

ME41100 Group Project Description

The Group Project is a significant component of this course to better understanding of vehicle dynamics. The group project (up to 4-5 students and self-enrollment via Brightspace) provides the freedom for the students to design own system or investigate specific research questions related to the course materials. The design choice is under the students' responsibility. To reduce potential risk of problem underestimation, it is strongly recommended to discuss the selected topic with the instructor to identify potential pitfalls.

Main focus of the project should be on vehicle / subsystem dynamics or physical effects (simple control strategies can be considered in the context of improvement of vehicle dynamics).

The project includes two stages:

- literature survey on the selected topic;
- design, simulation, implementation and analysis of vehicle or subsystem model(s).

The project is based on:

- vehicle model(s) developed in homework assignments.

The project should cover the following points:

- 1) Formulation of problem statement including:
 - description of research problem, objectives and test object;
 - definition of response variables.
- 2) Findings from literature survey
- 3) Mathematical description of the developed model(s) or investigated physical effect(s) according to the project targets;
- 4) Simulation maneuver(s) description;
- 5) Evaluation of the respective response variable if applicable;
- 6) Perform data analysis;
- 7) Present your research during presentation sessions (15 min presentation + 5 min Q&A);
- 8) technical report in IEEE paper format (max. 6 pages + appendix) taking into account feedback from presentation sessions.

The following assessment criteria are used to evaluate project outcome:

- Intro and Problem Statement – 10%
- Content, results and conclusions – 30%
- Presentation – 20%
- Q&A – 10%
- Report – 30 %

The evaluation is conducted by jury committee (the instructor + 2 external members) during presentation sessions. The report is evaluated by the instructor and PhD students.

The report should be submitted **after the presentation sessions and before the written exam.**

Examples of the project topics

- Model extension by roll dynamics and investigation of its effects
- Model extension by pitch dynamics and investigation of its effects

- Influence of relaxation length of tire on lateral response
- Selection of tires to provide the best lateral performance
- Effect of anti-roll bar on vehicle dynamics

An example of successful group project is available on Brightspace.

The presentations will be conducted on 30th March and 2nd April 2020.

In the case, if the student retakes the course, the project grade obtained in the past cannot be counted and the student should conduct the group project again.