STUDY MODULE DESCRIPTION FORM

Name of the module/subject	Code
System Design and Management	**1010112121010115664**

Field of study	Profile of study (general academic, practical)	Year /Semester
Civil Engineering	**general academic**	**1 / 2**
Elective path/specialty	Subject offered in:	Course (compulsory, elective)
-	**Polish**	**obligatory**

Cycle of study:	Form of study (full-time,part-time)
Second-cycle studies	**full-time**

No. of hours	No. of credits
Lecture: **10** Classes: **15** Laboratory: **-** Project/seminars: **-**	**3**

Status of the course in the study program (Basic, major, other)	(university-wide, from another field)
other	**university-wide**

Education areas and fields of science and art	ECTS distribution (number and %)

Responsible for subject / lecturer:

prof. dr hab. Jerzy Pasławski
email: jerzy.paslawski@put.poznan.pl
tel. +48(61) 6652363
Wydział Budowy Maszyn i Zarządzania
ul. Piotrowo 3, Poznań

Responsible for subject / lecturer:

mgr inż. Roman MILWICZ
email: roman.milwicz@put.poznan.pl
tel. 6652830
Wydział Budownictwa i Inżynierii Środowiska
ul. Piotrowo 5, Poznań

Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	knowledge of algebra and mathematical analysis
2	**Skills**	can formulate hypotheses
3	**Social competencies**	teamwork

Assumptions and objectives of the course:

Show activity in the wider context of engineering activities and cultural progress of humanity and civilization. Learn creative thinking and innovative conceptual design of products, services and systems.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. Knowledgeable about infrastructure management in the full life cycle of the objects. - [K_W19]
2. Knows and applies the provisions of construction law - [K_W17]
3. Knowledgeable about the impact of the investment and the existing buildings on the environment - [K_W13]

Skills:

1. Uses specialized tools to find useful information, communication and acquisition of software to support the work of the designer and organizer of the building process - [K_U05]
2. He can choose the tool (analytical or numerical) to solve technical problems - [K_U13]
3. It has the ability to communicate in foreign languages, including technical knowledge of the language elements of construction. - [K_U14]

Social competencies:

1. is able- implementing certain zadania- work independently, to work in a team and manage a team - [K_K01]
2. He is responsible for the accuracy of the results of their work and an assessment of the work of a subordinate unit - [K_K02]
3. ndependently complements and extends knowledge of modern processes and technologies in construction - [K_K03]

Assessment methods of study outcomes

Design of the project

Course description

Newton and reductionist thinking Descarte'sa, successes and failures. Holistic thinking, the way of science and technology, present status. System paradigm in science technology and culture. Future Shock, Third Wave civilization knowledge, the impact of information technology on learning technology and the economy. Systems of natural, artificial, abstract, material, technical, social engineering, the types and properties. The life cycles of systems, life cycle costs and their description, barriers to productivity of the economy. Simple models of behavior systems: market equilibrium model of production, competition for resources, the arms race, urbanization, consumption of machines and technical systems, models of the world - 'microworlds'. Identification, evolution, and behavior prediction systems. Conceptual design methods of systems analysis of the needs and limitations, methods of creative thinking, brainstorming, Brainwriting, synektyka, morphology, Delphi. Evaluation and optimization of system solutions, the use of utility theory and decision theory, decisions under uncertainty and risk, decision tree. The organization as a system of systems, self-organizing and self-learning, learning one and double loop learning organization, knowledge management. Virtual Engineering to optimize the system, the civilization of knowledge in the economy and society, the Western and Japanese approaches.

Basic bibliography:

1. Robertson J. S., Pełna Analiza Systemowa, WNT, Warszawa, 1999.
2. Blanchard B. S., Fabrycky W. J., Systems Engineering and Analysis, Prentice Hall, New Jersey, 1990.
3. Sage A. P., Systems Engineering, Wiley - Interscience, New York, 1992.
4. Gutenbaum J., Modele Matematyczne Systemów, Omnitech, Warszawa, 1992.
5. Tofler A. i H., Budowa Nowej Cywilizacji - Polityka Trzeciej Fali, Zysk i Ska, Poznań, 1996.

Additional bibliography:

1. Pogorzelski W., Inżynieria Badań Systemowych, Wyd. Polit. Warszawskiej, Warszawa, 1999.
2. Senge P. Piąta Dyscyplina ? Teoria i Praktyka Organizacji Uczących się, Wyd. ABC, Warszawa, 1998.
3. Cempel C., Teoria i Inżynieria Systemów,2 wyd,,Wyd.ITE, Radom2008,p293; e-skrypt, IV-Wyd. Internet http://neur.am.put.poznan.pl .
4. Kaposi A., Myers M., Systems for All, Imperial College Press, Londorn 2001, p375.
5. Skyttner L.,General Systems Theory, World Sientific, Singapore, 2001, p459.

Result of average student's workload

Activity	Time (working hours)
1. contact with the teacher	25
2. working individually or in groups on project	20

Student's workload

Source of workload	hours	ECTS
Total workload	75	3
Contact hours	30	1
Practical activities	45	2