COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Philosophy		
ACADEMIC UNIT	Department of Philosophy		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	**ΦΠ4.9**	SEMESTER	
COURSE TITLE	Reasoning, Cognition and Machines: from Aristotle to ChatGPT		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	WEEKLY TEACHING HOURS	CREDITS
	3	5
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Lecture-based, general background
PREREQUISITE COURSES:	None
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek. (Erasmus students can be provided with relevant study material and bibliography in English. They can also write their term papers in English).
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes
COURSE WEBSITE (URL)	

(2) LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

Upon completion of the course, students will have:

- gained a good understanding of concepts that run through the entire history of western philosophy concerning cognition, such as “logical reasoning”, “calculus”, “laws of thought”, “mechanization”, etc.
- become acquainted with a number of theoretical and practical attempts to mechanize rational thought and valid reasoning.
- understood the inherent difficulties that all such attempts to developing exclusively mechanical processes of reasoning had to face.
- mastered the appropriate conceptual tools to be able to critically evaluate older and contemporary discussions about the potential of AI to reason in a novel way.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Adapting to new situations
Decision-making
Working independently
Team work
Working in an international environment
Working in an interdisciplinary environment
Production of new research ideas
Project planning and management
Respect for difference and multiculturalism
Respect for the natural environment
Showing social, professional and ethical responsibility and sensitivity to gender issues
Criticism and self-criticism
Production of free, creative and inductive thinking
……
Others…
…….

Searching for, analyzing, and synthesizing information and philosophical ideas.
Independent research and study.
Sharpening of analytic and synthetic thought and skills.
Conceptual analysis.
Familiarization with the use of interdisciplinary methods in the analysis of philosophical issues.

(3) SYLLABUS

- The concept of “reasoning” and Aristotle's taxonomy of valid syllogisms.
- Ramon Lull: The first attempt to use mechanical components to draw conclusions from generally accepted assumptions (in this case, concerning theological issues).
- G. Leibniz's dream of creating a “universal language” and a suitable rational calculus, through which we could resolve any disagreement, of any nature (“Calculemus!”). The first mechanical “calculators”.
- G. Boole and the “Laws of Thought”.
- W.S. Jevons' “Logical Piano” and other logical machines.
- The birth of modern logic as a response to logical paradoxes and the need for mathematical rigor. Frege, Russell, Cantor.
- Hilbert's dream of an all encompassing formal system, within which we could mechanically determine whether there is a solution to any mathematical problem (“There is no ignorabimus in mathematics!”)
- K. Gödel's theorems and the most crucial blow to Hilbert’s dream.
- Turing machines and the discovery of problems that cannot be solved mechanically (the last nail to the coffin of Hillbert’s dream).
- The new understanding of what “mechanization” is, and the birth of modern computer science from the ashes of the old dreams.
- From contemporary computers to the AI of the 21st century. The “revived” dream.

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY *Face-to-face, Distance learning, etc.*	In the Classroom.
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	• Use of ICT in teaching and communicating with students. • Presentations – teaching with specialized software (ppt, videos, interactive digital environments, etc.).
TEACHING METHODS *The manner and methods of teaching are described in detail.* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.* *The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS*	

Activity	*Semester workload*
Lectures	39
Independent study	83
Final exam	3
Course total	125

STUDENT PERFORMANCE EVALUATION *Description of the evaluation procedure* *Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other* *Specifically-defined evaluation criteria are given, and if and where they are accessible to students.*	Written final exam in which students are asked to comment on topics and theses taught during the lectures. The exam includes a combination of longer and shorter questions (with some choice by the students on which questions to answer). Evaluation is based on the knowledge acquired, depth of understanding, clarity of exposition, and critical analysis skills demonstrated. Students can obtain timely information about the exact terms and format of the exam via the e-learn platform.

(5) ATTACHED BIBLIOGRAPHY

Suggested bibliography:

- Davis, M. (2001). *Engines of Logic: Mathematicians and the Origin of the Computer*. WW Norton & Co., Inc..
- Gardner, M. (1958). *Logic Machines and Diagrams.* The University of Chicago Press
- Glymour, C. (2015). *Thinking Things Through: An Introduction to Philosophical Issues and Achievements*. MIT Press.Boole G. (1854). *An Investigation of the Laws of Thought*. Walton & Maberly.
- Kneale, W. C., & Kneale, M. (1962). *The Development of Logic*. Oxford University Press.
- Horsten, Leon, and Philip Welch (eds), (2016). *Gödel's Disjunction: The Scope and Limits of Mathematical Knowledge*. Oxford Unversity Press
- Copeland, B. J. (Ed.). (2004). *The Essential Turing*. Clarendon Press

Related academic journals:

Minds and Machines. Synthese, Philosophy of Science, Studia Logica, Philosophia Mathematica. and others. Also: *The Stanford Encyclopedia of Philosophy:* https://plato.stanford.edu