

## COURSE OUTLINE

### (1) GENERAL

|                                                                                                                                                                                                                                                                       |                                                                                                 |                              |                       |
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| <b>SCHOOL</b>                                                                                                                                                                                                                                                         | Social Sciences                                                                                 |                              |                       |
| <b>ACADEMIC UNIT</b>                                                                                                                                                                                                                                                  | Cultural Technology and Communication                                                           |                              |                       |
| <b>LEVEL OF STUDIES</b>                                                                                                                                                                                                                                               | Undergraduate                                                                                   |                              |                       |
| <b>COURSE CODE</b>                                                                                                                                                                                                                                                    | <b>PLR 143</b>                                                                                  | <b>SEMESTER</b>              | <b>7<sup>th</sup></b> |
| <b>COURSE TITLE</b>                                                                                                                                                                                                                                                   | Semantic Web                                                                                    |                              |                       |
| <b>INDEPENDENT TEACHING ACTIVITIES</b><br><i>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</i> |                                                                                                 | <b>WEEKLY TEACHING HOURS</b> | <b>CREDITS</b>        |
| Lectures                                                                                                                                                                                                                                                              |                                                                                                 | 1                            | 2                     |
| Laboratories                                                                                                                                                                                                                                                          |                                                                                                 | 2                            | 3                     |
|                                                                                                                                                                                                                                                                       |                                                                                                 |                              |                       |
| <i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>                                                                                                                                              |                                                                                                 | 3                            | 5                     |
| <b>COURSE TYPE</b><br><i>general background, special background, specialised general knowledge, skills development</i>                                                                                                                                                | Optional/Special Background                                                                     |                              |                       |
| <b>PREREQUISITE COURSES:</b>                                                                                                                                                                                                                                          | No                                                                                              |                              |                       |
| <b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>                                                                                                                                                                                                                      | Greek/English                                                                                   |                              |                       |
| <b>IS THE COURSE OFFERED TO ERASMUS STUDENTS</b>                                                                                                                                                                                                                      | Yes                                                                                             |                              |                       |
| <b>COURSE WEBSITE (URL)</b>                                                                                                                                                                                                                                           | <a href="https://eclass.aegean.gr/courses/131329/">https://eclass.aegean.gr/courses/131329/</a> |                              |                       |

### (2) LEARNING OUTCOMES

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| <b>Learning outcomes</b><br><i>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.</i><br>Consult Appendix A <ul style="list-style-type: none"> <li>• Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</li> <li>• Descriptors for Levels 6, 7 &amp; 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</li> <li>• Guidelines for writing Learning Outcomes</li> </ul>                                                                              |
| At the end of this course, the students should be able to: <ul style="list-style-type: none"> <li>• Be familiar with the technologies for structured documents, data and knowledge representation, such as RDF, RDFS, OWL.</li> <li>• Understand concepts and practices related to the Ontology Engineering.</li> <li>• Be familiar with a of ontologies and applications of the Semantic Web.</li> <li>• Be familiar with the ontology-based access, integration and retrieval of (large volumes) heterogeneous data and knowledge (SPARQL, OBDA).</li> <li>• Understand the concept of Linked Data.</li> <li>• Understand the way of applying the above in the specific needs of Cultural Environments and Applications.</li> </ul> |
| <b>General Competences</b><br><i>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?</i><br><div style="display: flex; justify-content: space-between;"> <div> Search for, analysis and synthesis of data and information,<br/>with the use of the necessary technology<br/>Adapting to new situations </div> <div> Project planning and management<br/>Respect for difference and multiculturalism<br/>Respect for the natural environment </div> </div>                                                                                                                              |

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| <i>Decision-making</i><br><i>Working independently</i><br><i>Team work</i><br><i>Working in an international environment</i><br><i>Working in an interdisciplinary environment</i><br><i>Production of new research ideas</i>                                                                                                                                                                               | <i>Showing social, professional and ethical responsibility and sensitivity to gender issues</i><br><i>Criticism and self-criticism</i><br><i>Production of free, creative and inductive thinking</i><br>.....<br><i>Others...</i><br>..... |
| <ul style="list-style-type: none"> <li>• Search for, analysis and synthesis of data and information, with the use of the necessary technology</li> <li>• Working independently</li> <li>• Production of free, creative and inductive thinking</li> <li>• Transfer of know-how in other environments</li> <li>• Working in an interdisciplinary environment</li> <li>• Practice Critical Thinking</li> </ul> |                                                                                                                                                                                                                                            |

### (3) SYLLABUS

The course focuses on the Semantic Web technologies and the Internet of Things. Initially, an introduction in the Semantic Web, its vision and basic principles is provided. Later, the main technologies for structuring documents, for data and knowledge representation are presented (XML, RDF, RDFS, OWL). Emphasis is given in the engineering of Ontologies, in well-known ontologies and in their application in the Semantic Web. In addition, the following topics will be discussed: a) Ontology-based accessing, integration and retrieval of (large volumes) heterogeneous data and knowledge (SPARQL, OBDA), b) Linking (Big) Data.

1. Introduction to the Semantic Web I
2. Introduction to the Semantic Web II
3. RDF
4. RDFS
5. SPARQL
6. OWL
7. Ontology development (Protégé)
8. SWRL
9. JENA, Fuseki Server
10. Ontology Engineering, Methodologies
11. Linked Data
12. HTML Embedded Semantics (RDFa, Microdata, Schema.org)
13. Special Issues: Semantic Web of Data, Semantic Interoperability, etc.

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

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| <b>DELIVERY</b><br><i>Face-to-face, Distance learning, etc.</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Face-to-face                                                                                                                                                                                                                                                                                                                                                                                                                      |                          |
| <b>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</b><br><i>Use of ICT in teaching, laboratory education, communication with students</i>                                                                                                                                                                                                                                                                                                                                                                                             | Use of open source software for laboratory education or software with free license for Universities. Use ICT in teaching and communication with students. Also, the practice with W3C tutorials is proposed.                                                                                                                                                                                                                      |                          |
| <b>TEACHING METHODS</b><br><i>The manner and methods of teaching are described in detail.<br/> 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.<br/><br/> 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</i>                              | <b>Activity</b>                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>Semester workload</b> |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Διαλέξεις                                                                                                                                                                                                                                                                                                                                                                                                                         | 13 *3 ώρες =39 ώρες      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Μελέτη διαλέξεων                                                                                                                                                                                                                                                                                                                                                                                                                  | 13*2 ώρες = 26 ώρες      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Εργασία Εξαμήνου                                                                                                                                                                                                                                                                                                                                                                                                                  | 13*3=39 ώρες             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Προετοιμασία Εκπόνησης Εργασίας                                                                                                                                                                                                                                                                                                                                                                                                   | 13*2= 26 ώρες            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                   |                          |
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| <b>STUDENT PERFORMANCE EVALUATION</b><br><i>Description of the evaluation procedure<br/><br/> 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<br/><br/> Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i> | <b>Σύνολο Μαθήματος</b>                                                                                                                                                                                                                                                                                                                                                                                                           |                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 130 ώρες<br><br>Students are familiar with the evaluation criteria from the first course lecture. All notes are stored in the course's area in University e-class platform (eclass.aegean.gr).<br><br>The evaluation of students' performance is conducted at the end of the semester with a final assignment for the course, with a weighted percentage of 100%.<br><br><b>Interim project: 30%</b><br><b>Final project: 70%</b> |                          |

#### (5) ATTACHED BIBLIOGRAPHY

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| <p>- <i>Suggested bibliography:</i></p> <ul style="list-style-type: none"> <li>- Semantic Web for the Working Ontologist, G.A Vouros, K. Kotis, G. Santipantakis. <a href="https://www.disigma.gr/simasiologikos-istos.html">https://www.disigma.gr/simasiologikos-istos.html</a>. Greek version of the book "Semantic Web for the Working Ontologist: Effective Modeling in RDFS and OWL", by Dean Allemang, James Hendler.</li> <li>- Introduction to the Semantic Web (Semantic Web Primer) Grigoris Antoniou, Frank van Harmelen, ISBN: 978-960-461-234-5</li> </ul> <p>- <i>Related academic journals:</i></p> <ul style="list-style-type: none"> <li>- Journal of Web Semantics (Elsevier)</li> <li>- Knowledge and Information Systems (Springer)</li> <li>- Semantic Web Journal (IOS press)</li> <li>- International Journal on Semantic Web and Information Systems (IGI Global)</li> <li>- Open Journal of Semantic Web (OJSW)</li> <li>- Knowledge Engineering Review (KER)</li> </ul> |
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