MECHE 131 - VEHICLE DYNAMICS AND CONTROL (3 UNITS)

(Taken from the UC Berkeley Course Guide (http://guide.berkeley.edu))

COURSE OVERVIEW

SUMMARY

Physical understanding of automotive vehicle dynamics including simple lateral, longitudinal and ride quality models. An overview of active safety systems will be introduced including the basic concepts and terminology, the state-of-the-art development, and basic principles of systems such as ABS, traction control, dynamic stability control, and roll stability control. Passive, semi-active and active suspension systems will be analyzed. Concepts of autonomous vehicle technology including drive-by-wire and steer-by-wire systems, adaptive cruise control and lane keeping systems. Design of software control systems for an actual 1/10 scale race vehicle.

PREREQUISITES

Math 53, 54, Physics 7A-7B. Programming (E7) Ordinary differential equations (Math 1B, Math 54) Elementary linear algebra (M54), and ME 132

Spring only

TOPICS COVERED

At the end of the course the students should be able to:

- Formulate simple but accurate dynamic models for automotive longitudinal, lateral and ride quality analysis.
- Assess the stability of dynamic systems using differential equation theory, apply frequency-response methods to assess system response to external disturbances, sensor noise and parameter variations.
- Have a basic understanding of modern automotive safety systems including ABS, traction control, dynamic stability control and roll control.
- Follow the literature on these subjects and perform independent design, research and development work in this field.
- Expected to design feedback control systems for an actual 1/010 scaled vehicle platform which will be distributed to every group of two students in the class

- an ability to apply knowledge of mathematics, science, and engineering
- an ability to design and conduct experiments, as well as to analyze and interpret data
- an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
- an ability to function on multi-disciplinary teams
- an ability to identify, formulate, and solve engineering problems
- an ability to communicate effectively
- a knowledge of contemporary issues
- an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

WORKLOAD

TIME COMMITMENT

3 hours of lecture and 1 hour of discussion per week.

COLLEGE OF CHEMISTRY PEER SERVICES

Made by Angela Lee, c/o 2019

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lang=en) students/peer-
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