

COURSE OUTLINE

(1) GENERAL

SCHOOL	Science and Technology		
ACADEMIC UNIT	Science and Technology		
PROGRAMME OF STUDIES	MSc in Data Science, MSc in ICT Systems		
LEVEL OF STUDIES	Postgraduate		
COURSE CODE	DSC08, ISE18	SEMESTER	2
COURSE TITLE	Data Mining		
COURSE TYPE <i>Elective, compulsory</i>	Compulsory		
INSTRUCTOR(S)	Theory: Assist. Prof. Christos Tjortjis Lab: Dr. Christos Berberidis		
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	
	4	6	
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
COURSE TYPE <i>general background, special background, specialised general knowledge, skills development</i>	Special background		
PREREQUISITE COURSES:	-		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	English		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes		
COURSE WEBSITE (URL)	https://elearn-ucips.ihu.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>On completing the course, the student will be able to:</p> <ul style="list-style-type: none"> • Organize and process knowledge efficiently (either given a priori or extracted) • Understand and apply various data mining approaches, including Classification, Clustering and Association Rules. • Understand, evaluate and utilise knowledge extracted from large volumes of data • Develop skills on a broad range of business intelligence problems.
<p>General Competences</p> <p><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></p>

<i>Search for, analysis and synthesis of data and information, with the use of the necessary technology</i> <i>Adapting to new situations</i> <i>Decision-making</i> <i>Working independently</i> <i>Team work</i> <i>Working in an international environment</i> <i>Working in an interdisciplinary environment</i> <i>Production of new research ideas</i>	<i>Project planning and management</i> <i>Respect for difference and multiculturalism</i> <i>Respect for the natural environment</i> <i>Showing social, professional and ethical responsibility and sensitivity to gender issues</i> <i>Criticism and self-criticism</i> <i>Production of free, creative and inductive thinking</i> <i>Others...</i>
<ul style="list-style-type: none"> ● 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 	

(3) SYLLABUS

<p>The course introduces fundamental concepts and tools related to Data Mining (DM).</p> <ul style="list-style-type: none"> ● Introduction to Knowledge Discovery in Databases (KDD) and DM ● Classification ● Clustering ● Association Rules ● DM Systems, Data preprocessing and Evaluation
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(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY	Hybrid: Face to face and synchronous distance learning	
<p style="text-align: center;">USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</p> <p><i>Use of ICT in teaching, laboratory education, communication with students</i></p>	<p>Use of ICT in Teaching</p> <p>During the educational process, various programming tools are used, along with the material available at the e-learning platform. The hybrid teaching method involves synchronous learning with the support of the videoconferencing tool Zoom. Students are taught a variety of tools related to the course content and material.</p> <p>Use of ICT in Communication with students</p> <ul style="list-style-type: none"> ● The course material (slides, scientific articles, exercises, etc.) is posted on the course page at the e-learn platform (Moodle). ● Use of Moodle Forums announcements. ● Live video meetings via Zoom/Teams. ● Contact via email. 	
<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, recitation, 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>	Activity	Semester workload
	Lectures	30 hrs.
	Lab	9 hrs.
	Project	20 hrs.
	Non-Directed Study	88 hrs.
	Exams	3 hrs.
	Course total	150 hrs.

<p style="text-align: center;">STUDENT PERFORMANCE EVALUATION</p> <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 style="text-align: center;"><i>Specifically-defined evaluation criteria are given, and if and where they are accessible to students</i></p>	<p>Language of Evaluation: English</p> <p>Evaluation Procedure:</p> <ul style="list-style-type: none"> ● Written Exams (70%). Methods of evaluation: <ul style="list-style-type: none"> ○ Open-ended questions ○ Problem solving ○ Multiple choice questions (on lab material) ● Projects (30%): <ul style="list-style-type: none"> ○ The students should achieve a passing grade to participate in the written exams. <p>The evaluation procedure is announced to the students during the first lecture and is also accessible at the e-learn platform throughout the entire semester.</p>
<p style="text-align: center;">STUDENT OBLIGATIONS</p> <p><i>Compulsory attendance of lectures, labs, recitations, compulsory participation in midterms, exams, compulsory delivery of homework, projects, etc.</i></p>	<ul style="list-style-type: none"> ● Compulsory attendance of lectures ● Compulsory attendance of labs ● Compulsory participation in the exams ● Compulsory delivery of project

(5) ATTACHED BIBLIOGRAPHY

<ol style="list-style-type: none"> 1. J. Han and M. Kamber, Data Mining: Concepts and Techniques, 3rd ed., The Morgan Kaufmann Series in Data Management Systems, Morgan Kaufmann Publishers, 2017. 2. I. Witten, E. Frank, and M. Hall, "Data Mining: Practical Machine Learning Tools and Techniques", 4th Ed., Morgan Kaufmann, 2017. 3. G. Shmueli, P.C. Bruce, I. Yahav, N.R. Patel, K.C. Lichtendahl Jr., Data Mining for Business Analytics: Concepts, Techniques, and Applications in R, 1st Ed., Wiley 2018. 4. P.N. Tan, M. Steinbach, and V. Kumar, "Introduction to Data Mining" Int'l Ed., 2nd Ed., Pearson HE, 2019. 5. R. Sharda, D. Delen, E. Turban, Decision Support and Business Intelligence, 11th Ed. Pearson HE, 2020. 6. M.H. Dunham, "Data Mining: Introductory and Advanced Topics", Prentice Hall, 2008.
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