

Tárgytematika / Course Description

Vehicle properties and conceptual design

AJNM_JFTA006**Tárgyfelelős neve /****Teacher's name:** dr. Feszty Dániel**Félév / Semester:** 2024/25/1**Beszámolási forma /****Assesment:** Folyamatos számonkérés**Tárgy heti óraszám /****Teaching hours(week):** 2/2/0**Tárgy féléves óraszám /****Teaching hours(sem.):** 0/0/0

OKTATÁS CÉLJA / AIM OF THE COURSE

The goal of the course is to give a new, efficient viewpoint to the students about the conceptual phase of vehicle development as well as to practice the process of conceptual design of a vehicle. Conceptual design is the first phase of a new model's development, which outcome is a preliminary design, which should be strong enough to build a complex product onto it, but also flexible enough to be able to handle all later requirements and/or possible design modifications. This can be fulfilled only via a conscious design process from the very first pen stroke. The course was designed by a leading industrial expert in the Conceptual Design of vehicles.

TANTÁRGY TARTALMA / DESCRIPTION

I. TEACHING PERSONNEL

Course coordinator: Dr. Daniel Feszty, Széchenyi University (feszty.daniel@sze.hu)

Instructors/Course Designers:

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SZÁMONKÉRÉSI ÉS ÉRTÉKELÉSI RENDSZERE / ASSESSMENT'S METHOD

I. SEMESTER PROJECT

An individual semester project will be assigned to the students. The semester project's goal will be to complete the conceptual design of a vehicle. The exact details of the semester project are laid down in a separate document and handed out to the class at the class indicated in the Course Schedule. Students will be required to present their semester project on Tuesday, 1 December.

II. COURSE EVALUATION

The course will be evaluated based on the Term Project (60%) as well as a written Final Exam (40%), which will be of 2 hrs length.

III. FINAL GRADING

The final grade for the course will be allocated based on the following scheme:

Percentage	Grade
0 - 39	1 (Fail)
40 - 54	2
55 - 69	3
70 - 84	4

TERM PROJECT

Task: to complete the conceptual design of a passenger vehicle with the following parameters:

- CO2 emission of no more than 80 g/km in Germany and China
- Level 4 autonomous capability
- Minimum 500 km range
- Minimum 130 km/h cruising speed
- Maximum 30 minutes re-charging time or refueling time during highway drive
- Capacity of minimum 4 adult passengers and corresponding luggage
- Optional built-in "Last mile" solution for a Park and Ride situation

Breakdown of tasks:

- Market analysis
- Competitor analysis
- Definition of vehicle properties
- Definition of the derived engineering characteristics
- Details of novelties/innovations
- Sketches of vehicle concept options
- Ergonomic considerations
- Basic sizing of chassis, key elements of powertrain, and proof of achieving the desired performance characteristics
- Outline of engineering design
- Concept of manufacturing
- 3-view conceptual drawing of the vehicle with all main components (e.g. engine, gearbox, battery, seats, passengers, etc.) shown, proving that the requirements have been met
 - o Optional: 3D CAD model + 3D printing of best concept
- Market announcement documentation

The Term Project has to be developed by student individually.

Deliverables:

- Progress report presentation in halftime (up to the sketch drawings of the vehicle) – 15 min.
- Final presentation (30 min) in PPT form at the end of the project

Evaluation:

Overall evaluation criteria:

- concept
- engineering design
- report quality

KÖTELEZŐ IRODALOM / OBLIGATORY MATERIAL**LECTURE NOTES:**

Electronic lecture notes will be provided to the students.

TEXTBOOKS:

There are no set textbook required for this course. However, the following references might be useful for the students:

(1) Julian Happian-Smith: Introduction to modern vehicle design, ISBN 978-0-0805-2304-0

(2) Anthony Harding and Ronald Barker: Automobile Design, ISBN of 978-1-56091-210-1(3) Ivo Ferreira: Enhancing the conceptual design phase of complex engineering systems, ISBN 978-3-6599-4883-1

AJÁNLOTT IRODALOM / RECOMMENDED MATERIAL