COURSE OUTLINE

1. GENERAL INFORMATION

SCHOOL	MARITIME AND INDUSTRIAL STUDIES		
DEPARTMENT	INDUSTRIAL MANAGEMENT AND TECHNOLOGY		
LEVEL OF STUDY	UNDERGRADUATE		
COURSE UNIT CODE	ΤΕΠΑΡ03	**SEMESTER OF STUDY**	7th
COURSE TITLE	ARTIFICIAL INTELLIGENCE (ELECTIVE COURSE)		

INDEPENDENT TEACHING ACTIVITIES *in case in which credits are awarded for separate components/parts of the course, e.g. in lectures, laboratory exercises, etc. If credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures, Lab, Project		5.5
Add rows if necessary. The organization of teaching and the teaching methods used are described in detail at section 4.		

COURSE TYPE *general background, special background, specialized general knowledge, skills development*	Special background
PREREQUISITE COURSES:	None
LANGUAGE OF INSTRUCTION and EXAMINATION/ASSESSMENT:	Greek / English (in ERASMUS class)
THE COURSE IS 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 (certain) level, which students will acquire upon successful completion of the course, are described in detail. It is necessary to consult:

APPENDIX A

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

The course presents the possibilities and perspectives of artificial intelligence as it analyzes a series of core issues such as problem representation, problem solving techniques, use of logic in problem solving, mechanical learning and optimization.

Upon successful completion of the course students will:

- Demonstrate knowledge on basic issues of artificial intelligence
- Be familiar with the use of knowledge representation methods with propositional and categorical logic, as well as with retrospective rules
- Demonstrate knowledge on the basic structures of search algorithms
- Have developed basic intelligent agent programming plans
- Know in depth the features of an expert system
- Be trained in programming

General Competences

Taking into consideration the general competences that students/graduates must acquire (as those are described in the Diploma Supplement and are mentioned below), at which of the following does the course attendance aims

Search for, analysis and synthesis of data and information, by the use of technologies that are necessary according the case
Adapting to new situations
Decision-making
Independent work
Team work
Working in an international environment
Working in an interdisciplinary environment
Introduction of innovative research
Project planning and management
Respect for difference and multiculturalism
Environmental awareness
Social, professional and ethical responsibility and sensitivity to gender issues
Critical consciousness, criticism and self-criticism
Development of free, creative and inductive thinking

- Search for, analysis and synthesis of data and information, by the use of technologies that are necessary according the case
- Adapting to new situations
- Decision-making
- Independent work
- Team work
- Working in an international environment (ERASMUS)
- Working in an interdisciplinary environment (ERASMUS)
- Introduction of innovative research
- Respect for difference and multiculturalism
- Social, professional and ethical responsibility and sensitivity to gender issues
- Development of free, creative and inductive thinking

2. COURSE CONTENT

The course covers the following topics:

1. INTRODUCTION
    - 1.1. COMPUTERS
    - 1.2. NATURAL AND ARTIFICIAL INTELLIGENCE
    - 1.3. ACIEVING ARTIFICIAL INTELLIGENCE
    - 1.4. DEVELOPMENT OF ARTIFICIAL INTELLIGENCE
        - 1.4.1. The history of AI
        - 1.4.2. AI milestones
        - 1.4.3. AI progress evaluation
    - 1.5. UP-TO-DATE PROSSIBILITIES OF AI
    - 1.6. COURSE SCOPE
2. PROBLEM REPRESENTATION
    - 2.1. SEMANTICS
    - 2.2. SELECTION OF SEMANTICS
        - 2.2.1. First AI representation
        - 2.2.2. Second AI representation
        - 2.2.3. Third AI representation
    - 2.3. MANAGING SEMANTICS - LOGIC
        - 2.3.1. Propositional logic
        - 2.3.2. Predicate logic
    - 2.4. FUZZY LOGIC
3. AI PROBLEM SOLVING TECHNIQUES
    - 3.1. SEARCHING
        - 3.1.1. Solving by means of searching in the problem environment
        - 3.1.2. Serach methods (British museum, depth first, breadth first, best first, beam, hill climbing, branch and bound, dynamic programming, A*)
    - 3.2. SOLVING AS ANALYSIS AND SATISFACTION OF CONSTRAINTS
4. USING LOGIC TO SOLVE PROBLEMS
    - 4.1. EVERYDAY KNOWLEDGE

4.1.1. Semantic nets
4.1.2. Figures
4.1.3. Natural language processing
4.1.4. Knowledge-based systems)
4.2. EXPERT KNOWLDGE
4.2.1. Rule-based systems (prospective, retrospective)
4.2.2. Expert systems, EC standard, MYCIN
4.2.3. Fuzzy expert systems
5. MACHINE LEARNING
5.1. STRATEGIES FOR AI LEARNINGTECHNIQUES
5.2. ARTIFICIAL NEURAL NETWORKS
5.2.1. Basic elements of brain structure
5.2.2. basic elements of ANN structure
5.2.3. ANN learning
5.2.3. ANN evaluation
6. OPTIMIZATION
6.1. GENETIC ALGORITHMS

Students also attend a laboratory training program in the Laboratory of Production Management Information Systems in order to develop an intuitive and hands-on understanding of the concepts presented in the lectures. The software used is MS EXCEL or equivalent (Open Office, etc.). Students are trained in workshops with a rotation system. The workshop program is posted on the course website and eclass at the beginning of the semester..

In addition, articles, audiovisual lecture material, web addresses, useful information and case studies are posted at eclass.

3. TEACHING METHODS - ASSESSMENT

TEACHING MODE *Face-to-face, in-class lecturing, on distance teaching and distance learning etc.*	In-class lecturing / Laboratory teaching
USE OF INFORMATION AND COMMUNICATION TECHNOLOGY *Use of ICT in Teaching, Laboratory Education, Communication with students*	**Teaching:** Lectures with audiovisual media, support of the learning process through the eclass platform **Laboratory Education:** Use of open use software **Communication with students:** face-to-face at office hours, email, eclass
COURSE DESIGN *Description of teaching techniques, practices and methods:* *Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, clinical practice, Art Workshop, Interactive teaching, Educational visits, project, Essay writing, Artistic creativity, etc.* *The study hours for each learning activity as well as the hours of non- directed study are given according to the principles of the ECTS*	
STUDENT PERFORMANCE EVALUATION/ASSESSMENT METHODS *Detailed description of the evaluation procedures:* *Language of evaluation, assessment methods, formative or summative (conclusive), multiple choice questionnaires, short- answer questions, open-ended questions, problem solving, written*	**Language of exams:** Greek / English (in ERASMUS class) **Assessment Methods:** After the last lecture, the exam material is posted at eclass. The final course grade is formed as follows: • By the participation of students in class activities (10%) • By the project (40%)

Activity / Method	***Semester Workload***
Lectures	26
Laboratory	26
Project	55
Self-study of lecture material and exercises	28
Counselling	0.5
Exams (written)	2
Course Total	***137.5***

work, Essay/report, oral exam, public presentation, laboratory work, art interpretation, other……etc *Evaluation criteria are specifically defined and given as well as if and where they are reported and accessible to students.*	• By the written exams (50%) taken in the examination period of the winter semester and, in case of failure, in the September resits The written examination includes problem solving/exercises and short-answer questions. It is conducted with closed books. The evaluation of students with special learning difficulties in writing and reading (as certified and qualified by a competent institution) is performed according to the relevant procedure decided by the Department Assembly. **Notification of the Assessment Criteria:** The evaluation criteria are made known during the first lecture and are clearly stated on the course website and e-class. The answers to the exam questions are posted at eclass after the exam date. Students have the opportunity to discuss their exam paper with the course instructor (at the posted office hours) after the announcement of the course grades.

4. SUGGESTED BIBLIOGRAPHY

-Suggested Bibliography :
-Scientific Journals: not applicable
-Lecture Notes
-Laboratory Workbook