UNIVERSITY of NICOSIA

Course Syllabus

Course Code	Course Title	ECTS Credits
COMP-140	Introduction to Data Science	6
Prerequisites	**Department**	**Semester**
None	Computer Science	Fall
Type of Course	**Field**	**Language of Instruction**
Required	Data Science	English
Level of Course	**Lecturer(s)**	**Year of Study**
1st Cycle	Dr D. Trihinas	1st
Mode of Delivery	**Work Placement**	**Corequisites**
Face-to-Face	N/A	None

Course Objectives:

The main objectives of the course are to:

- Introduce the multi-faceted aspects of Data Science and its role in today's society.
- Survey the emerging Data Science landscape.
- Describe the different types and shapes of data and what constitutes a dataset.
- Provide an overview of the challenges for data characterized as “big” data.
- Introduce the stages, tasks and challenges involved in a Data Science project.
- Present the tools used by Data Scientists to attack different tasks in a Data Science project.
- Present the fundamental concepts in computational thinking and how modelling data can assist in drawing conclusions not immediately evident from data in raw form.
- Demonstrate the effectiveness of storytelling and the power of data visualization towards showcasing insights derived from data exploration and analysis.
- Present ethical and privacy concerns that Data Scientists are faced with when processing sensitive data related to the personal lives of human beings.

Learning Outcomes:

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

- Describe the importance and value of Data Science to society, science and business.
- Acknowledge the different roles of a Data Scientist and the skills required for each role.

- Distinguish between the different types of data and identify basic challenges related to "big" data.
- Describe the stages, tasks and problems involved in a Data Science project.
- Understand the basic concepts involved in computational thinking towards solving data-oriented problems.
- Recognize the different toolsets required to attack different Data Science projects.
- Comprehend the methods towards presenting stories not immediately evident within datasets and knowledge extracted from raw data.
- Identify and understand the ethical and privacy concerns for society when processing sensitive and personal data.

Course Content:

1. The Multi-Faceted Profile of a Data Scientist
    a. What is Data Science?
    b. The Different Roles of a Data Scientist
    c. The Current Data Science Landscape and Future Directions
2. Data and Datasets
    a. Where Does Data Come From?
    b. The Many Types and Shapes of Data
    c. What Constitutes a Dataset
3. The Big Data Hype
    a. What Makes Data “Big”?
    b. Datafication
4. The Data Science Process
    a. How is Raw Data Converted into Knowledge?
    b. The Philosophy of Exploratory and Explanatory Data Analysis
    c. The Toolsets of a Data Scientist
5. Algorithmic Thinking
    a. Data-Oriented Problem Solving
    b. The Importance of Models in Data Science
6. Storytelling Through Data
    a. Data Journalism
    b. Data Visualization as a Data Science Tool
7. The Ethical Concerns Faced by Data Scientists
    a. Does Correlation Imply Causality?
    b. How Does Data Science Affect Privacy
    c. Data Science Ethics
8. Data Science Case Studies
    a. Fighting Spam
    b. Recommendation Engines

c. Online Social Networks
d. The Internet of Things

Learning Activities and Teaching Methods:

Lectures, In Class Exercises, Case-Study Presentations, Discussions.

Assessment Methods:

Final Exam, Midterm Exam, Semester Project, Weekly Homework.

Required Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
Think Like a Data Scientist	Brian Godsey	Manning	2017	978-1-633-43027-3
Doing Data Science	Cathy O'Neil and Rachel Schutt	O'Reilly	2014	978-1-449-35865-5

Recommended Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
Data Science	John D. Kelleher and Brendan Tierney	MIT Press	2018	978-1-469-09677-3
The Art of Data Science	Roger D. Peng and Elizabeth Matsui	LuLu	2016	978-1-365-06146-2