

Tárgytematika / Course Description

Alternative Vehicles

AJNB_BMTA017

Tárgyfelelős neve /

Teacher's name: dr. Tóth-Nagy Csaba

Félév / Semester: 2021/22/2

Beszámolási forma /

Assesment: Vizsga

Tárgy heti óraszám /

Teaching hours(week): 2/0/0

Tárgy féléves óraszám /

Teaching hours(sem.): 0/0/0

OKTATÁS CÉLJA / AIM OF THE COURSE

Students will become familiar with the environmental, energy issues, and legislative movements that prompted the development of alternative vehicles. Students will learn about different alternative drive systems, energy converters, energy storage devices, and fuels. Students will learn to design a drive system and size the main driveline components of a given vehicle for given driving parameters. Students will understand the basic operation principles of alternative vehicles.

TANTÁRGY TARTALMA / DESCRIPTION

The course will be delivered through lecture notes, handouts, books, youtube video materials, homework assignments.

- 1) Environmental issues, decreasing oil reserves, emission standards in Europe, USA, and Japan, challenges.
- 2) Electric vehicles.
- 3) Electric machines, motors, alternators, architecture and operating principles
- 4) Inverters, converters, architecture and operating principles
- 5) Energy storage devices
- 6) Alternative energy carriers, alternative fuels
- 7) Test
- 8) Alternative energy converters, internal and external combustion engines, architecture and operating principles
- 9) Fuel cells, architecture and operating principle
- 10) Hybrid-electric drive systems, architecture and operating principles: Series
- 11) Hybrid-electric drive systems, architecture and operating principles: Parallel
- 12) Hybrid-electric drive systems, architecture and operating principles: Combined and power split
- 13) Testing principles of alternative vehicles, methodical differences, standards and recommended practices, Decreasing exhaust gas emissions and fuel consumption with alternative drive technology
- 14) Test

SZÁMONKÉRÉSI ÉS ÉRTÉKELÉSI RENDSZERE / ASSESSMENT'S METHOD

Grade will be combine from two parts.

50% Design assignment. Continuous semester work based on a design handout. Students will design a hybridvehicle to meet specifications. Deadline is week 11.

50% Test

60 % ont he design assignment must be reached to get signature for the course.

The grade will be the average of the design assignment and the test.

Grading:

90-100% Excellent (5)

80-89,9% Good (4)

70-79,9% Mediocre (3)

50-69,9% Pass (2)

0-59,9% Fail (1)

KÖTELEZŐ IRODALOM / OBLIGATORY MATERIAL

- 1) Bosch Yellow Jackets: Hybrid Drives, Fuel Cells, Alternative Fuels, ISBN-13: 978-0-8376-1606-3, Robert Bosch GmbH, 2008
- 2) Mehrdad Ehsani, Yimin Gao, Stefano Longo, Kambiz Ebrahimi: Modern Electric, Hybrid Electric, and Fuel Cell Vehicles, CRC Press, ISBN 9781138330498, 2018
- 3) Lecture notes, handouts