COURSE OUTLINE

(1) GENERAL

<table>
<thead>
<tr>
<th>SCHOOL</th>
<th>School of Engineering, University of Patras</th>
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<tr>
<td>ACADEMIC UNIT</td>
<td>Department of Computer Engineering and Informatics</td>
</tr>
<tr>
<td>LEVEL OF STUDIES</td>
<td>Undergraduate Core Elective</td>
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<tr>
<td>COURSE CODE</td>
<td>CEID_NE552</td>
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<tr>
<td>SEMESTER</td>
<td>SPRING</td>
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<tr>
<td>COURSE TITLE</td>
<td>INTELLIGENT SYSTEMS TECHNOLOGIES AND ROBOTICS</td>
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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

| Lectures, Tutorials, Lab Sessions (Project) | 2, 1, 2 | 5 |

Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).

TOTAL 5

COURSE TYPE
specialised general knowledge, skills development.

PREREQUISITE COURSES:
There are no prerequisite courses. Recommended background knowledge: Data Structures (CEID_NE233), Algorithms (CEID_NY205), and Programming (CEID_NY131, CEID_NY134)

LANGUAGE OF INSTRUCTION and EXAMINATIONS:
Greek. Instruction may be given in English if foreign students attend the course.

IS THE COURSE OFFERED TO ERASMUS STUDENTS?
YES

COURSE WEBSITE (URL)
https://eclass.upatras.gr/courses/CEID1095/

(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

Learning outcomes:
At the end of this course the student will be able to:
• Design and implement LISP programs
• Generate rules by applying decision tree algorithms through the WEKA tool
• Design and implement rule-based programs with the CLIPS tool
• Evaluate the performance of classification systems with appropriate metrics
• Describe the structure and function of robotic agents
• use ROS system for robot software development
• Describe algorithms for the SLAM problem
• describe maze solving algorithms

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

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

### (3) SYLLABUS

#### First part
- Functional Programming - LISP Language
- Symbolic expressions, Basic functions, Definition of functions-program
- Assign-Let, Flow Control-if, cond, dolist, do, dotimes, Flash, Structures, Input-Output
- Artificial Intelligence Applications in LISP
- Development of LIPS implementation

#### Second part
- Rule Based Programming
- Intelligent Rules-Based Systems
- Development of Intelligent Systems
- Methodologies, Tools
- CLIPS Tool: Structure, Event and Rule Drawing, Functions, Conflict Resolution Strategies
- Application development in CLIPS

#### Third part
- Introduction to Robotics
- Robotic Intelligent Agents
- ROS Operating System
- The SLAM problem
- Resolving labyrinths

### (4) TEACHING and LEARNING METHODS - EVALUATION

#### DELIVERY
- Face-to-face, Distance learning, etc.

#### USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
- Use of ICT in teaching, laboratory education, communication with students

#### 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.

#### Activity | Semester workload
--- | ---
Lectures | 60
Tutorials | 30
Lab Sessions (Projects) | 60
Course total | 150

#### STUDENT PERFORMANCE EVALUATION
- Description of the evaluation procedure
- Language of evaluation, methods of evaluation, summative or conclusive,

- 1st Project Development: Developing a LISP program (35% of the total grade)
- 2nd Project Development: Developing a CLIPS classification system from data (45% of the total grade)
- 3rd Project development: Developing a robotic agent in
### 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.

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<tr>
<th>ROS (20% of the total grade)</th>
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### ATTACHED BIBLIOGRAPHY

- **Suggested bibliography:**
  - Βλαχάβας Ιωάννης, Κεφάλας Πέτρος, Βασιλειάδης Νικόλαος, Κόκκορας Φώτης, Σακελλαρίου Ηλίας. Τεχνητή Νοημοσύνη. Εκδόσεις Παν/μιου Μακεδονίας, Διαθέτης: Εταιρεία Αξιοποίησης και Διαχείρισης Περιουσίας του Πανεπιστημίου Μακεδονίας, Θεσσαλονίκη, 2011.
  - Ι. Χατζηλυγερούδη και Κ. Κουτσογιάννης. Ευφυής Προγραμματισμός. Πανεπιστημιακές Παραδόσεις, Πανεπίστημιο Πατρών, 2006
  - Sebastian Thrun, Wolfram Burgard, Dieter Fox. Πιθανοτική Ρομποτική. Εκδόσεις Κλειδάριθμο ΕΠΕ, Αθήνα, 2011.