy

Graded Course Activities

Homework is regularly assigned but neither collected or graded.

The only admissible materials during quizzes are 1) an electronic calculator.

The only admissible materials during exams are 1) the notes prepared by the person taking the exam, and 2) an electronic calculator.

Points	Description
30	Quizzes or assignments
30	Mid-term exam
40	Final Project
100	Total Points Possible

Any questions regarding the **quiz score** must be discussed with the Grader within two weeks of the date of return of the quiz to the class and no changes in the quiz score will be considered after these two weeks.

Any questions regarding the **midterm and project scores** must be discussed with the instructor within two weeks of the date of return of these scores to the class and no changes in these scores will be considered after these two weeks.

Inform Your Instructor of any Accommodations needed within the first two weeks of the course.

Commit to Integrity

As a student in this course (and at this university) you are expected to maintain high degrees of professionalism, commitment to active learning and participation in this class and also integrity in your behavior in and out of the classroom.

Covid 19 guidelines and restrictions

Prof. Burlion will remind students to wear face coverings, should such a reminder be needed.
If a student declines to wear a face covering after a reminder, Prof. Burlion must ask the student to leave class and then report the event to the appropriate contact overseeing student conduct.

Food is not permitted in classrooms.
Beverages may be consumed provided that face coverings are promptly replaced.
Self-quarantine is strongly encouraged.