



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Integrated design

### Course

Field of study

Year/Semester

Transport

1/1

Area of study (specialization)

Profile of study

general academic

Level of study

Course offered in

Second-cycle studies

Polish

Form of study

Requirements

full-time

compulsory

### Number of hours

Lecture

Laboratory classes

Other (e.g. online)

15

0

Tutorials

Projects/seminars

15

0

### Number of credit points

2

### Lecturers

Responsible for the course/lecturer:

Responsible for the course/lecturer:

dr hab. inż. Przemysław Kurczewski, prof. PP

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Transport Institute

Faculty of Civil and Transport Engineering

### Prerequisites

Basic knowledge of techniques and design processes. Skills of logical and systemic thinking, work organization, using information obtained from the library, the Internet, standards and catalogs. Ability to transfer the acquired knowledge, basics of teamwork skills

### Course objective

Gaining basic knowledge on various models and methods of integrated design, taking into account the issues of concurrent engineering and optimization in terms of technical, economic, safety and environmental criteria

### Course-related learning outcomes

Knowledge



Student has advanced and detailed knowledge of the processes taking place in the life cycle of transport systems

Student knows advanced methods, techniques and tools used in solving complex engineering tasks and conducting research in a selected area of transport

#### Skills

Student is able to make a critical analysis of existing technical solutions and propose their improvements

Student is able to solve complex tasks in the field of transport engineering, including atypical tasks and tasks with a research component, using, among others conceptually new methods

In accordance with a given specification, taking into account non-technical aspects, Student is able to design a complex device, system in the field of transport engineering or a process and implement this project (at least in part) using appropriate methods, techniques and tools, including adapting the existing or developing new tools

#### Social competences

Student understands that knowledge and skills become obsolete very quickly in the field of transport engineering

#### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Lecture - written test

Classes - written test and test based in the own studies of the planned project

#### Programme content

Elements and methods of integrated design

Strategies and methodology of concurrent engineering

Organizational and process aspects of concurrent engineering

Elements of design and construction methodology

Activities of the working team in solving problems

The importance of system theory of technology for design

Human-device social engineering system

Principles and conditions of designing mechatronic systems

Principles of life cycle management

Design models and examples of their applications in the field of transport systems



Principles of systems optimization

Design for X concept

Principles of integrated security

Development and construction of multi-variant products

Cost-oriented design

### Teaching methods

Lectures - presentations of issues and discussion on them

Classes - presentations of methods used in integrated design and examples of their applications as well as workshops on projects developed by students

### Bibliography

Basic

1. Branowski B. : Methods of creative solving of engineering problems, Greater Poland Technical Corporation NOT, Poznań, 1999
2. Dietrych J. : System and structure, WNT, Warsaw, 1978
3. Ed. Kurczewski P., Lewandowska A., Principles of pro-environmental design of technical objects for the purposes of managing their life cycle, KMB Druk, Poznań 2008

Additional

1. Gawrysiak M.: System analysis of a mechatronic device, Białystok University of Technology, Białystok, 2003
2. Radkowski S. : Fundamentals of safe technology, Publishing House of the Warsaw University of Technology, Warsaw, 2003
3. Ullman D., G. : The Mechanical Design Process, Mc Graw Hill, New York, 2003

### Breakdown of average student's workload

	Hours	ECTS
Total workload	60	2,0
Classes requiring direct contact with the teacher	30	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) <sup>1</sup>	30	1,0

<sup>1</sup> delete or add other activities as appropriate