Course Title	Data Analytics and Visualisation				
Course Code	ACSC450				
Course Type	Elective				
Level	BSc (Level 1)				
Year / Semester	4th (Fall/Spring)				
Teacher's Name	Dr Christos Markides				
ECTS	6	Lectures / week	2	Laboratories/week	2
Course Purpose	The course introduces students to the to the drivers of Data Analytics and the data value chain life-cycle, to understand the opportunities and the impact of data analytics, the way that data analytics serves as a basis for data-driven decision making, and the trends in creating and/or identifying sources of data, preparing data for data analysis, processing data with data analytics tools to obtain insight, and communicating results with the aid of visualisation tools. The students have the opportunity to use various programming languages such Python and R, as well as visualisation tools such as Tableau.				
Learning Outcomes	By the end of the course, the students should be able to: 1. Discuss the drivers of Data Analytics, and navigate through the data value chain life-cycle. 2. Understand the opportunities and the impact of data analytics, and the way that data analytics serves as a basis for data-driven decision making. 3. Identify, create, and combine sources of data. 4. List, select, and compare various data generation sources, data collection methods, and data transport pathways. 5. Describe, use, and work with data storage systems. 6. Distinguish, select, and compare data processing methods. 7. Compare and select the appropriate tools, languages, and modern software to perform data analytics. 8. Visualise and communicate data analysis results, and justify data-driven decision making based on data analysis.				
Prerequisites	ACSC430		Co-requisites	None	
Course Content	• **Introduction to Data Analytics**: Importance of data today, characteristics of data (Local Data, External Data, 5Vs – 10Vs, structured, semi-structured, unstructured), Current State of Data Analytics and Adoption, Applications of Data Analytics, and the Data Analytics Lifecycle (DAL). • **Data Discovery**: Overview of Data Sources, access to data, ways to create data, identify Local and External sources of data, framing the				

	problem, and asking the right questions. • **ETL – Extract Transform and Load**: Preparing the Analytics Sandbox, Data Integration Process, Data Governance and Legislation on Data Processing, Data Preparation and Conditioning, Normalizing Datasets, and ETL Tools. • **Data Modelling**: Model Planning, Assess the Structure of the Datasets, Identify Candidate Models, Data Exploration and Model Selection, and Data Modelling Tools. • **Data Visualisation:** Key Points Supported by Data, Visually Appealing Presentation of Data, Common Representation Methods, Removing Visual Distractions, and Data Visualisation Tools.
Teaching Methodology	The taught part of course is delivered to the students by means of lectures, conducted with the aid of computer presentations. Lectures are complimented with in-class examples/exercises and laboratory work carried out. Laboratory sessions involve applying techniques learned in class and solving problems through small exercises in Python, R, and Tableau. Lecture notes/presentations and Lab exercises are available on the e-learning platform and the web for students to use in combination with the textbooks.
Bibliography	Textbooks: • Field Cady, ***The Data Science Handbook***, 1st Edition, John Wiley & Sons, 2017, ISBN: 978-1119092940. References: • Jake VanderPlas, ***Python Data Science Handbook***, 1st Edition, O'Reilly, 2016, ISBN: 978-1491912058. • G. Grolemund, H. Wickham, ***R for Data Science***, 1st Edition O'Reilly, 2016, ISBN: 978- 1491910399. • Alexander Loth, ***Visual Analytics with Tableau***, 1st Edition, John Wiley & Sons, 2019, ISBN:978-1119560203 • Manuals on Python, R, and Tableau Documentation and tools are available on the Course's Web Site and online.
Assessment	Students are assessed on the theoretical aspects of the course through a midterm, and the final exam, while lab exercises cover the applied and hand-on aspects of the course. Coursework will comprise of one midterm, a set of lab exercises, and three-hour closed book exam. The weights for each assessment component are: • Labs: 40% • Midterm: 20% • Final Exam: 40%
Language	English