

<b>STUDY MODULE DESCRIPTION FORM</b>		
Name of the module/subject <b>Flexibility in Engineering Design</b>		Code <b>1010112111010105658</b>
Field of study <b>Civil Engineering</b>	Profile of study (general academic, practical) <b>(brak)</b>	Year /Semester <b>1 / 1</b>
Elective path/specialty <b>-</b>	Subject offered in: <b>Polish</b>	Course (compulsory, elective) <b>obligatory</b>
Cycle of study: <b>Second-cycle studies</b>	Form of study (full-time, part-time) <b>full-time</b>	
No. of hours Lecture: <b>30</b> Classes: <b>15</b> Laboratory: <b>-</b> Project/seminars: <b>-</b>		No. of credits <b>2</b>
Status of the course in the study program (Basic, major, other) <b>(brak)</b>		(university-wide, from another field) <b>(brak)</b>
Education areas and fields of science and art <b>technical sciences</b> <b>Technical sciences</b>		ECTS distribution (number and %) <b>2 100%</b> <b>2 100%</b>
<b>Responsible for subject / lecturer:</b> Richard de Neufville email: ardent@MIT.EDU tel. 001 617-253-1101 (3-1101) MIT Institute for Data, Systems, and Society 77 Massachusetts Ave., Cambridge, MA 02139, USA		<b>Responsible for subject / lecturer:</b> Piotr Nowotarski email: piotr.nowotarski@put.poznan.pl tel. 616652113 Wydział Budownictwa i Inżynierii Środowiska ul. Piotrowo 5 60-965 Poznań
<b>Prerequisites in terms of knowledge, skills and social competencies:</b>		
1	<b>Knowledge</b>	Knowledge of basic techniques of execution of works in the traditional way. Knowledge of basic techniques of project management in construction. Knowledge of the types of buildings with the division into its purpose.
2	<b>Skills</b>	Computer skills and execution calculations using software such as MS Excel. Carrying out simple analysis of cause and effect related to the adopted solution. Team work skills.
3	<b>Social competencies</b>	Cooperation in a team for project delivery. Presenting to a group of associates tasks to be performed and the achieved results tasks. Awareness of the need to constantly update and complement the knowledge and skills.
<b>Assumptions and objectives of the course:</b> Learning and expand knowledge of the basic principles for flexibility in terms of the project construction. Increasing the awareness of students in designing buildings to optimize not only production costs (construction of object) but also use of the building in subsequent years, expansion capabilities, adaptation, change of destination.		
<b>Study outcomes and reference to the educational results for a field of study</b>		
<b>Knowledge:</b>		
1. Have knowledgeable about doing business in the construction industry. Understand the principles of financial management companies - [K_W11 ]		
2. Knowledgeable about infrastructure management in the full life cycle of the objects. - [K_W19 ]		
3. Knows and applies the provisions of construction law - [K_W17]		
<b>Skills:</b>		
1. Is able to carry out risk analysis in the implementation of projects and operation of buildings and implement appropriate measures and safety. Able to develop standards and norms of work and quality management procedures. - [K_U13]		
2. It has the ability to communicate in foreign languages, including technical knowledge of the language elements of construction - [K_U14 ]		
3. Student can make the development of preparing him to undertake scientific work - [K_U18]		
<b>Social competencies:</b>		

1. Can carry out certain tasks to work independently, to work in a team and manage a team. - [K\_K01 ]  
 2. Student is responsible for the accuracy of the results of their work and an assessment of the work under his team - [K\_K02 ]  
 3. Student can complement and extends knowledge of modern processes and technologies in construction - [K\_K03]

**Assessment methods of study outcomes**

Lecture:

Exam in writing or using the Moodle system.

Scoring:

- 55-64% - 3  
 65-74% - 3.5  
 75-84% - 4  
 85-94% - 4.5  
 95-100% - 5

Exercises:

Final test in writing or using Moodle system.

Active participation in the exercises.

Preparation of the report of the exercises after classes.

Scoring:

- 55-64% - 3  
 65-74% - 3.5  
 75-84% - 4  
 85-94% - 4.5  
 95-100% - 5

**Course description**

The principle of flexibility in the design.

Flexibility in use.

Flexible approach to the construction process.

Examples of the use of flexibility in the construction industry in the world.

The concept of NPV and Global Market.

Tools such as decision tree.

Productivity tools group - brainstorming.

**Basic bibliography:**

1. Flexibility in Engineering Design, Richard De Neufville, Stefan Scholtes
2. Applied Systems Analysis: Engineering Planning and Technology Management, Richard De Neufville
3. Materiały szkoleniowe udostępnione na portalu Moodle

**Additional bibliography:**

1. Systems Analysis for Engineers and Managers, Richard De Neufville
2. Engineering Design: A Systematic Approach, Gerhard Pahl, W. Beitz, Jörg Feldhusen, Karl-Heinrich Grote
3. Project Management Institute, A Guide to the Project Management Body of Knowledge (PMBOK Guide), Fifth Edition
4. Airport Systems: Planning, Design, and Management, Richard De Neufville, Amedeo Odoni

**Result of average student's workload**

Activity	Time (working hours)
1. Participation in lectures	15
2. Exam preparation	30
3. Participation in exercises	15
4. Reports preparation	15
5. Final test preparation	15

**Student's workload**

<b>Source of workload</b>	<b>hours</b>	<b>ECTS</b>
Total workload	90	2
Contact hours	30	2
Practical activities	15	1