Introduction to Vehicle Dynamics

MKT4834 – Department of Mechatronics Engineering, YTU

Spring 2023

Instructor and Assistant Information

Instructor	Email	Office Location & Hours
Dr. M. Selçuk ARSLAN	selcuk.mkt@gmail.com	Dekanlik / Mon. 9:00 -12:00, or by appointment.
Res. Asst. Emre GÜR	emrgr37@gmail.com	E2 / by appointment.

General Information

Prerequisite

System Dynamics + Experience in MATLAB/Simulink.

Description

The purpose of this course is to teach students the dynamics of rubber wheeled ground vehicles.

Expectations

Students should have an access to MATLAB.

The lower bound of course attendance is 70% of whole semester.

Students, who are the both sides of cheating, will get FF.

Without instructor's permission, taking picture of the black(white)board and any digital recording of the class are not allowed.

Students must enroll to the web group of the course.

Course Learning Outcomes

1. Have a basic understanding of the tire models
2. Be able to discuss the important elements in vehicle system dynamics and chassis design.
3. Be able to derivate the dynamic equations governing a road vehicle.
4. Be able to solve the fundamental problems in vehicle dynamics.
5. Be familiar with the basic ride motions of vehicles.

Course Materials

Required Material

- Gillespie, Thomas, Fundamentals of Vehicle Dynamics, Society of Automotive Engineers, Inc., 1992.

Optional Materials

- Jazar, Reza N., Vehicle Dynamics - Theory and Applications, Springer, 2008.
- Wong, Jo Yung, Theory of ground vehicles, Wiley, 2001.

- Rajamani, Rajesh. Vehicle dynamics and control. Springer Science & Business Media, 2011.
- Control Tutorials for MATLAB: http://ctms.engin.umich.edu

Course group

Go to Google Classroom (classroom.google.com) and join the class with the code: **ike2zb4**

Course Schedule

Week	Topic	Reading	Exercises
1	Introduction		
2	Dynamics of the vehicle	Chapter-1	
3	Tires	Chapter-10	
4	Acceleration performance	Chapter-2	
5	Braking performance	Chapter-3	
6	Road loads	Chapter-4	
7	Lateral dynamics	Rajamani, ch.2	
8	Lateral dynamics	Rajamani, ch.2	
9	Midterm	Review all class notes	
10	Steady-state cornering	Chapter-6	
11	Steady-state cornering	Chapter-6	
12	Steady-state cornering	Chapter-6	
13	Ride	Chapter-5	
14	Ride + Rollover	Chapter-5 and Chapter-9	

Additional Information and Resources

Make-up Exams
Students should act according to the OIDB Mevzuat. Don't be surprised if you find that make-up exams are harder.

Grading
0.3*MT + 0.4*Final + 0.3*HWs

Code of Ethics
Akademik etik (http://www.yildiz.edu.tr/~msarslan/akademiketik.htm)