COURSE OUTLINE

GENERAL

SCHOOL	Sciences and Engineering		
ACADEMIC UNIT	Computer Science		
LEVEL OF STUDIES	1st Cycle		
COURSE CODE	COMP-495	**SEMESTER**	Fall, Spring
COURSE TITLE	Data Science Final Year Project II		

INDEPENDENT TEACHING ACTIVITIES *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*	**WEEKLY TEACHING HOURS**	**CREDITS**
	0	6
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	skills development
PREREQUISITE COURSES:	COMP-494
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	English
IS THE COURSE OFFERED TO ERASMUS STUDENTS	
COURSE WEBSITE (URL)	

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*

After completion of the course students are expected to be able to:

- Apply methodologies, theories, skills and tools learning during the course and incorporate, where appropriate, best practice in terms of professional, technical and ethical issues.
- Make self-determined choices about their own learning agenda in relation to their career aspirations.
- Time-manage a substantial task through the creation of milestones and self-managed study.
- Understand the role of deliverables at various stages of a project's development.
- Critically evaluate the results of the project in relation to the goals that they have set.
- Organize and present documentation in a professional manner.

- Have developed a final profile (the new graduate's CV) of personal/professional attributes within the context of qualities and transferable skills, including self-evaluation, necessary for employment and further study or professional development, articulated through the personal development plan.
- Design and implement an appropriate data-science research methodology for their project, covering data collection, preprocessing, modelling, evaluation and reproducibility.

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	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

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

SYLLABUS

In the Final Year Project the student will be asked to implement a solution and tackle a real-world problem in the area of Data Science.

Possible topic areas include, but are not limited to:

- Application of Deep Learning
- Reinforcement Learning
- Text Processing and Text Analysis
- Mining Web Data for real world applications
- Use of Data Science tools for understanding social phenomena
- Machine Learning for Image Analysis and Video Recognition
- Analysis of User Generated Content
- Interdisciplinary topics like Social Behaviour, Analysis of Political Data, Sports Analytics.
- Development of Intelligent User Interfaces with an adaptive, machine learning core.
- Building Artificial Agents for Video Games
- Developing platforms for integrating multiple, heterogeneous sources.
- Mining Urban Data (e.g. data generated by sensors in smart cities).
- Data Privacy and Ethics

- Applications of Big Data Processing and Analysis to bioinformatics, medicine and public health.
- Development of Platforms that enable the use of data science tools in a user-friendly way.
- Interpretability of Machine Learning algorithms
- Data Science for Forecasting, Time-series and business applications
- Anomaly Detection with Intelligent Data Analysis Techniques

Other areas of work may be included as subject area develops.

The major topics of study on this module include:

- Data-science research methodologies (e.g., CRISP-DM, KDD), experimental design, statistical inference, cross-validation and reproducibility.
- types of project and research methods
- methodologies and project planning
- software testing and usability evaluation techniques
- report structure and presentation
- interpreting project assessment criteria for different project types
- oral presentation skills
- personal planning for career goals.

TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY
Face-to-face, Distance learning, etc.</td><td>Face-to-face</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, communication with students</td><td>Use of ICT in teaching / Χρήση ΤΠΕ
Communication with students / Επικοινωνία με Φοιτητές</td></tr>
<tr><td>TEACHING METHODS
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.

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</td><td><table><tr><th>Activity</th><th>Semester workload</th></tr><tr><td>Coursework</td><td>150</td></tr><tr><td>Course total</td><td>150</td></tr></table></td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION
Description of the evaluation procedure

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</td><td>Coursework 100% (includes Project Report and Viva Presentation)</td></tr>
</table>

Specifically-defined evaluation criteria are given, and if and where they are accessible to students.	

ATTACHED BIBLIOGRAPHY

Required Textbooks / Readings:

Topic-specific research papers and texts, along with research/development project management and software engineering texts.

Recommended Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
Projects in Computing and Information Systems: A Student's Guide, 3/E	Dawson C.	Pearson	2015	9781292073460
Data Science Projects with Python: A case study approach to gaining valuable insights from real data with machine learning, 2e	Klosterman S.	Packt Publishing	2021	978-1-80056-448-0