Tárgytematika / Course Description

Sustainability

AJNB_KMTA033

Tárgyfelelős neve / Teacher's name: dr. Torma András

Félév / Semester: 2022/23/2

Beszámolási forma / Assesment: Folyamatos számonkérés

Tárgy heti óraszáma / Teaching hours(week): 1/1/0

Tárgy féléves óraszáma / Teaching hours(sem.): 0/0/0

OKTATÁS CÉLJA / AIM OF THE COURSE

The aim of the subject/course is to show students their responsibility in sustainability as vehicle engineers, inspire them to have a sustainability mindset during their professional career and show them concepts and tools that can be applied in vehicle engineering to foster development that are environmentally, socially and economically more sustainable.

TANTÁRGY TARTALMA / DESCRIPTION

1. Sustainable Development. The SDGs, Paris Agreement, and Role of Engineering. Sustainable Development and the Engineering Profession.
2. Sustainable Engineering 1.: Concepts, Principles, and Frameworks. Key Concepts for Sustainable Engineering. The Goals of Sustainability.
3. Sustainable Engineering 2.: Systems Thinking. Industrial Ecology. Green Economy and Low-Carbon Economy. Resources Efficiency and Eco-efficiency. Triple Bottom Line.
4. Environmental impacts of the vehicle industry: The anthropogenic impact on the environment, the mechanism of climate change, resource exploitation and pollution. How the environment is affected by the vehicle industry (life cycle perspective - sourcing of raw materials, designing of vehicles, usage and disposal at the end of the life cycle).
5. Circular Economy: How and in what ways industry 4.0 tools support the circular economy while also promoting economic growth.
6. Tools for Sustainability Assessment 1.: Environmental Management System. Environmental Auditing. Environmental Impact Assessment.
7. Tools for Sustainability Assessment 2.: Design for Sustainability. CSR. Eco-Labeling.
8. Analytical Tools 1.: Carbon, Water, and Product Environmental Footprints. Environmental Risk Assessment.
9. Analytical Tools 2.: Cost Benefit Analysis . Multi-criteria Analysis.
10. Analytical Tools 3.: Fundamentals of Life Cycle Assessment: Introduction – Why and What Is LCA? The LCA Methodology. The LCA Goal and Scope Definition. Life Cycle Inventory. Life Cycle Impact Assessment. Interpretation and Presentation of Results.
11. Applications in the Automotive Industry: Wastewater Treatment. Solid Waste Management. Chemicals.
12. Introduction to Environmental Economics.Valuing the Environment. Market-based for Sustainability.
13. Business and Sustainability. The Business Case for Sustainability. Sustainability by Departmental Functions. Putting Sustainability into Business Practice
14. The Contribution of Engineers to Sustainability. Innovation for Sustainability. Role of Engineers across Stages of Project Delivery. The Sustainability Competent Engineer.

SZÁMONKÉRÉSI ÉS ÉRTÉKELÉSI RENDSZERE / ASSESMENT'S METHOD

Evalution will take place as follows: written or oral assessment of atoms (50%) AND class and acitivity participation (50%).

Written or oral assessment of atoms (40%): will evaluate students' knowledge related to the course material. The assessment takes place throughout the semester.

Class and project participation (60%):

- Class participation (15%) will be evaluated based on presence and kahoot! quizzes.
- Successful completion of individual and group activities throughout the semester (25%)
- Introduction of the content of a journal article and a business related to one of the topics of the course (short presentation): 20%

Assessment is performed on a scale of five grades. Grades will be determined as follows:

0-51% fail,

52-61% passable,

62-71% satisfactory,

72-81% good,

82-100% excellent.

KÖTELEZŐ IRODALOM / OBLIGATORY MATERIAL

- Brinkmann, R. (2016). Introduction to Sustainability (1st edition), Wiley-Blackwell
- Webster, K. (2016). The Circular Economy: A Wealth of Flows (2nd edition). Ellen MacArthur Foundation Publishing
- Schönmayr, D. (2017). Automotive Recycling, Plastics, and Sustainability. The Recycling Renaissance. Springer