Course Title	Database Management				
Course Code	ACSC223				
Course Type	Compulsory				
Level	BSc (Level 1)				
Year / Semester	2nd (Spring)				
Teacher's Name	Dr Christos Markides				
ECTS	5	Lectures / week	2	Laboratories/week	2
Course Purpose	The aim of this subject is to provide students with a thorough introduction to designing and using database systems within the context of data representation, and in particular the relational model. Students are introduced to both theoretical elements of data analysis including relational algebra, entity relationship modelling, normalization and integrity issues as well as practical aspects such as database modelling and implementation, SQL statements, and system performance.				
Learning Outcomes	By the end of the course, the students are expected to: 1. Understand how databases as a special type of software systems for storing and retrieving huge amount of data, related models and implementation techniques. 2. Describe the mathematical foundation and internal mechanisms based on relational algebra as well as to ensure practical skills for analysing data and design of relational database using entity-relationship diagrams. 3. Demonstrate and apply in practice the normalization techniques for logical design of non-redundant databases with high performance. 4. Describe and use fourth generation language (SQL) for creating and manipulating databases using different types of interface. 5. Demonstrate and apply practical examples using the most popular database systems such as MySQL, and MS SQL, as well as their programming environments.				
Prerequisites	ACSC110, ACSC182	Co-requisites	None		
Course Content	• **Introduction to databases**: Data, information and knowledge. Approaches to working with data. Definition of database and database system. • **Types of Databases systems**: Three-level architecture. Data models (relational, network, hierarchical). Functions and components of DBMS. • **The relational Model**: Tables, rows, attributes and data types. Primary and Foreign Keys. Table Relations. Integrity constraints. Physical and logical views. • **Relational Algebra and Calculus**: Selection, Projection, Union, Set				

	difference, Cartesian Product, Join, Theta-join, outer and left joins. • **Manipulating Databases**: The SQL language. Table construction (CREATE, DROP, ALTER). Data manipulation (INSERT, UPDATE, DELETE, SELECT). Joins and join types. • **Database analysis and specification**: Database System Development, Planning fact-finding and specification. • **Database design**: Entity-Relationship diagrams. Enhanced ER. Normalization and Normal
Teaching Methodology	The taught part of course is delivered to the students by means of lectures, conducted with the help of computer presentations. Lecture notes and presentations are available through the e-learning platform and the web for students to use in combination with the textbooks. The course will combine theoretical aspects of operating systems with some practical work with the concepts of operating systems. Delivery will be based on 2 periods of lectures and 2 periods of Labs. Laboratory work will mainly consist of introducing students to the MySQL RDBMS, and lab exercises will address the aspects of creating, maintaining, updating, and administering a relational database.
Bibliography	Textbooks: • Thomas M. Connolly, Carolyn E. Begg, ***Database Systems: A Practical Approach to Design, Implementation, and Management***, 6th Edition, Addison-Wesley Publishing, 2015, ISBN: 978-0132943260. References: • R. Elmasri, S. B. Navathe, ***Fundamentals of Database Systems***, 7th Edition, Pearson, 2016, ISBN: 978-1292097619. • R. Ramakrishnan, J. Gehrke, ***Database Management Systems***, 3rd Edition, McGraw Hill, 2003, ISBN: 978-0071231510. • P. DuBois, MySQL Cookbook: ***Solutions for Database Developers and Administrators***, O'Reilly, 3rd Edition, 2014, ISBN: 978-1449374020. • MySQL™, ***MySQL Documentation***, Available [Online]: https://dev.mysql.com/doc/.
Assessment	Students are assessed on the theoretical aspects of the course through tests, and the final exam, while lab exercises cover the applied and hand-on aspects of the course. Coursework will comprise of two tests, a set of lab exercises, and three-hour closed book exam. The weights for each assessment component are: • Labs: 16% • Tests: 24% • Final Exam: 60%
Language	English