

COURSE OUTLINE

(1) GENERAL

SCHOOL	ENGINEERING		
ACADEMIC UNIT	ELECTRICAL AND COMPUTER ENGINEERING DEPT.		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	ECE_INF850	SEMESTER	8
COURSE TITLE	INFORMATION SYSTEMS – DATA MINING & BUSINESS INTELLIGENCE		
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	3		
Seminars / Practice exercises	1		
Laboratory	1		
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (4).</i>	5	5	
COURSE TYPE <i>general background, special background, specialised, general knowledge, skills development</i>	Specialized, Skills Development		
PREREQUISITE COURSES:	No. Students are advised to have already attended the course: ECE_K350 “Software Engineering”.		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes		
COURSE WEBSITE (URL)	https://www.ece.uop.gr		

(2) LEARNING OUTCOMES

<p>Learning outcomes</p> <p><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></p> <p><i>Consult Appendix A</i></p> <ul style="list-style-type: none"> • <i>Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</i> • <i>Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</i> • <i>Guidelines for writing Learning Outcomes</i> <p>In addition to the primary goal of understanding what an Integrated Information Systems (IIS) is, what its requirements are, and what they are useful for in a modern organization, students have the opportunity to investigate more specialized issues. Some of the topics discussed are the technological infrastructures required, the changes needed in the operational and organizational structure of the organization, the operational intelligence, the data management and knowledge mining capabilities provided, the ethical and social issues that arise, etc.</p> <p>Moreover, the course aims at making students understand more practical aspects of both the data mining and the business intelligence processes in an information system. To this end, the students will apply their Machine Learning techniques knowledge acquired during the respective course to solve real-life problems using specific datasets.</p>
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Upon successful completion of the course, the students will be able to:

- At the knowledge level:
 - have a clear picture of what an IIS is. They will get to know its structural elements and different levels of architecture, its life cycle, purpose, and its utility for an organization.
 - understand the basic categories of IISs, as well as see practical examples and their applications.
 - understand the basic principles governing Executive Support Systems, Decision Support Systems, Management Information Systems, and Transaction Processing Systems.
 - be aware of the possibilities of using Business Intelligence systems in an organization and the possibilities provided by Data Mining and Machine Learning technologies.
 - be aware of moral and social issues arising from the inclusion of an IIS in an organization.
- At the skill level:
 - recognize the capabilities of cloud computing technologies and their use in an IIS.
 - understand the various security issues that arise in an IIS.
 - recognize the capabilities of Machine Learning and Data Mining technologies and their use in an IIS.
- At the level of abilities:
 - capture user requirements and translate them into system requirements, as well as design the architecture of different levels of an IIS.
 - understand the basic principles of Enterprise Resource Planning Systems (ERP) and Customer Relationship Management Systems (CRM) and will be able to adapt and manage ERP and CRM systems.
 - be able to support effectively the process of decision making using the tools of Machine Learning and Data Mining.
 - fully understand the concept of knowledge discovery (KD) and, in particular, the phases of data pre-processing, data mining, and data processing by applying in practice specific tools, techniques, and algorithms to solve particular problems.
 - expand the above knowledge and skills in Big Data management issues.

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?

<i>Search for, analysis and synthesis of data and information, with the use of the necessary technology</i>	<i>Project planning and management</i>
<i>Adapting to new situations</i>	<i>Respect for difference and multiculturalism</i>
<i>Decision-making</i>	<i>Respect for the natural environment</i>
<i>Working independently</i>	<i>Showing social, professional and ethical responsibility and 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>.....</i>
<i>Production of new research ideas</i>	<i>Others...</i>
	<i>.....</i>

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Decision making.
- Teamwork.
- Production of free, creative and inductive thinking
- Creation of new research ideas

(3) SYLLABUS

The course aims to go deeper into topics related to Integrated Information Systems (IIS).

The course is developed in 13 lectures.

- i. Integrated Information Systems Analysis and Design: what are the building blocks and their different levels of architecture? What is the life cycle of an IIS, and what is its purpose and

<ul style="list-style-type: none"> ii. Integrated Information Systems Analysis and Design: User requirements, system requirements, and design of different levels of IIS architecture. iii. IIS Categories and their applications. iv. Executive Support Systems, Decision Support Systems, v. Management Information Systems, and Transaction Processing Systems. vi. Enterprise Resource Planning System (ERP): What are ERPs and their utility, an ERP system architecture, modern ERP systems, and their selection criteria. vii. Customer Relationship Management Systems (CRMs): What are CRMs and their utility, CRM system architecture, modern CRM systems, and their selection criteria. viii. Case studies of ERPs and CRMs: Customizing and managing ERP and CRM systems. ix. Data Mining and Machine Learning A, B x. Data Mining and Machine Learning A, B xi. Business Intelligence A,B xii. Business Intelligence A,B xiii. Cloud computing technologies and IIS Security. Ethical and Social Issues arising from ICT Integration in an organization <p>In the laboratory, there will be an introduction to integrated ERP systems, data mining, and business intelligence.</p>

(4) TEACHING and LEARNING METHODS - EVALUATION

<p style="text-align: center;">DELIVERY</p> <p style="text-align: center;"><i>Face-to-face, Distance learning, etc.</i></p>	<ul style="list-style-type: none"> • Face-to-face 																				
<p style="text-align: center;">USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</p> <p style="text-align: center;"><i>Use of ICT in teaching, laboratory education, communication with students</i></p>	<ul style="list-style-type: none"> • Learning process support via the electronic e-class platform. • Powerpoint presentations with examples and practice exercises in the classroom. • During the lectures, a computer is used to write and run code. 																				
<p style="text-align: center;">TEACHING METHODS</p> <p><i>The manner and methods of teaching are described in detail.</i></p> <p><i>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;">Activity</th> <th style="text-align: center;">Semester workload</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Lectures</td> <td style="text-align: center;">39</td> </tr> <tr> <td style="text-align: center;">Seminars - Practice exercises that focus on the application of the methods discussed in the classroom</td> <td style="text-align: center;">20</td> </tr> <tr> <td style="text-align: center;">Laboratory practice</td> <td style="text-align: center;">13</td> </tr> <tr> <td style="text-align: center;">Preparation of laboratory exercises</td> <td style="text-align: center;">20</td> </tr> <tr> <td style="text-align: center;">Independent study (Study of lectures and bibliography)</td> <td style="text-align: center;">33</td> </tr> <tr> <td style="text-align: center;"> </td> <td style="text-align: center;"> </td> </tr> <tr> <td style="text-align: center;"> </td> <td style="text-align: center;"> </td> </tr> <tr> <td style="text-align: center;"> </td> <td style="text-align: center;"> </td> </tr> <tr> <td style="text-align: center;">Course Total</td> <td style="text-align: center;">125 hours (5 ECTS)</td> </tr> </tbody> </table>	Activity	Semester workload	Lectures	39	Seminars - Practice exercises that focus on the application of the methods discussed in the classroom	20	Laboratory practice	13	Preparation of laboratory exercises	20	Independent study (Study of lectures and bibliography)	33							Course Total	125 hours (5 ECTS)
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<p style="text-align: center;">STUDENT PERFORMANCE EVALUATION</p>	<p>Team project (up to 50% of the final grade) which includes</p> <ul style="list-style-type: none"> - Analysis and Design of the Architecture of an IIS. 																				

<p><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>	<ul style="list-style-type: none"> - Selection of technological solutions for its development and set-up. - IIS customization. - ERP systems - Application of knowledge mining techniques - Use of business intelligence tools. - Application, customization, expansion, and use of ERP systems. <p>Note: The assignments will cover the laboratory part of the course.</p> <p>Written final exam (min 50% of the final grade) which includes:</p> <ul style="list-style-type: none"> - Theory evaluation. - Short answer questions. - Multiple choice questions. - Problem-solving related to the course's content.
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(5) ATTACHED BIBLIOGRAPHY

<p>- <i>Suggested bibliography:</i></p> <ul style="list-style-type: none"> • <i>David Avison, Guy Fitzgerald, «Information Systems Development : Methodologies, Techniques and Tools», ISBN-10: 9780077096267</i> • <i>Moxammed Zaki, Wagner Meira, Data Mining and Analysis: Fundamental Concepts and Algorithms, ISBN-10: 052176633.</i> • <i>Pang-Nin Tan, M. Steinbach, A. Karpatne, V. Kumar Introduction to Data Mining, ISBN-10: 0133128903</i> • <i>George Ioannou, Integrated ERP Systems, 2006.</i> • <i>Bill Chambers and Matei Zaharia, Spark: The Definitive Guide, 2018 Databricks, O'Reilly Media, Inc.</i> <p>- <i>Related academic journals:</i></p> <p>ACM International Journal of Enterprise Information Systems IEEE Transactions on Engineering Management</p>
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