STUDY MODULE DESCRIPTION FORM

Name of the module/subject	Code
Transportation and Logistics Systems Designing II	**1010612221010614871**

Field of study	Profile of study (general academic, practical)	Year /Semester
Transport	**(brak)**	**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)
(brak)	**(brak)**

Education areas and fields of science and art	ECTS distribution (number and %)
technical sciences	**2 100%**

Responsible for subject / lecturer:

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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, definition of distribution network and inbound vs. outbound transportation
2	**Skills**	Student is able to think analytically, to interpret the phenomena, and to build simple mathematical models based on the verbal problem description
3	**Social competencies**	Student is aware of the role and importance of making the right decisions and problems concerning transport and logistics activities

Assumptions and objectives of the course:

-The objective of the course is as follows: the knowledge of key factors and important issues in design the inbound logistics (within warehouse) and outbound logistics (distribution network), the practical skills of simulation modelling of logistics phenomena.

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

Knowledge:

1. Has a structured, theoretically founded knowledge in the field of logistics, including: the essence of logistics, the reasons for the development of logistics concepts, structure of logistic systems, logistics management, exploitation of synergies, decision-making problems in micrologistic systems, the importance of logistics in the supply - [K1A_W09]

2. Has knowledge of mathematics including: elementary functions, series of numbers, continuity and limes of functions, calculus of one and several variables, determinants, matrices, algebraic systems of linear equations - [K1A_W01]

Skills:

1. Is able to organize and manage the transport, logistics and freight forwarding process in field of study, especially in the chosen specialization. - [K1A_U16]

2. Is able to use acquired mathematical theories to create and analyze simple models of transport and logistics systems. - [K1A_U18]

3. Is able to create a system schematics, select items and perform basic calculations of the magazine layout - [K1A_U19]

Social competencies:

1. Understands the need and knows the possibilities of lifelong learning, knows the need for acquiring new knowledge for professional development. - [K1A_K01]
2. Is aware of and understands the importance and impact of non-technical aspects of mechanical engineering activities and its impact on the environment and responsibility for own decisions in short and long-term aspect. - [K1A_K02]
3. Is able to think and act in an entrepreneurial manner, make decisions, work for the development of the employer and the society. - [K1A_K07]
4. Is aware of the transfer of knowledge to society, takes steps to ensure that the information is understandable - [K1A_K08]

Assessment methods of study outcomes

-- The intermediate evaluation is proving to have an overwiev on: methodology of transportation and logistics systems design, simulation modelling using ExtendSIM tool, ability to design a simple simulation model and validation od the model.

- The final assessment is executed based on the multiple-choice test.

Course description

-Introduction to the course. Basic concepts and definitions, including logistics projects and concepts, design on the micro -and macro- level, criteria of classificiation logistics facilities, classification of logistics facilities, dimensions of logistics chains, types of transport and logistics network, main functions of logistics facilities, logistics processes (flow of goods).

A comprehensive methodology of inbound logistics solutions design. The principles and best practice in logistics solution design. Key design steps and practical tips, including: forecasting of the flow of goods (demand), inventory classification based on ABC / XYZ, inventory turnover, the manner of goods storage, the way the order is processing, the structure of procurement method of picking and packaging, friquency of supply, the main storage areas, transportation routes, selection of transportation and storage equipment.

The key steps in simulation-based project design, including: problem description (recognition), design of simulation model, model parametrization, simulation experiments, an interpretation of the results, design of different option, selection of the most desirable solution.

Introduction to ExtendSIM simulation tools, incl. workspace, libraries, the types of flows, the control parameters of objects. Principles of simulation model design, incl.: construction of the model, the presentation of an exemplary application of ExtendSIM. Case study on analysis of the packing of finished products, incl. problem description, design of simulation model, model parametrization, simulation experiments, an interpretation of the results.

Inbound warehousing logistics design using ExtendSIM tool. Construction of a conceptual model, selection of the objects for modeling flow of goods, human resources and warehouse equipment. Defining parameters of simulation objects.

Design of other logistics solutions and projects using simulation tool - ExtendSIM. Solving several transportation and logistics problems, incl.: fleet sizing and fllet composition problem, deliveries of parts and components to the production line by 3 part logistics service provider, design of logistics networks and others.

Basic bibliography:

1. Sawicki P.: Design of transportation and logistics systems. E-papers available on: www.put.poznan.pl/~piotr.sawicki (in Polish).

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

3. Imagine That Inc., EXTEND OR, ver. 6, Handbook, San Jose (CA), 2002.

4. Coyle J.J., Bardi E.J., Langley C.J. Jr., The management of business logistics. West Pub. Co, New York, 1988.

Additional bibliography:

1. Krug W. Modelling, Simulation and Optimisation. European Publishing House. Delft, 2002.

2. Gubał M., Popielas J., The principles in warehousing management. Instytut Logistyki i Magazynowania, Poznań 2005 (in Polish).

3. Pfohl H-Ch., Logistics management. Functions and tools. Instytut Logistyki i Magazynowania, Poznań 1998 (in Polish).

4. Tarkowski J. et al., Transport and Logistics. Instytut Logistyki i Magazynowania, Poznań 2001 (in Polish).

Result of average student's workload

Activity	Time (working hours)
1. Lectures	30
2. Labs and projects	30
3. Own work	10

Student's workload

Source of workload	hours	ECTS
Total workload	70	3
Contact hours	60	2
Practical activities	30	1