



COURSE DESCRIPTION CARD - SYLLABUS

Course name

Life cycle management [S2MiBP1E-PE>ZCŹ]

Course

Field of study

Mechanical and Automotive Engineering

Year/Semester

1/2

Area of study (specialization)

Product Engineering

Profile of study

general academic

Level of study

second-cycle

Course offered in

English

Form of study

full-time

Requirements

compulsory

Number of hours

Lecture

15

Laboratory classes

0

Other (e.g. online)

0

Tutorials

0

Projects/seminars

15

Number of credit points

2,00

Coordinators

dr inż. Jędrzej Kasprzak

jedrzej.kasprzak@put.poznan.pl

Lecturers

Prerequisites

Knowledge: Basic knowledge of machinery and technology and the impact on the environment and global energy balance. Basic knowledge about the impact of technological changes on the organization of social life, health and psychology of individuals in interactions between people. Basic knowledge of the machine life cycle, recycling of machine elements, construction materials and consumables. Skills: Ability to refer to an example technical object, its analysis and development at the system level. Obtaining information from literature, the internet, databases and other sources. Ability to prepare and submit a short, verbal and multimedia presentation devoted to the results of an engineering task. Social competences: Awareness and understanding of the importance and impact of non-technical aspects of mechanical engineering activities and its impact on the environment and responsibility for one's own decisions. Ability to work in a group, developing and sharing ideas with other group members

Course objective

Induction of awareness and understanding of the importance of the impact of technical objects on the environment, economy and society. Introduction of a methodology for the assessment and development of technical objects as part of life cycle thinking.

Course-related learning outcomes

Knowledge:

He knows the modern engineering methods of computer graphics and the theoretical basis of engineering calculations using the finite element method.

Has knowledge of the principles of safety and ergonomics in the design and operation of machines and the threats that machines pose to the natural environment.

Is aware of the civilization effects of technology.

Skills:

He can estimate the potential threats to the environment and people from the designed working machine and vehicle from a selected group.

Can lead the team's work.

Can interact with other people as part of teamwork and take a leading role in teams.

Social competences:

He is ready to critically assess his knowledge and received content.

Is ready to recognize the importance of knowledge in solving cognitive and practical problems and to consult experts in case of difficulties in solving the problem on its own.

It is ready to initiate actions for the public interest.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

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Credit based on the audit work (written test - 4-5 open questions), presentation of the results of individual or group work (project regarding the implementation of assumptions for designing the life cycle of a selected technical object).

Programme content

Sustainable product strategies. Sustainable development and implications. Life cycle thinking. Technical objects life cycle phases. Concept, aspects and implementation of the life cycle concept (LCM). Life cycle assessment: LCA, LCC and SLCA. Acquisition and processing of primary and secondary data for life cycle assessment. Relations between environmental, economic and social aspects and impact on the life cycle of technical objects. Developing LCM strategies for various stakeholders.

Course topics

LECTURES:

1. SUSTAINABLE ECONOMY & LIFE CYCLE THINKING
2. LCM CONCEPT, BASICS & DEFINITIONS
3. MODELING FOR LCM PURPOSES
4. LIFE CYCLE SUSTAINABILITY ASSESSMENT
5. LCM IN BUSINESS PRACTICE: IMPLEMENTATION APPROACH
6. PLM – A DIFFERENT CONCEPT OF LIFECYCLE MANAGEMENT
7. FINAL EVALUATION

PROJECT:

1. LCM PROJECT - GENERAL DESCRIPTION
2. CHOOSING A TECHNICAL OBJECT/PRODUCT
3. MODELING A PRODUCT LIFE CYCLE
4. DEFINING ASPECTS OF A PRODUCT LIFE CYCLE
5. PROPOSING DIFFERENT LIFE CYCLE SCENARIOS
6. PROJECT CONTENT CONSULTATIONS
7. PROJECT CONTENT CONSULTATIONS

Teaching methods

Lecture: multimedial presentation, illustrated with examples on the board

Projects: individual and group project cases supported by the dedicated software, done under the supervision of subject caretaker

Bibliography

Basic

Lectures - presentations.

Guidelines for Social Life Cycle Assessment of Products UNEP/SETAC 2009.

ISO 14040:2009 Environmental management - Life cycle assessment - Principles and framework

ISO 14044:2009 Environmental management - Life cycle assessment - Requirements and guidelines

Life Cycle Management: How business uses it to decrease footprint, create opportunities and make value chains more sustainable. UNEP/SETAC 2009.

Rogall H.: Economy of sustainable development. The theory and the practice. 2008

Additional

Daly H., Beyond Growth: The Economics of Sustainable Development, Beacon Press, Boston 1997

Hirsch F., Social Limits to Growth. Harvard University Press, Cambridge 1976

Jorgensen T. H., Towards More Sustainable Management Systems: Through Life Cycle Management and Integration, Journal of Cleaner Production 16 (2008), pp. 1071-1080

Ny H. et al.: Sustainability constraints as system boundaries: an approach to making life-cycle management strategic. Journal of Industrial Ecology, vol. 10, no.1-2, 2006, pp. 61-77

Pearce D., E. Barbier A., Markandya A., Sustainable Development, Economics and the Environment in the Third World, Brookfield 1990

Robert K.-H. et al.: Strategic sustainable development ? selection, design and synergies of applied tools. Journal of Cleaner Production, vol.10, no.3, 2002, pp. 197-214

Schmidt W.-P., Strategies for Environmentally Sustainable Products and Services, Corporate Environmental Strategy, Vol. 8, No. 2 (2001), pp. 118-125

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,00
Classes requiring direct contact with the teacher	30	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	20	1,00