COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Engineering, University of Patras		
ACADEMIC UNIT	Department of Computer Engineering and Informatics		
LEVEL OF STUDIES	Undergraduate Core Elective		
COURSE CODE	CEID_NE552	**SEMESTER**	SPRING
COURSE TITLE	INTELLIGENT SYSTEMS TECHNOLOGIES AND ROBOTICS		

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**
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 *general background, special background, specialised general knowledge, skills development*	Specialised general knowledge and 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	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
	Respect for the natural environment
	Showing social, professional and ethical responsibility and

Decision-making	*sensitivity to gender issues*
Working independently	*Criticism and self-criticism*
Team work	*Production of free, creative and inductive thinking*
Working in an international environment	*……*
Working in an interdisciplinary environment	*Others…*
Production of new research ideas	*…….*

Search for, analysis and synthesis of data and information, with the use of the necessary technology
Decision-making
Working independently
Team work
Project planning and management
Production of free, creative and inductive thinking
Production of new research ideas

(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.*	Face-to-face
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY *Use of ICT in teaching, laboratory education, communication with students*	Information and Communications Technologies are used in communicating with students. We use: eclass, email and forum.
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: 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.*	ROS (20% of the total grade)

(5) 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. Χατζηλυγερούδης και Κ. Κουτσογιάννης. Ευφυής Προγραμματισμός. Πανεπιστημιακές Παραδόσεις, Πανεπιστήμιο Πατρών, 2006
- Sebastian Thrun, Wolfram Burgard, Dieter Fox. Πιθανοτική Ρομποτική. Εκδόσεις Κλειδάριθμος ΕΠΕ, Αθήνα, 2011.
- http://wiki.ros.org/