COURSE OUTLINE

(1) GENERAL

SCHOOL	Engineering		
DEPARTMENT	Electrical and Computer Engineering		
LEVEL OF STUDY	Undergraduate		
COURSE UNIT CODE	7.021	**SEMESTER OF STUDY**	7th
COURSE TITLE	Logic Programming		

COURSEWORK BREAKDOWN	**TEACHING WEEKLY HOURS**	**ECTS Credits**
Lectures and Exercises	5	4
TOTAL	**5**	**4**

COURSE UNIT TYPE	Special Background
PREREQUISITES	None
LANGUAGE OF INSTRUCTION/EXAMS	Greek
COURSE DELIVERED TO ERASMUS STUDENTS	No
WEB PAGE (URL)	https://eclass.hmu.gr/courses/TP314/

(2) LEARNING OUTCOMES

Learning Outcomes
Upon successful completion of the course the student will acquire the following scientific knowledge, skills and abilities of the appropriate level. Familiarity with the basic principles of Computational Logic. Understanding Logic programming and its applications. Familiarity with the use of logic as a programming language. Understanding the Prolog programming language. Acquisition of the ability to represent problems in logic and solve them. Familiarity with the development of applications following the Logic Programming approach. Acquisition of programming skills in Prolog for solving practical problems.
General Skills
The course aims to acquire, by the graduate, the following general skills: • Search, analysis and synthesis of data and information, using the necessary technologies. • Adaptation to new situations. • Autonomous work. • Teamwork. • Work in an interdisciplinary environment. • Production of new research ideas. • Promoting free, creative and inductive thinking. • Application of knowledge in practice.

(3) SYLLABUS

- Formulas and their truth, logical equivalences and transformations of formulas into regular forms in propositional calculus. Semantic consistency, deriving conclusions and resolution in propositional calculus.
- Syntactic components of predicate calculus. Interpretation of sentences, semantic consistency, logical equivalences, transformations of formulas into regular forms and deriving conclusions in predicate calculus.
- Substitution. Unification.
- The resolution in predicate calculus. SLD-Resolution and SLD trees.
- Definite logic programs.
- Negation in logic programming.
- Normal logic programs.
- General logic programs.
- Basic components of a Prolog program. Unification, Equality. Input and output predicates.
- Recursion. Lists. Arithmetic in Prolog. Call mode of a predicate. Structure construction in the head and in the body of clauses.
- Search Tree, backtracking and Cut (!). Negation in Prolog. Control flow in Prolog programs.
- User-defined operators.
- Embedded predicates: (Input from a file and output to a file. Metalogical predicates. Predicates that collect all solutions of a goal. Program update predicates. Other embedded predicates.).
- Data Structures in Prolog. Programming techniques.
- Applications of Logic Programming.

(4) TEACHING METHODS - ASSESSMENT

<table>
<tr><td>MODE OF DELIVERY</td><td>In-Class Face-to-Face</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATION TECHNOLOGY</td><td>Use of ICT in lectures.
Use of ICT in labs.
Use of ICT in communicating with students through the electronic platform e-class.</td></tr>
<tr><td>TEACHING ORGANISATION</td><td>
<table>
<tr><th>Method description / Activity</th><th>Semester Workload</th></tr>
<tr><td>Lectures</td><td>52</td></tr>
<tr><td>Lab</td><td>13</td></tr>
<tr><td>Independent study</td><td>55</td></tr>
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<tr><td>Total Contact Hours</td><td>120</td></tr>
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<tr><td>ASSESSMENT METHODS</td><td>Language of Assessment: Greek

Evaluation methods:
1.Written final exam (70%)
• problem solving.
2.Mid-term exam 30%.
3.Written examination with questions requiring extended answers.
4. Evaluation of written laboratory exercises.
5. Written teamwork.
6. Written individual assignments.
7. Lab assignments.</td></tr>
</table>

(5) RECOMMENDED BIBLIOGRAPHY

In Greek

1. *M. Marakakis, Prolog: Programming in Logic for Artificial Intelligence, New Technologies Publications, 2nd edition, 2019, ISBN: 978-960-578-055-5.*
2. *H. Sakellariou, N. Vasiliadis, P. Kefalas, D. Stamatis, Techniques of Logic Programming, - The Language Prolog, Greek Academic Textbooks and Aids, www.kallipos.gr, Hellenic Academic Libraries Association, 2015, ISBN: 978-960-603-246-2.*
3. *G. Mitakidis, From Logic to Logic Programming, Kardamitsa Publications, 1992, ISBN: 960-7262-59-X.*

In English

1. *I. Bratko, Prolog Programming for Artificial Intelligence, Pearson Education Canada, 4th edition, 2011, ISBN 13: 9780321417466.*
2. *U. Nilsson and J. Maluszynski, Logic, Programming and Prolog, Second edition, John Wiley & Sons, 1995, ISBN: 0 471 95996 0.*

- *Related Scientific Journals:*

1. Theory and Practice of Logic Programming, Cambridge University Press.
2. ACM Transactions on Computational Logic, ACM.
3. New generation computing, Springer.