

Online Master in International Logistics: Methodology, Design and Implementation

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Abstract: The article presents conceptual ideas as well as methodological approach to development and implementation of a fully online international Master program. Master in International Logistics is being created by nine universities from eight different countries leveraging the strength of each partner, while assuring uniformity of the expected outcomes. The authors in this paper focus on global features and objectives of the program which not only offers flexibility of deployment by the project partners but guarantees rigorous requirements of didactic process as well. The paper also describes the principles of designing the whole course, individual classes, along with the methods of knowledge assessment. The program has been fully accredited by Chartered Institute of Logistics and Transport. The Master courses are already deployed by the International University of Logistics and Transport in Wrocław, Poland; they will be initially offered in 2022/2023 academic year in a mode of online and blended learning.

1 INTRODUCTION

The use of internet technology in distance learning processes has a long tradition. The idea of distance education itself is even older as it began to develop together with radio and then television technologies. The main foundation of e-learning is both the physical distance between a teacher and a student, and the time shift, while ensuring free, two-way communication among all participants of the education process (Caballe, 2021), (Elkins, 2015), (Horton, 2014).

The current pandemic situation of COVID-19 in the world proves that the use of online tools for education becomes indispensable and vital. Nowadays, owing to the access to e-learning management systems such as MOODLE or communication platforms like Zoom or Microsoft Teams, not only online distance education is feasible. It is commonly believed that academic e-learning pursues much broader goals than just supporting the educational process, notably experimentation, simulation, knowledge discovery. It is expected that the presented Master in International Logistics program will meet these requirements by means of

preparing students to take key managerial positions in logistics companies, as well as in logistics support: logistics services of manufacturers and of distributors, and also in transport firms.

The main objectives of the paper are twofold. Firstly, to present a development methodology of complex e-learning programs. Secondly, to publish information about a new online Master in International Logistics program at the International University of Logistics and Transport in Wrocław, Poland, starting in 2023. The online mode is targeted at graduates and professionals who wish to attend fully interactive classes at any time, any place at their convenience. Therefore, special attention has been given to the structure, organization and interactive content of all courses.

Logistics has become one of the areas of greatest interest in the academic world. Each year universities and schools offer new programs and online courses for candidates who are interested to master skills in supply chain management, procurement, warehousing, transport and distribution. The leading countries in logistics training are the USA, Western European countries, China and Australia.

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One of the interesting reviews was published in the USA where top-ranking Masters in Logistics are presented¹. Among the highly ranked universities were: Michigan State University, Georgia College, University of Southern California, University of Washington. Most of them offer from two to four semesters, 100% online programs. The tuition fees are ranged from \$1,600 up to \$50,000.

In Europe there are more than 100 universities offering Master's degrees in Logistics; most of them in the United Kingdom and Germany². In the United Kingdom among the leading universities are the University of Salford, University of Hull, University of Birmingham. They offer also 100% online Master programs, composed of four semesters with the tuition fees close to those of American universities. In Germany³, the most recognized Master of Science programs in Logistics can be considered those of Technical University of Munich, Khune Logistics University, International School of Management in Dortmund, SRH Berlin University of Applied Sciences, Dresden International University. In general, 4 semesters programs are common, with the tuition fees from € 2,500 to 9,500 per semester.

In Poland, Master diploma in Logistics is offered by only a few universities, located in Gdańsk, Poznań Katowice, and Wrocław⁴. The courses are offered usually in a form of blended learning because of the government restriction of online courses to 50% of the program contents. The duration of the study is from 3 to 4 semesters. Currently, to our knowledge, no university offers 100% online internationally oriented Master diploma in Logistics. Therefore, the presented project can be considered as the first 100% online Master in International Logistics, accredited by the Chartered Institute of Logistics and Transport-UK; CILT(UK). The tuition fee is largely below the announced fees of the above cited universities. This is an important point in searching costless studies, in particular by candidates from developing countries.

The paper is divided into five sections. The next section gives the goals, structure and constraints of Master in International Logistics project. The third section describes the methodological rules for development and implementation of the Master in International Logistics courses. It also enumerates all principles of designing the whole course, individual classes, but also the methods of remote verification of students' progress, including final grading procedures. It is worth to mention that the project

follows the legal, organizational and technical requirements of higher education in Poland and the European Union. Section 4 provides an example of course description included in the Master of Logistics program. Section 5 presents the design solutions extracted from the program. The conclusion ends with a summary which refers to the conditions of the Master in International Logistics project realization, and implementations at the International University of Logistics and Transport in Wrocław and at the universities of the project partners.

2 THE IDEA, STRUCTURE AND CONSTRAINTS OF THE MASTER IN INTERNATIONAL LOGISTICS

The goal of the Master in International Logistics project was to create new e-learning materials and tools for online education at the Master's level in the domain of logistics. The lectures for students are delivered by internationally recognized lecturers, company leaders and practitioners. The courses are presented online, using various educational forms namely lectures, computer laboratories, simulation games. E-learning materials include complete elaboration of 22 courses of the Master level logistics programs.

The project was carried out from January 2020 till December 2021 as part of an international partnership. The role of the project leader is performed by the International University of Logistics and Transport in Wrocław, with the following universities as partners: Uniwersiapolis – Université Internationale d'Agadir (Agadir, Morocco), National Aviation University of Ukraine (Kiev, Ukraine), University of Economics and Management (Prague, the Czech Republic) University of Žilina (Žilina, Slovakia), Slovak University of Agriculture (Nitra, Slovakia), University of Leipzig (Leipzig, Germany), School of Business of Belarusian State University (Minsk, Belarus) and University of Niš (Niš, Serbia). It is expected that the project will contribute to strengthening the current educational and scientific activities, and will also help to develop long-term partnership cooperation, including undertaking tasks relating to future joint e-learning projects.

¹ <https://www.bestcollegereviews.org/best-online-masters-in-logistics-and-supply-chain-management-degrees/>

² <https://www.educations.com/search/masters-degree-transport-logistics-europe/>

³ <https://www.mygermanuniversity.com/>

⁴ <https://www.masterstudies.com/MastersDegree/Logistics/Poland/>

According to the Polish Qualifications Framework, the program of Master of Logistics has been divided into four semesters - a total of 120 ECTS credits, with duration of 720 hours. The first three semesters are of theoretical and professional studies, while the last one is practical (internship and Master thesis preparation). It is important that the accreditation of programs was carried out by the Chartered Institute of Logistics and Transport, UK, which is an organization that sets logistic education standards in the whole world, for all partners. The accreditation requirement of the course content focuses on the importance of the balance between transferable workplace skills across the profession, coupled with knowledge of specific technical areas at the appropriate level, in the field of supply chain, logistics and transport. The accreditation also requires confirming that the university's faculty potential is capable of implementing the program being developed. According to both European and Polish Qualifications Frameworks, the Master in International Logistics is awarded with qualifications on the seventh level. For this level, the universal characteristics have been defined in the categories of the theoretical or factual domain knowledge, mental or cognitive skills, and social competences.

The program of Master in International Logistics contains 22 courses and computer laboratories that were developed and assigned to elaborate to the project partners. The course topics, the hour load, ECTS points and partners in charge of design are given in Table 1.

Each course has a uniform structure and respects a unified format of a graphical presentation. The following general assumptions of the methodology for designing the content of e-learning course education were adopted:

1. The courses are entirely made using e-learning techniques in a way that enables remote teaching in both synchronous and asynchronous modes.
2. The duration of each course (30 or 60 hours) is interpreted as 30 or 60 lesson units. Each lesson unit is planned in the following way:
 - 30 minutes should be allocated to the course content (not exceeding 0.5 Gb),
 - 15 minutes should be assigned to specific batch of material, didactic films or consultations.
3. From the allocated number of lesson units, 50% i.e. 30 units (for a 60-hour course) or at least 16 units (for a 30-hour course) should be allocated to the presentation of the new knowledge. The remaining part should be intended for shaping the desired new social skills and competences.

4. The knowledge presentation can have the following forms:
 - e-lecture - it consists in recording and then reproducing the content of education in the form of a lecturer's videos with recordings of his/her face and voice,
 - slide presentation - it is a slide show on the educational platform with the possibility of being played at a given pace, or according to the needs of a student,
 - presentation of excerpts from textbooks, scientific articles, monographs, etc.,
 - presentation of the results of computing (including also animations).
5. The detailed criteria for the performance are accepted by all partners of the project.

Table 1: Master in International Logistics – Courses.

<i>Semester/Course</i>	<i>Hrs</i>	<i>ECTS</i>	<i>Partner</i>
Semester 1			
Foundation of Internat. Logistics	60	8	UIA, Agadir
Logistics Mgmt. and Marketing	60	8	UEM, Prague
Designing of Logistic Inf. Syst Information Systems	30	4	UL, Leipzig
Logistics Processes	30	3	UL, Leipzig
IT	30	3	IULT, Wrocław
Data Science in Logistics	30	4	UL, Leipzig
Semester 2			
Informat. Systems and Services	60	8	UZ, Zilina
Artificial Intelligence	60	3	IULT, Wrocław
Operations Research	30	4	UIA, Agadir
Supply Chain Management	60	8	UIA, Agadir
Sustainable Logistics	30	3	NAU, Kiev
Warehouses and Distr. Systems	30	4	BSU, Minsk
Semester 3			
Organ. and Mgmt of Transport Processes	60	8	UN, Nitra
Law, Insurance. and Ethics Logistics	60	8	UN, Nis
Organization of Product. Mgmt Management	60	8	IULT, Wrocław
Intermodal Logistics Concepts and GIS*	30	3	NAU, Kiev
Transport Safety*	30	3	UZ, Zilina
Applications in Logistics*	30	3	IULT, Wrocław
Negotiations*	30	3	UEM, Prague
City Communication*	30	3	NAU, Kiev
Humanitarian Logistics*	30	3	IULT, Wrocław
Aviation Logistics*	30	3	NAU, Kiev
Semester 4			
Internship		30	Enterprises

Legend: *Elective courses

The basis component of a course is a topic. However, a topic is related to a particular e-learning course, but it may be also used in another e-learning training. It may be also a part of a blended learning course which combines online educational with traditional place-based classroom methods. In the next section, the rules of development and implementation will be presented, followed in the last section by an example of some course materials.

3 DEVELOPMENT AND IMPLEMENTATION RULES

The realization of the project by many authors from various international universities required the use of uniform criteria for the implementation of the task, i.e. developing a course in the form of an e-learning educational package. Uniform and agreed project activities are the basic formal criterion for developing a new course in the form of classes conducted remotely at the required education quality level. Schematically, the process of the course development is shown in Figure 1.

Step 1 starts with a course content specification which is finally detailed in a course syllabus. It should contain information about the course content, objectives, topics of all lectures and laboratories, effects of acquired knowledge and skills, assessment rules, references and the list of lecturers. An example of a syllabus is given in Appendix (Table 2). The

detailed course syllabus is verified by experts and a person in charge of Master of International Logistics. The detailed course syllabus is verified by experts and a person in charge of Master of Logistics. Moreover, in the project, each course syllabus was evaluated by the Chartered Institute of Logistics and Transport (CILT), UK. After a positive evaluation of the course content, the authors could start to design a course.

Two approaches to the course development are possible (the first one contains steps 3, 4 and 5, and the second one - step 6). The choice of the approach depends on the skills and technical competencies of authors involved in designing and editing e-learning materials. The sequence 3-4-5 is recommended for beginners or authors without experience in authoring interactive materials (green rectangles in Fig.1). In this case, they should provide two documents to the Centre of E-Learning: first, the PowerPoint slides of lectures with exact indications of interactive parts (.ppt file) and a specification of quizzes and interactions in the required format. Based on these two documents, the technical staff integrates the PowerPoint presentation with quizzes, tests and exams. It is important that the author collaborates with the technical staff in the process of interaction implementation.

The next important step concerns recording audio/video of lectures integrated with the slide presentation. Recording is conducted in a dedicated studio and mounted by the Centre of E-Learning technical staff.

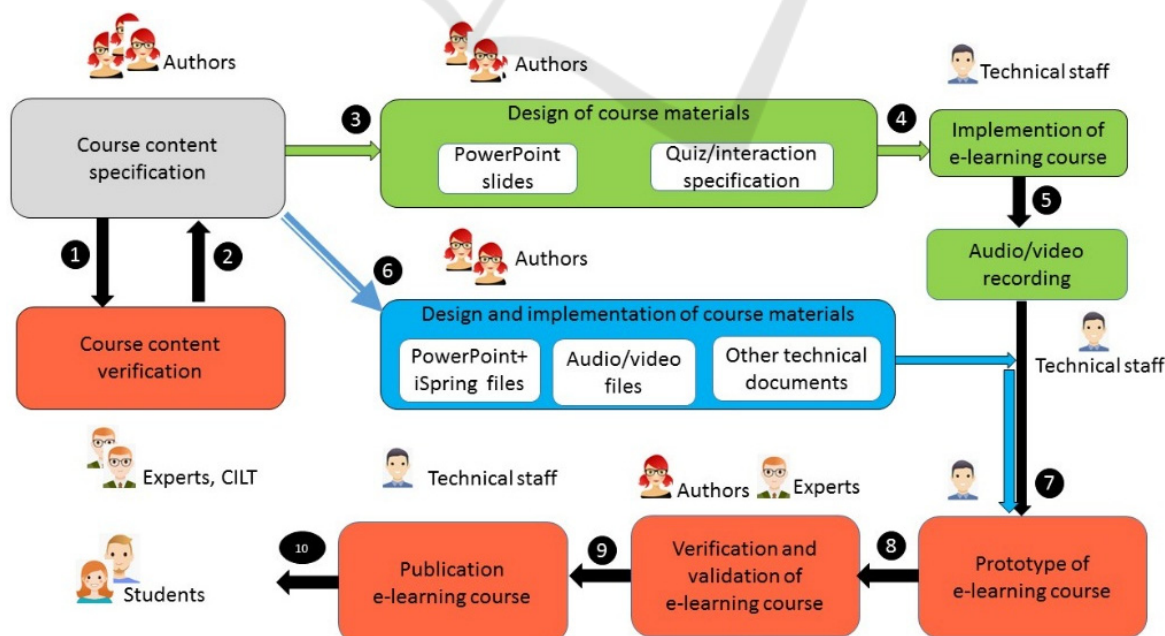


Figure 1: The process of course development.

The result of these operations, a prototype of an e-learning course is uploaded on the “development portal” and passed to the author and then to experts to verify and validate according to the approved syllabus and Master of International Logistics (MIL) curricula (steps 7-8). Once positively evaluated, the e-learning course will be published and finally available to the students of MIL.

The presentation of teaching materials is based on the MS PowerPoint, using the provided template, but designers were free to use more sophisticated editors such as iSprings, Thinkific, LearnWorlds, uQualio,...(Bean, 2014), (Kapp, 2014). The rules for creating presentations are strictly defined, i.e. the minimum and maximum number of slides allowed, the maximum length of a lecture unit, the size and colour of the font in the main content of the slides, the size and colour of the font in the title of the slides, numbering of the slides or its absence, arrangement of permanent graphics (the university logo, the project logo, a project partner logo etc.) (Methodological Guide, 2020) The format of the first opening slide of presentation and the second one with the structure of the lecture has been predefined. The subsequent slides have only predefined settings reduced to the header contents and the footer. The last slide should contain a few control questions or problems, and the list of references.

To evaluate the knowledge of students quizzes and tests are defined. A teacher determines the number and the time of conducting all tests in the course, and their scores in the final grade. In general, student knowledge should be tested after each learning block (topic) using short tests (3 - 5 questions) or longer tests (10 - 15 questions). A large final test (20 - 30 questions) is suggested at the end of the course. In order to automate the assessment, it is agreed that each test may only consist of closed questions. To implement the questions on an e-learning platform a few formats are available, notably Aiken, GIFT, Blackboard, WebCT (Bean, 2014), (Clark, 2016).

The method of assessing participants is based on a score. The project assumes that each participant can get a maximum score of 100 points during the course. A teacher independently determines what activities in the course are evaluated and how many points can be obtained for their performance.

The minimum score necessary to pass the course is 51. Each teacher can set his/her own way of converting points into the scale of grades used in his/her organization. For the needs of the IULT, the following system of converting the number of points into assessment is proposed:

- from 92 to 100 points - very good (5.0);
- 83 points to 91 points - good plus (4.5);
- from 73 points to 82 points - good (4.0);
- from 62 points to 72 points - satisfactory plus (3.5);
- from 51 points to 61 points - satisfactory (3.0);
- 50 points or below - unsatisfactory (2.0).

Exams and credits “had defended” themselves for a long time against using distance learning techniques. In the general opinion of academic teachers, only the personal participation of a teacher and a student in the evaluation process at the same place and time gives the guarantee of objectivity and fairness of assessment. On the other hand, the crisis situation that we have been facing during the COVID-19 pandemic, and the need to remain at home for both students and academic teachers, have forced the need to solve the way of conducting the diploma exam at a distance.

4 AN EXAMPLE OF A COURSE DESCRIPTION

To illustrate the content of a course description, a syllabus of the course on Artificial Intelligence (AI) is given in Table 2 (see Appendix). The objective of this course is to present the foundations of AI to be applied in logistics and transport. To understand the underlying ideas many examples and case studies are given, in particular related, knowledge representation and reasoning, to graph and network searching and computational intelligence. They combine in-depth treatments of basic and advanced concepts along with required explanations. Algorithmic issues, tools and systems are also provided to help students gain insight about AI perspectives.

The program of the course was divided into seven chapters (topics). To provide a practical view of AI and its applications in Logistics six last chapters are complemented by computer laboratories. During some laboratories, students are asked to install software tools available for different platforms (Microsoft, Apple, Linux) and/or connect through the Internet to professional platforms and databases. The assessment in this course is composed of four integrated parts namely: 1) three pre-tests to preliminarily check the student’s knowledge, 2) three graded quizzes, 3) one assignment (a project) which can be done in pairs, and 4) one class exam.

5 A DESIGN OF STUDENT INTERACTION AND ASSESSMENT

Quizzes and tests are an essential part for knowledge evaluation, engagement and assessment of students in e-learning (Clark, 2016), (Nariman, 2021). They can be run not only before and after each training, but also during a course. The reasons to include quizzes and tests are multiple. One of the first ones is to keep track of students' progress and get information what has been learned and what hasn't. Quizzes enable students to retain new information and knowledge. They motivate and create deeper engagement of students in e-learning. Finally, for course designers and lecturers, they provide data to identify gaps in an e-learning program and help to improve its content.

This section is focussed on rules and techniques to design e-learning materials, in particular quizzes and tests using iSpring Suite platform. In general, there are two types of quizzes: reinforcement quizzes and assessment quizzes. Reinforcement quizzes help consolidate and force a review of the training material. They are usually performed at regular intervals (e.g. end of topic) for practice and data collection. There are no time limits, no penalties for wrong answers, several attempts can be allowed. On the contrary, assessment quizzes help evaluate students' knowledge. In terms of constraints, one attempt to answer is allowed, no explanation for errors.

A popular platform to develop student interactions within the PowerPoint presentation is iSpring Suite, offering editing facilities for various types of questions that can be designed. One of the interesting but less used types of questions is a Hotspot question. In this type of question, a student must point out to one or more designated areas in the image attached to the question. To implement the question one should add the intended image where a students will mark the correct areas (see Figure 2). An author may also add feedback in case of a correct or incorrect answer, and also indicate the score.

The efficacy of a quiz greatly depends on how well the questions are formulated. If a student does not understand the questions, he or she has little choice but to begin answering them at random, rather than relying on his or her knowledge. This will ruin students chances of getting an accurate assessment.

There are a few more issues while quiz designing. To prevent cheating in an iSpring Suite an author may define time limits for taking a quiz and randomize the selection of questions. If we want to conduct a comprehensive "diagnostic" of students' knowledge, it is possible to set a quiz to "one attempt". Then it will be more difficult to guess the correct answer.

Another important issue to reinforce students: branching. It is particularly useful to learn the material better. The feedback, especially after a wrong answer, is very important and has to be given to each incorrect answer. Therefore, when students make a mistake, they are directed to an additional info slide. If the answer is correct, they pass to the next part of the course.

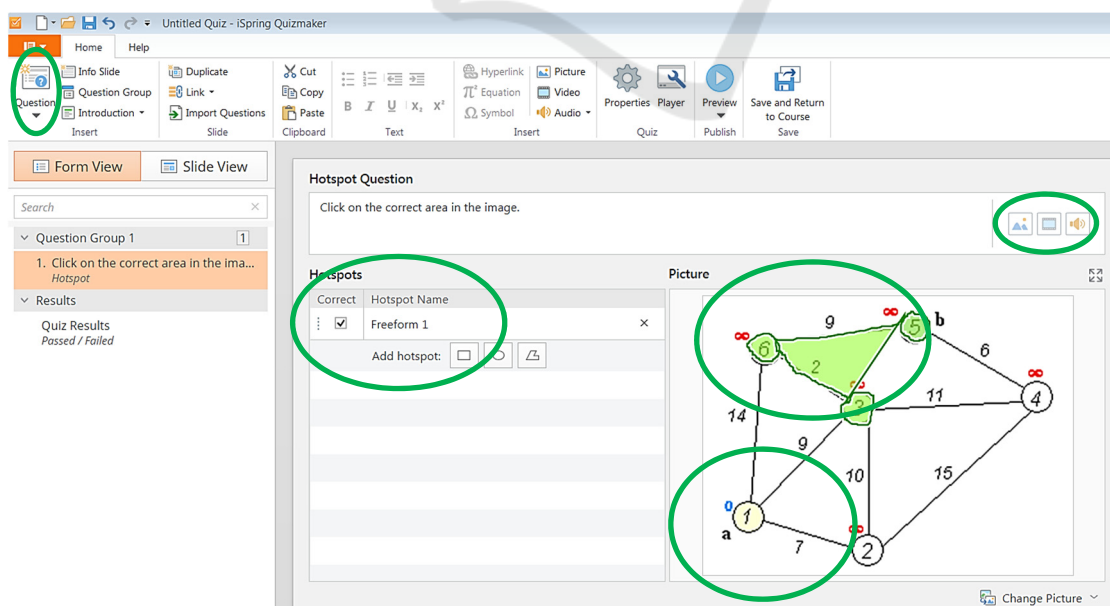


Figure 2: Indication of the Hotspot area.

6 CONCLUSIONS

Summing up, the project of online Master in International Logistics has found a favourable climate both among the University authorities, lecturers and partners of the project. The complexity of this project was tremendous: 800 hours of effective classes, lectures and computer laboratories, designed by over 30 lecturers from 9 universities from 8 countries. It has resulted in several thousand hours of recordings teaching materials, and finally many hours devoted to making the entire program available on the e-learning platform. A large part of the courses is already positively evaluated, and some of them will be initially offered in 2022/2023 in a mode of blended learning at the International University of Logistics and Transport in Wrocław, Poland. According to the schedule, the project will be terminated in December 2021, so the project partners could offer the Master in International Logistics program in 2022.

The high level of education and the attractiveness of the program have been assured by:

- designing a modern and compacted curriculum of the Master of International Logistics with a teaching load limited to four major courses per semester,
- including a large number of practical case studies in supply chain management, warehousing, logistics technology, distribution and transport,
- integrating the advanced Information Technology, computer networks, the Internet of Things and artificial intelligence with the lecturing materials,
- respecting the National and European Framework of Qualifications and CILT accreditation criteria to stimulate and guarantee the educational and professional outcomes resulting from different subjects.

Two years to design and fully deploy such a complex e-learning program is obviously not enough. Ahead of us there is still enormous time-consuming testing and evaluation of the program implementation. Among the urgent tasks, we are going to continue work on increasing the interactivity of lectures, extending the use of multimedia technology and modularity of the program contents to adjust the offer to the profile of future candidates.

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APPENDIX

Table 2: Syllabus of the course “Artificial Intelligence”.



Project title: Master in International Logistics 2.0		 NARODOWA AGENCJA WYMIANY AKADEMICKIEJ						
Project no.: PPI/APM/2019/1/00087								
 THE INTERNATIONAL UNIVERSITY OF LOGISTICS AND TRANSPORT IN WROCLAW		<h1>SYLLABUS</h1>						
Teacher	prof. dr hab. Jerzy Korczak							
Course	Artificial Intelligence							
Module	Mandatory	ECTS	4	Course code	20SM.P.LEL.12			
Major	Specialty		Academic year					
LOGISTICS	Master in International Logistics (MIL)		2021/2022					
Semester	1	Year of studies		I				
Type of studies	Full-time			Extramural				
	E-learning							
Type of classes	E-lecture	Exercise	Project	Instruction & lab	E-Lecture	Exercise	Project	Instruction
Amount of hours	40			20				
TOTAL	60							
Course objectives	The objective of this course is to present the foundations of AI to be applied in logistics and transport. To understand the underlying ideas many examples and case studies will be given, in particular related, knowledge representation and reasoning, to graph and network searching and computational intelligence. It combines in-depth treatments of basic and advanced concepts along with accessible explanation. Algorithmic issues, tools and systems will be provided to help students gain insight about AI perspectives. Students will learn how AI works and what opportunities it offers for logistics. In each part of the course many real-life logistics problems and AI applications such as automated warehousing, smart roads, intelligent transportation systems, autonomous cars, will be illustrated and discussed							
Minimum knowledge required from the student before the classes beginning								
Foundations of mathematics, statistics and informatics, basis of logistics								
Recommended literature to study before the classes beginning								
It is not required								
LEARNING OUTCOMES					KEK	METHODS OF ASSESSMENT		
KNOWLEDGE	K01	Explain and apply proficiently modern methods and tools of logistic management. Explain the relationships and dependencies between logistics and other functional areas of the company, also in the international scale			K2_W03_L_P	EM6	Written colloquium with multiple choice (single choice possible) questions	
	K02	Explain selected methods of designing logistic processes and systems, methods of solving decision problems and methods and techniques used in logistics planning. Proficiently explain them in English.			K2_W05_L_P	EM6	Written colloquium with multiple choice (single choice possible) questions	
	K03	Explain and apply proficiently economic, technical, legal and organizational issues, related to the specialty of studies. Proficiently describe and apply the methods and tools of management, including planning, organizing, controlling, analyzing and improving selected processes and systems			K2_W10_L_P	EM12	Control tests evaluation (quizzes)	
	K04	as above			K2_W03_L_P	EM12	Written colloquium with practical tasks (computational or drawing)	
SKILLS	S01	Utilize integrated knowledge from various fields, as well as to select appropriate methods and tools for identify, interpret, describe and analyze problems and areas of logistics and its conditions			K2_U01_L_P	EM6	Written colloquium with multiple choice (single choice possible) questions	
	S02	Utilize integrated knowledge to identify problems and acquire data in order to describe, analyze and evaluate specific processes and tasks appropriate for the studied educational specialty			K2_U01_L_P	EM6	Written colloquium with multiple choice (single choice possible) questions	
	S03	Utilize ability to design a complex device, object, system or process related to logistics and implement this project, at least in part, using the right methods, techniques and tools, adapting existing or developing new methods, techniques and tools for this purpose			K2_U15_L_P	EM12	Control tests evaluation (quizzes)	
	S04	as above			K2_U01_L_P	EM12	Control tests evaluation (quizzes)	
SOCIAL COMPETENCE	SC01	Students demonstrate proficiency in independent and critical knowledge and skills acquisition. Student will be able to supplement and develop through different fields of science. Students are able to share knowledge with other people			K2_K04_L_P	EM10	Project evaluation	
	SC02	Students are able to cooperate in the preparation of economic projects, taking into account legal, economic and technical aspects and understand the effects of the actions taken, including their impact on the environment and the related responsibility for the			K2_K05_L_P	EM10	Project evaluation	

Table 2: Syllabus of the course “Artificial Intelligence” (cont.).

Course contents	E-Lecture	1. Introduction to Artificial Intelligence (4h) 2. Knowledge Representation and Reasoning (6h) 3. Searching (7h) 4. Machine Learning and Data Mining (9h) 5. Neural Networks (5h) 6. Artificial evolution (5h) 7. Natural Language Processing (4h)
	Instructions	1. Knowledge Representation and Reasoning (4h) 2. Searching (4h) 4. Machine Learning and Data Mining (6h) 5. Neural Networks (4h) 6. Artificial evolution (2h) 7. Summary - Future of AI in Logistics (1h)
Teaching methods	TM2	Informational e-lecture using multimedia techniques
	TM6	Problem e-lecture using multimedia techniques
	TM10	Case method
	TM16	Laboratories - task and problem solving
Obligatory literature	1	Dierkx K., Heutger M., Artificial Intelligence in Logistics, Whitepaper, SSS-Schaefer.com, 2018
	2	Bostrom N., Superintelligence – Path, Dangers, Strategies, 2014
	3	Marr B., Ward M., Artificial Intelligence in Practice : How 50 Successful Companies Used AI and Machine Learning to Solve Problems, Wiley, 2019
	4	Russell S., Norvig P., Artificial Intelligence: A Modern Approach, Pearson, 2016
Additional literature	1	Perez C.A., Practical Artificial Intelligence, Apress, 2018
	2	Yao M., Jia M., Zhou A., Applied Artificial Intelligence. A Handbook for Business Leaders, Topbots Inc., 2018
	3	Mitchell M., Artificial Intelligence. A Guide for Thinking Humans, Penguin Books, 2019
	4	https://medium.com/emergent-future/
	5	https://business.udemy.com/?ref=footer&locale=pl_PL&mx_pg=dp-artificial-intelligence-az
Requirements to pass the course		
<ul style="list-style-type: none"> • 3 on-line tests (20% of grade) • 1 in-class exam (closed books, no notes), one covering the course material on AI, (50% of grade) • 1 assignment (done in pairs) – (30%) 		