STUDY MODULE DESCRIPTION FORM

Name of the module/subject		Code
Simulation in Logistics II		**1010612321010617931**

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

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

No. of hours	No. of credits
Lecture: **-** Classes: **-** Laboratory: **-** Project/seminars: **1**	**2**

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 %)
technical sciences	**2 100%**

Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Student has a basic knowledge related to: inventory management, inbound and outbound transport, distribution network design methods; student knows the basics of modeling and simulation in logistics.
2	**Skills**	Student is able to think analytically, to interpret the phenomena, and to build simple simulation models based on the verbal problem description.
3	**Social competencies**	Student is aware of the role and importance of making the right decisions, as well as the role and importance of problems concerning logistics activities.

Assumptions and objectives of the course:

The acquisition of knowledge in systems? modeling and simulation aiming to design of a complex logistics system and to solve decision problem. The subject matter of the course also includes the application of the object-oriented simulation tool ExtendSim and the other analytical tools, including spreadsheet programs.

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

Knowledge:

1. The student has an advanced and detailed knowledge in the field of transport engineering, theoretical background, methods and tools applied to solve simple engineering problems. - [T2A_W01]

2. The student knows advanced methods, techniques and tools used in solving complex engineering tasks and conducting research in a selected area of transport. - [T2A_W06]

Skills:

1. The student is able to integrate the knowledge from different fields of transport while formulating and solving engineering tasks, including the knowledge from the other research disciplines, and to apply system?s approach, including non-technical aspects. - [T2A_U05]

2. The student can make a critical analysis of existing technical solutions and propose their improvements. - [T2A_U08]

Social competencies:

1. The student understands the importance of using the latest knowledge in the field of transport engineering in solving research and practical problems. - [T2A_K02]

Assessment methods of study outcomes

Presentation of logistics system projects, modeled in the ExtendSim object simulation tool, along with the computational experiments and the analysis of obtained results.

Course description

1. Introduction to the course, including the purpose and milestones. A reminder of basic information on simulation modeling and model construction in the ExtendSim object-oriented simulation tool.

2. Students? presentations of the concept of projects, including: general characteristics of modeled logistic systems, definition of decision problems, presentation of the analyzed processes in the form of block diagrams.

3. Presentation of individual stages of the project implementation ? data, simulation model, computational experiments. Discussion about existing problems.

4. Final presentations of logistic systems? projects - assumptions, simulation model, analysis of simulation results.

Basic bibliography:

1. ExtendSim User Guide, ver. 9, Handbook, Imagine That Inc., San Jose (CA), 2017.

2. Krahl D.: ExtendSim 9. In Pasupathy R., Kim S.-H., Tolk A., Hill R., Kuhl M.E. (eds.): Proceedings of the 2013 Winter Simulation Conference: Simulation: Making Decisions in a Complex World, Washington D.C., 8-11 grudnia, 2013, pp. 4065-4072

3. Law A.M., Kelton W.D., Simulation modeling and analysis. McGraw-Hill. Boston, 2000.

4. Sawicka H.: Symulacje w logistyce. Materiały wykładowe, Politechnika Poznańska. (in Polish)

Additional bibliography:

1. Gubała M., Popielas J.: Podstawy zarządzania magazynem w przykładach. Instytut Logistyki i Magazynowania, Poznań, 2005 (in Polish).

2. Pfohl H-Ch.: Zarządzanie logistyką. Funkcje i instrumenty. Instytut Logistyki i Magazynowania, Poznań, 1998 (in Polish).

3. Tarkowski J. i in.: Transport ? Logistyka. Instytut Logistyki i Magazynowania, Poznań, 2001 (in Polish).

Result of average student's workload

Activity	Time (working hours)
1. Preparation for classes: project.	10
2. Participation in the classes according to the plan: project.	15
3. Strengthening the content of classes / reports: project.	5
4. Consultations: project.	10
5. Preparation for the exam / pass: project.	7
6. Participation in the exam / pass: project.	3

Student's workload

Source of workload	hours	ECTS
Total workload	50	2
Contact hours	15	1
Practical activities	15	1