

Module code	DMMD	NQF level	7
Credit value	20	Study duration	12 weeks

Data Management, Modelling and Design

Module description

This module introduces students to the theory underpinning data and knowledge management. It provides the student with the ability to evaluate and apply the methodologies, tools and techniques used in data collection, cleaning, transformation, management and analysis using industry standard programming languages and databases.

This module aims to:

- Understand data types, their collection and processes involved in the data pipeline
- Understand various forms of databases and their management
- Understand current and future challenges, limitations and opportunities in data management

Learning outcomes

On successful completion of the module, student should be able to:

- collect different formats of data from diverse sources
- appraise and apply key steps and issues involved in data management - preparation, cleaning, exploration, optimisation and evaluation
- evaluate, develop and implement solutions for processing and managing datasets and solving complex problems in various environments using relevant programming paradigms
- reflect on the limitations of data and knowledge management systems in a socio-technical and organisational context
- critically assess, design and implement different forms of data models and database architecture to solve a given organisational scenario

Syllabus

- Impact of big data on business and introduction to different data types
- Data collection from open sources databases and from web, using APIs and web scraping tools (e.g. BeautifulSoup)
- Detailed understanding of data management pipeline – cleaning, transformation, normalisation, integration and storage
- Working with un/structured data and different file formats (e.g. Excel, json)
- Accessing and querying datasets with Python programming language
- Database modelling: entity-relationship model and the relational model
- Relational (PostgreSQL) and non-relational (NoSQL/MongoDB) database systems
- Comparing common database systems - concurrency and performance issues in databases, transaction management
- Accessing and querying the database with SQL statements – basic queries (create, read, update, delete)
- Accessing and querying the database with SQL statements – advanced queries (aggregation and mathematical functions) queries
- Current challenges in data management
- Future directions (e.g. cloud services) in data management



Learning and teaching methods

This module will be delivered by learning materials provided on the learning platform supplemented by readings. Tutor support will be available to students via phone, email, and a fortnightly question and answer (Q&A) session.

Description of unit of assessment	Length/Duration	Submission date	Weighting
Mid module report	2,500 words	End of Week 6	50%
End of module report	2,500 words	End of Unit 12	50%