ARTIFICIAL INTELLIGENCE PRINCIPLES AND APPLICATIONS

Course code	*GRAI019*
Compulsory in the programmes	*International Marketing and Management / Innovations and Technology Management / Financial Economics*
Level of studies	*Graduate*
Number of credits	*6 ECTS (32 contact hours + 2 consultation hours, 124 individual work hours)*
Course coordinator (title and name)	*Assist. Prof. Dr. Simonas Čepėnas*
Prerequisites	*Undergraduate diploma*
Language of instruction	*English*

THE AIM OF THE COURSE:

In this introductory Artificial Intelligence (AI) course, students will explore the fundamental principles and methodologies of AI without requiring prior programming knowledge. The course will cover core topics such as machine learning concepts, neural networks, and data analysis techniques through conceptual frameworks, real-world case studies, and interactive discussions.

Given the diverse backgrounds of students in data science and analytics, the course also includes a foundational component in data analytics. This will provide students with an essential understanding of how data-driven insights are generated and how these principles underpin many AI systems today.

The course aims to equip students with the ability to critically evaluate AI systems, understand their societal implications, and build a strong theoretical foundation for more advanced study or applied work in the AI field.

MAPPING OF COURSE LEVEL LEARNING OUTCOMES (OBJECTIVES) WITH DEGREE LEVEL LEARNING OBJECTIVES (See Annex), ASSESMENT AND TEACHING METHODS

Course level learning outcomes (objectives)	Degree level learning objectives (Number of LO)	Assessment methods	Teaching methods
CLO1. **Knowledge and its application.** Demonstrate and apply critical understanding of the artificial intelligence (AI) principles.	LO1.3. Students will be able to demonstrate critical thinking in problem solving.	Final exam.	Lectures, Interactive class and group discussions, workshops, individual and group assignments.
CLO2. **Research skills.** Gain skills how to synthesize and apply theoretical knowledge of AI using R and R studio.	LO1.2. Students will become **independent learners** and develop their own comprehension of scientific theories, models, and concepts. LO3.2. Students will	In-class group activities, final exam, Kaggle competition.	Theory sessions and workshops. R assignments.

	develop and deliver a **coherent written research paper**.		
CLO3. Special abilities. Be able to analyze the organizational capability to innovate and provide recommendations from an AI perspective.	LO1.1. Students will be able to define the business problem and develop **innovative solutions**.	In-class group activities, Kaggle competition.	Case analysis, groups discussions, R assignments.
CLO4. **Social abilities.** Adhere to the principles of professional ethics and citizenship participating in discussions on relevant academic issues. Be able to lead the team and be accountable for its performance.	LO2.1. Students will be able to evaluate past and current practices in their discipline from an **ethical perspective**. LO3.1. Students will develop and deliver a **coherent oral presentation**.	In-class group activities, final exam, Kaggle competition.	Group activities, discussions and workshops.
CLO5. **Personal abilities.** Develop personal and professional abilities, critical thinking, and creativity.	LO2.1. Students will be able to evaluate past and current practices in their discipline from an **ethical perspective**.	Demonstration of professional behavior, creativity and critical thinking during the class and group discussions.	Critical evaluation of the theories and group members' opinion, management of complicated social situations during the discussion of cases.

ACADEMIC HONESTY AND INTEGRITY

Plagiarism is considered a breach of academic integrity. In case of plagiarism, a student/group will result in an automatic failure in this course. Late assignments are marked zero.

COURSE OUTLINE

This course will consist of lectures, case studies and workshops during which we will use our theoretical knowledge to apply theory to business cases. Lectures will consist of interactive discussions, case analysis, class discussions, group project work, article analysis discussions, group presentations, and individual final class exam.

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APPROVED BY
THE STUDY COMMISSION
Minutes No. 02-12-2025-14
as of 28th August 2025

Part 1

Day	Topic	Class hours		Readings
		T	P	
Friday 1	**Intro to CS, DS and AI**			
12:30-14:00	**Introduction to AI: history, principles, myths vs. reality** How do data scientists analyse and process information?	2		Provost & Fawcett [Ch. 1].
14:15-15:45	**Module 1** Introduction to Computer Science and Data Analytics and Visualization.	2		Provost & Fawcett [Ch. 1, 2].
16:45-18:15	**Workshop 1** Algoritmic thinking – tic-tac-toe/decision trees.	1	1	The material and instructions for workshop will be provided by the instructor.
18:30-20:00	**Workshop 2** Case studies: How businesses employ data for competitive advantage.		2	TBA
Saturday 1	**Supervised Learning**			
9:00-10:30	**Module 2** Introduction to Machine Learning. Supervised Learning: Regression – prediction, evaluation and applications	2		Provost & Fawcett [Ch. 1-Ch.3].
10:45-12:15	**Module 3** Introduction to Machine Learning. Supervised Learning: Classification – decision-making, errors, confusion matrices	2		Grolemund & Wickham. Ch. 4-5]
13:15-14:45	**Workshop 3** ML in-class project and presentation.		2	The material and instructions for workshop will be provided by the instructor.
15:00-16:30	**Recap and Refresh** Review and in-class group activities to cement the knowledge acquired during the first week of classes.	1	1	The material and instructions for workshop will be provided by the instructor.

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Part 2

Day	Topic	Class hours		Readings
		T	**P**	
Friday 2	**Unsupervised Learning and Deep Learning**			
12:30-14:00	**Module 4** Introduction to Unsupervised Learning: Cluster Analysis.	1	1	Provost & Fawcett [Ch. 6-7].
14:15-15:45	**Module 5** Neural networks and deep learning.	2		TBA.
16:45-18:15	**Module 6** Generative AI: text, images, and audio in business applications.	2		IBM Research Blog on Generative AI.
18:30-20:00	**Workshop 3** Prompting generative AI tools (ChatGPT, image generation) and critique [or similar].		2	
Saturday 2	**Large Language Models, AI Ethics and Futrue Outlook**			
9:00-10:30	**Module 7** Large Language Models: capabilities, risks and business use cases.	1	1	TBA
10:45-12:15	**Module 8** Evaluating AI adoption strategies in organizations. Emerging AI frontiers: multimodal AI, autonomous agents, AI in decision-making. AI ethics.	1	1	EU AI Act
13:15-14:45	**Kaggle Competition** Group activity. The due date for the final machine learning model/student predictions will be announced after a discussion with the students.		2	The material and instructions for workshop will be provided by the instructor.
15:00-16:30	**Recap and Refresh** Review and in-class group activities to cement the knowledge acquired during the first week of classes.		2	The material and instructions for workshop will be provided by the instructor.
	Total class hours:	**17**	**15**	
	CONSULTATIONS		**2**	

	FINAL EXAM	**2**	

FINAL GRADE COMPOSITION

Part 1

Type of assignment	%
Individual Components	
Final Examination **(Oct 10)** Analytical case-based mini-project (in-class).	30
Total:	**30**

Part 2

Type of assignment	%
Group Components	
In-class assignments/participation	40
Kaggle competition	30
Total:	**70**

DESCRIPTION AND GRADING CRITERIA OF EACH ASSIGNMENT
(Provide short descriptions and grading criteria of each assignment)

Final Examination. The examination is an <u>individual assignment</u> and makes up 30% of the final grade. The exam is based on all of the material covered in the class.
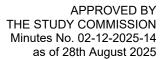
In-class assignments/group activities/participation. Students will have to complete at least four group activities, which will facilitate their understanding of the course material. These assignments make up 40% of the final grade.

Kaggle competition. Students will have to create a machine learning model/algorythm to predict scores from consumer reviews. Best performing groups will receive the highest grades. This group activity makes up the remaining 30% of the grade.

Note. Syllabus is subject to small changes.

Assessment requirements, procedures, and other important regulations may be communicated verbally during lectures. Failure to attend a lecture where such information is provided does not exempt the student from the responsibility to comply with these requirements.

Retake exam. Students who receive a failing final grade have a right to a retake exam, which comprises 30% of the final grade. **In-class assignments and Kaggle competition cannot be completed at a later time.**

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REQUIRED READINGS

Provost, F., Fawcett, T. (2013). Data Science for Business: What You Need to Know about Data Mining and Data-Analytic Thinking. United Kingdom: O'Reilly Media.

ADDITIONAL READINGS

TBA

SOFTWARE REQIOREMENTS

None.

ADDITIONAL REMARKS

The syllabus is subject to small changes.

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ANNEX

DEGREE LEVEL LEARNING OBJECTIVES

Learning objectives for the <u>**Master of Business Management**</u>
Programme:
Innovations and Technology Management

Learning Goals	Learning Objectives
Students will be innovative decision makers	LO1.1. Students will be able to define the business problem and develop **innovative solutions**.
	LO1.2. Students will become **independent learners** and develop their own comprehension of scientific theories, models, and concepts.
	LO1.3. Students will be able to demonstrate critical thinking in problem solving.
Students will be socially responsible leaders	LO2.1. Students will be able to evaluate past and current practices in their discipline from an **ethical perspective**.
Students will be effective communicators	LO3.1. Students will develop and deliver a **coherent oral presentation**.
	LO3.2. Students will develop and deliver a **coherent written research paper**.