

COURSE OUTLINE

(1) GENERAL

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|---|---|-----------------|---|
| SCHOOL | Social Sciences | | |
| ACADEMIC UNIT | Cultural Technology and Communication | | |
| LEVEL OF STUDIES | Undergraduate | | |
| COURSE CODE | KPLR 118 | SEMESTER | 8 |
| COURSE TITLE | DATA MINING FROM DIGITAL AND WEB CONTENT | | |
| INDEPENDENT TEACHING ACTIVITIES <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> | WEEKLY TEACHING HOURS | CREDITS | |
| 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 | |
| COURSE TYPE <i>general background, special background, specialised general knowledge, skills development</i> | Core Course/General Background | | |
| PREREQUISITE COURSES: | None | | |
| LANGUAGE OF INSTRUCTION and EXAMINATIONS: | Greek | | |
| IS THE COURSE OFFERED TO ERASMUS STUDENTS | Yes | | |
| COURSE WEBSITE (URL) | https://eclass.aegean.gr/courses/131303/ | | |

(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

The students will be in the position to:

- Understand the requirements for performing knowledge discovery from data basis
- Get familiar with the standard methodologies for knowledge discovery from data basis
- Implement nearest neighbor classification, and rule-based classification.
- Implement different types of data clustering such as: the hierarchical clustering, the c-means and the fuzzy c-means algorithms
- Comprehend the basic functionality of the Kohonen network
- Develop and apply knowledge discovery in Web content

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
Decision-making

Project planning and management
Respect for difference and multiculturalism
Respect for the natural environment
Showing social, professional and ethical responsibility and

| | |
|--|--|
| <i>Working independently</i> | <i>sensitivity to gender issues</i> |
| <i>Team work</i> | <i>Criticism and self-criticism</i> |
| <i>Working in an international environment</i> | <i>Production of free, creative and inductive thinking</i> |
| <i>Working in an interdisciplinary environment</i> | |
| <i>Production of new research ideas</i> | <i>Others...</i> |
| | |

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Adapting to new situations
- Decision-making
- Working independently
- Team work
- Project planning and management
- Production of free, creative and inductive thinking
- Working in an interdisciplinary environment

(3) SYLLABUS

Basic concepts of data bases and knowledge discovery in large data sets. Data pre-processing, classification algorithms, and clustering algorithms. Techniques for establishing relationships for various types of data sets. Tools for knowledge discovery. Knowledge discovery in Web-based content by applying data mining methods.

The course is structured as follows:

1. Introduction in Data Mining
2. Data types: (a) Arithmetical data and (b) Categorical data, (c) Metadata.
3. Description of the mathematical tools used in data mining.
4. Typical data mining model (Part I).
5. Typical data mining model (Part II).
6. Introduction to cluster analysis
7. The k-Means Algorithm (Part I)
8. The k-Means Algorithm (Part II)
9. Kohonen networks and learning vector quantization.
10. Image segmentation: Application to digitized art paintings.
11. Image compression: Application to digitized art paintings.
12. Introduction to Business Intelligence
13. Summary and determination of the key points

(4) TEACHING and LEARNING METHODS - EVALUATION

| <p style="text-align: center;">DELIVERY <i>Face-to-face, Distance learning, etc.</i></p> | Face-to-face | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|--|-----------------|--------------------------|----------|-----------------------|-----------------|-----------------------|---------------------|-----------------|--|----------|--|--|--|--|--|--|--|--|--|--|--|--|--------------|------------------|
| <p style="text-align: center;">USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, communication with students</i></p> | Use of open source software (such as OCTAVE and ANACONDA BASED PYTHON) for laboratory education. | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p style="text-align: center;">TEACHING METHODS <i>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.</i></p> <p><i>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></p> | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;"><i>Activity</i></th> <th style="text-align: center;"><i>Semester workload</i></th> </tr> </thead> <tbody> <tr> <td>Lectures</td> <td style="text-align: center;">13 *1 hours =13 hours</td> </tr> <tr> <td>Lectures' study</td> <td style="text-align: center;">13*5 hours = 65 hours</td> </tr> <tr> <td>Laboratory Practice</td> <td style="text-align: center;">13*2 = 26 hours</td> </tr> <tr> <td>Laboratory Preparation and semester assignment</td> <td style="text-align: center;">33 hours</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td>Course total</td> <td style="text-align: center;">137 hours</td> </tr> </tbody> </table> | | <i>Activity</i> | <i>Semester workload</i> | Lectures | 13 *1 hours =13 hours | Lectures' study | 13*5 hours = 65 hours | Laboratory Practice | 13*2 = 26 hours | Laboratory Preparation and semester assignment | 33 hours | | | | | | | | | | | | | Course total | 137 hours |
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| <p style="text-align: center;">STUDENT PERFORMANCE EVALUATION <i>Description of the evaluation procedure</i></p> <p><i>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</i></p> <p><i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i></p> | <p>The final examination is the main tool to evaluate student's performance. In this exam the student gets involved in solving complex programming problems.</p> <p>During semester, each student is also invited to carry out optional homework tests. If the student accepts the invitation, these tests will be positively considered in student's final evaluation.</p> <p>The evaluation criteria are clearly announced during the first lecture and in the e-class web site.</p> | | | | | | | | | | | | | | | | | | | | | | | | | |

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

- Roiger R.J., Geatz M.W., Εξόρυξη Πληροφορίας, (Επιμέλεια μετάφρασης Ευαγγελίδης Γ., Σαμαράς Ν., Δέρβος Δ.), Εκδόσεις Κλειδάριθμος, 2008.
- Zaki M. J., Meira W. J., Εξόρυξη και Ανάλυση Δεδομένων, (Επιμέλεια μετάφρασης Μεγαλοοικονόμου Β, Μακρής Χ.), Εκδόσεις Κλειδάριθμος, 2017.