COURSE LAYOUT

1. GENERAL

SCHOOL	FOOD, BIOTECHNOLOGY AND DEVELOPMENT		
DEPARTMENT	BIOTECHNOLOGY		
STUDY LEVEL	*Undergraduate*		
COURSE CODE	**222**	**SEMESTER**	9th
COURSE TITLE	INTELLIGENT SYSTEMS AND DATA MINING (SELECTIVE)		

INDEPENDENT TEACHING ACTIVITIES	WEEKLY TEACHING HOURS	ECTS
Theory: Lectures	3	
Laboratory: Use of Software Tools	2	

COURSE TYPE	General knowledge, Scientific Area, Skills development
PREREQUISITES	
LANGUAGE	Greek
IS THE COURSE OFFERED forERASMUS STUDENTS?	Yes (in Greek)
COURSE WEB PAGE	http://openeclass.aua.gr

2. LEARNING OUTCOMES

Learning Outcomes

Upon successful completion of this course , the student will
- be aware of the possibilities and the individual branches of Artificial Intelligence that can be implemented in areas of Biotechnology ,
- understand the meaning and characteristics of an intelligent system
- understand the concept of an intelligent training system
- justify whether it is possible to develop a system based on Artificial Intelligence,
- be able to distinguish and choose the most appropriate method for knowledge extraction through large data sets,
- acquire the necessary skills to exploit ready-made tools for data mining , in order to develop an intelligent system,
- be able to organize his/her data in simple files or in Database to be ready for data mining processing ,
- be able to use basic SQL commands to manipulate data in a DB ,
- combine results of classification, clustering and association rules and will be able to end up with the production of new knowledge .

General Competences

- Data retrieval, analysis and synthesis of data and information through the use of new information technologies.
- Adapting to new situations.
- Decision making.
- Individual work.
- Teamwork.
- Work in a multidisciplinary environment
- production of new research ideas.
- Design and project management.

• Promotion of free, creative and inductive way of thinking.

3. COURSE CONTENT

Theory
1. Introduction to Databases: Data base Models, Introduction to SQL.
2. Data Warehousing: Definition, data transformation.
3. Introduction to Artificial Intelligence:
   - Expert Systems (Architecture Expert Systems , Knowledge Representation , knowledge processing , knowledge engineering , expert systems development).
   - Artificial Neural Networks (Model neuron , Principles , training , Evaluation , Categories of Artificial Neural Networks Use of tools for the development of Artificial Neural Networks)
4. Methods and techniques of data mining.
   - Classification (classification models, types and evaluation of classifiers).
   - Clustering (clustering concept, set of basic clustering algorithms).
   - Basic Association Rules.

Laboratory
1. Exploitation and use of tools for data mining purpose (WEKA, Analysis Services).
2. Exploitation and use of tools for data Warewouses
3. Exploitation and use of Software development tools for expert system and Artificial Neural Networks.
4. Development of Educational Applications of Intelligent Systems with emphasis in Biology and Biotechnology.

4. TEACHING and LEARNING METHODS - Evaluation

TEACHING METHOD	In classroom and in laboratory (face-to-face)
USE OF INFORMATICS and COMMUNICATION TECHNOLOGIES	Exploitation of Information and Communication Technologies in teaching, in laboratory training and in the communication with students. Use of dedicated software. Use of integrated e-learning system. Communication with students via open eclass platform and e-mail.
TEACHING ORGANISATION	<table><tr><td>*Activity*</td><td>*Work Load*</td></tr><tr><td>Lectures</td><td>39 hours</td></tr><tr><td>Laboratory work</td><td>26 hours</td></tr><tr><td>Individual Study</td><td>60 hours</td></tr><tr><td>***Total contact hours and training***</td><td></td></tr></table>
STUDENTS EVALUATION	**I. Theory** Final Exam, written or oral, of increasing difficulty, which may include Multiple choice test, Questions of brief answer, Questions to develop a topic, Judgment questions and Exercise solving. Assuming feasibility, progress exams will take place during the semester whose marking will contribute to the determination of the final theory mark. **Marking Scale:** 0-10. **Minimum Passing Mark:** 5. **II. Laboratory** Final Exam, hands on computer, of the software tools taught. Assuming feasibility, • the performance of the trainees at the exercises

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assigned το them during the semester will be evaluated,

- Progress exams will take place during the semester, and the mark of the above will contribute to the determination of the final Laboratory mark.

Marking Scale: 0-10.
Minimum Passing Mark: 5.

The final Course mark is the average of the marks on Theory and Lab.

If needed, the evaluation can be performed electronically through the eClass platform. The evaluation criteria are known in advance and uploaded into the electronic page of the course in eClass. The students are able to access their examination deliverables.
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BIBILIOGRAPHY

Related Literature:
1. Tan Pang - Ning, Steinbach Michael,Kumar Vipin, **Introduction to Data Mining**. 2nd Edition, ΕΚΔΟΣΕΙΣ Α. ΤΖΙΟΛΑ & ΥΙΟΙ Α.Ε., 2018, Athens.
2. Anand Rajaraman, Jeffrey David Ullman, Jure Leskovec, **Mining of Massive Datasets**. 3rd Edition, ΕΚΔΟΣΕΙΣ ΝΕΩΝ ΤΕΧΝΟΛΟΓΙΩΝ ΙΔΙΩΤΙΚΗ ΚΕΦΑΛΑΙΟΥΧΙΚΗ ΕΤΑΙΡΕΙΑ, 2020, Athens.
3. Νικόλαος Ματσατσίνης, **Επιχειρηματική Ευφυΐα, Αναλυτική και Ανάλυση Μεγάλων Δεδομένων για Λήψη Αποφάσεων**. ΕΚΔΟΣΕΙΣ ΝΕΩΝ ΤΕΧΝΟΛΟΓΙΩΝ ΙΔΙΩΤΙΚΗ ΚΕΦΑΛΑΙΟΥΧΙΚΗ ΕΤΑΙΡΕΙΑ, 2020, Αθήνα.
4. Κύρκος Ευστάθιος. **Επιχειρηματική Ευφυΐα και Εξόρυξη Δεδομένων** (Κωδικός Βιβλίου στον Εύδοξο: 320088) Έκδοση: 1/2016 ISBN: 978-960-603-109-0. Ηλεκτρονικό Βιβλίο. Διαθέτης (Εκδότης): Ελληνικά Ακαδημαϊκά Ηλεκτρονικά Συγγράμματα και Βοηθήματα - Αποθετήριο "Κάλλιπος".
5. Σταλίδης Γιώργος, Καρδάρας Δημήτρης. **Διαχείριση δεδομένων και επιχειρηματική ευφυΐα**. (Κωδικός Βιβλίου στον Εύδοξο: 320080). Έκδοση: 1/2016. ISBN: 978-960-603-398-8. Ηλεκτρονικό Βιβλίο Διαθέτης (Εκδότης): Ελληνικά Ακαδημαϊκά Ηλεκτρονικά Συγγράμματα και Βοηθήματα - Αποθετήριο "Κάλλιπος".

Related Scientific Journals:
1. DATAMINE - Data Mining and Knowledge Discovery
2. IDA - Intelligent Data Analysis
3. IJDWM - International Journal of Data Warehousing and Mining
4. MLDM - Transactions on Machine Learning and Data Mining