Course unit title	Course unit code
BASICS OF ARTIFICIAL INTELLIGENCE	

Lecturer (s)	Department where course unit is delivered
Assoc. Prof. Dr. Vytautas Rudžionis	Kaunas Faculty Institute of Applied Informatics Muitinės St. 8, LT-44280 Kaunas

Cycle	Level of course unit	Type of the course unit
First	1/2	Compulsory

Mode of delivery	Semester or period when the course unit is delivered	Language of instruction
Face-to-face	Semester 1 (01/09 - 26/01)	English

Prerequisites and corequisites	
Prerequisites: Algorithmic theory, programming lannguages, basics of computer science	**Corequisites:**

Number of ECTS credits allocated	Student's workload	Contact work hours	Individual work hours
5	134	48	86

Purpose of the course unit: programme competences to be developed		
To acquire general knowledge of artificial intelligence algorithms, to get knowledge about evalutaion of AI methods efficiency, to be able to set quantintative requirements, to be able to find the limits of intellectual methods		
Learning outcomes of course unit	**Teaching and learning methods**	**Assessment methods**
To become familiar with the main methods and algorithms of artificial intelligence, to develop abilities to evaluate quality and parameters of AI methods, to develop abilities to formulate feasible requirements to AI systems.	Formal lecture, Literature analysis, Practical exercise	Examination, Mid-term assessment of practical exercise

Course content: breakdown of the topics	Contact work hours							Individual work hours and tasks	
	Lectures	Consultations	Seminars	Practice classes	Laboratory	Practice	All contact work	Individual work	Tasks
1 Search methods and algorithms: uninformed search; uninformed search algorithms; informed search; heuristics, startegies for								2	Algorithmic analysis; problem solving

informed search								
2. Knowledge representation and expert systems: knowledge, knowledge representation, logic, frames, semantic nets, fuzzy systems, architecture of expert systems, ES development							2	Algorithmic analysis; problem solving; ES prototype development
3. Machine learning: learning, types of learning, supervised and unsupervised learning, induction, classification and regression trees, efficiency of learning,							2	Algorithmic analysis; problem solving; prototype development
4. Neural networks: neuron, neural network, biological networks; models of artificial neurons; training methods; training quality; generalization; overtraining and effects								Algorithmic analysis; problem solving; software code development
5. Deep learning and its applications							2	Algorithmic analysis; problem solving; software code development
6. Genetic algorithms: genetic algorithms and their features; strategies and stages of evolution; efficiency of genetic algorithms								Algorithmic analysis; problem solving
7. Natural language processing; advances and challenges; statistical language processing; parsing; machine translation; data mining							2	Algorithmic analysis; problem solving; prototype development
8. Spoken language processing: speech synthesis, synthesis algorithms; speech recognitionj,; hidden Markov models, deep netwoorks; syntactic restrictions							2	Algorithmic analysis; problem solving; prototype development
9. Computer vision: image properties; main image processing algorithms; image enhancement; object detection; image recognition							2	Algorithmic analysis; problem solving

	Total	2			2			4	6	

Assesment strategy	Comparative weight percentage	Date of examination	Assesment criteria
Two assignments practical assignments – Pr1, Pr2	2*15%=30 %	At predefined time	10-9: Perfect and very good knowledge. Evaluation level. 90-100 % correct answers.. 8-7: Good knowledge and abilities, could be several mistakes. Synthesis level. 70-89 % correct answers. 6-5: Average knowledge and abilities, there are errors. Analysis level. 50-69 % correct answers. 4-3: Knowledge and abilities below average, there are significant errors. Knowledge application level. 20-49 % correct answers. 2-1: Below minimum requirements. 0-19 % correct answers.
Colloquia –C	20%	At predefined time	Materials from first seven lectures. Graded in 1-10 mark scale. 10-9: Perfect and very good knowledge. Evaluation level. 90-100 % correct answers.. 8-7: Good knowledge and abilities could be several mistakes. Synthesis level. 70-89 % correct answers. 6-5: Average knowledge and abilities, there are errors. Analysis level. 50-69 % correct answers. 4-3: Knowledge and abilities below average, there are significant errors. Knowledge application level. 20-49 % correct answers. 2-1: Below minimum requirements. 0-19 % correct answers.
Individual assignment, defending the proposed solution ID	10%	At predefined time	The solution of selected problem using neural networks. Graded in 1-10 mark scale. 10-9: Perfect and very good knowledge. Evaluation level. 90-100 % correct answers.. 8-7: Good knowledge and abilities could be several mistakes. Synthesis level. 70-89 % correct answers. 6-5: Average knowledge and abilities, there are errors. Analysis level. 50-69 % correct answers. 4-3: Knowledge and abilities below average, there are significant errors. Knowledge application level. 20-49 % correct answers. 2-1: Below minimum requirements. 0-19 %

			correct answers.
Exam -E	40 %	Assigned time during exam session	The material of second part of lectures. Graded in 1-10 mark scale. 10-9: Perfect and very good knowledge. Evaluation level. 90-100 % correct answers.. 8-7: Good knowledge and abilities, could be several mistakes. Synthesis level. 70-89 % correct answers. 6-5: Average knowledge and abilities, there are errors. Analysis level. 50-69 % correct answers. 4-3: Knowledge and abilities below average, there are significant errors. Knowledge application level. 20-49 % correct answers. 2-1: Below minimum requirements. 0-19 % correct answers.
The final grade: FG= Pr1+Pr2+C+ID+E			

Author	Year	Title	Number of periodical publication or publication Volume	The place of publication and publisher or online link
Required reading				
Russel S., Norwig P.	2009	Artificial Intelligence: Modern Approach		New York: Prentice-Hall
Toshinori M.	2008	Fundamentals of the New Artificial Intelligence		Berlin: Springer
Nilsson N.	1998	Artificial Intelligence: A New Synthesis		New York: Morgan Kaufman
Hawkins J., Blakeslee S.	2004	On Intelligence		Henry Holt And Co