



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Integrated design [N2Trans1>PZ]

### Course

Field of study

Transport

Year/Semester

1/1

Area of study (specialization)

Railway Transport

Profile of study

general academic

Level of study

second-cycle

Course offered in

Polish

Form of study

part-time

Requirements

compulsory

### Number of hours

Lecture

9

Laboratory classes

0

Other (e.g. online)

0

Tutorials

9

Projects/seminars

0

### Number of credit points

2,00

### Coordinators

dr hab. inż. Przemysław Kurczewski prof. PP  
przemyslaw.kurczewski@put.poznan.pl

### Lecturers

### 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:

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

### Course topics

none

### 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. Dierych 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	2,00
Classes requiring direct contact with the teacher	18	1,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	42	1,00