

## MODULE DESCRIPTOR

<b>MODULE TITLE</b>	DATA MANAGEMENT		
<b>MODULE CODE</b>	TE3003 (L6)	<b>CREDIT VALUE</b>	20 UK CREDITS / <u>10 ECTS</u>
<b>SCHOOL</b>	SCHOOL OF SCIENCES		

### MODULE AIMS

- To provide students with opportunities to develop a good understanding in concepts and principles of modern data management.
- To introduce techniques and tools of modern data representation and data management.
- To help develop students' practical competencies in handling datasets.
- To develop student skills in understanding and using modern backend systems using programmatic or REST-based APIs.

### MODULE CONTENT

The module provides students with a broad overview of the different tools, techniques and concepts of modern data management and analysis. A comparison between traditional relational databases, SQL and alternative models (NoSQL databases) is presented.

Moreover, the module develops a basic understanding of how the backend of web applications works with databases, while also getting familiar with the data workflows between the databases and the frontend. In this context the module covers commodity commercial backends (such as Firebase) as well as common backend architectures (such as node.js with an SQL database).

As part of this module, students are introduced to the following areas:

#### Data Organization

Students acquire a basic understanding of entities and relationships (tabular organization of data) and NoSQL approaches (document kind of relationships). Also, SQL and its main features are briefly discussed.

#### Data Management Concepts

Three main topics in data management are introduced: Data Integrity, Transaction Management (ACID), Data Architectures and Data Access (CRUD) and REST-based interfaces.

#### Operational Concepts

Students are introduced to common commercial backend options (such as Firebase) and common architectures (such as node.js and SQL). They develop skills in understanding and assessing different options and selecting the most suitable based on the characteristics of intended use.

#### Ethical and legal issues

Ethical and legal issues involved in storing and managing data collections are discussed. Covered topics include privacy, ownership, intellectual property and licensing issues in data collection, management, retrieval and reuse.

### INTENDED LEARNING OUTCOMES

**On successful completion of this module, a student will be able to:**

1. Identify and apply current data management techniques.
2. Develop students' knowledge and understanding on data workflows between frontends and backend databases.
3. Identify and understand current backend technologies.
4. Develop students' skills to choose the most appropriate means of storing and managing data, depending on the size and structure of a particular dataset and its intended use.

## TEACHING METHODS

This module presents a general, practical approach to data management. It includes weekly sessions incorporating a mixture of lecture delivery, and in-class practical work. A series of practical exercises are designed to reinforce the lecture material and are central to the success of students learning in this module.

A variety of engagement activities are incorporated to give students an opportunity to both learn and demonstrate their understanding in a way that goes beyond just creating deliverables.

Real-world datasets are used and analysed during both lectures and seminars, enabling students to translate their theoretical understanding into practical solutions.

Guest speakers are invited to talk about their area of expertise and give guidance and industry insight to the ways that data can be managed and used.

## ASSESSMENT METHODS

This module is assessed through one Technique Portfolio and one Examination.