WM194-15 Database Design and Implementation

24/25

Department
> WMG

Level
> Undergraduate Level 1

Module leader
> Jianhua Yang

Credit value
> 15

Module duration
> 14 weeks

Assessment
> 60% coursework, 40% exam

Study locations
> University of Warwick main campus, Coventry Primary
> Distance or Online Delivery

Description

Introductory description

Industries store a large amount of data for their day-to-day operations. The data related to customers, employees and machines are all managed using a database management system (DBMS). The data can be organized and can be accessed at any point for operations management using DBMS. Beyond essential requirements of data storage, modern DBMS also need to address the needs of efficiency and information security, These put a high demand for robust data systems.

[Module web page](#)

Module aims

This module will teach apprentices both theoretical and practical aspects of the design and implementation of database systems. Apprentices will gain knowledge and hands-on experience in data modelling and using database management languages and tools. The current module is based on a programming module and feeds into advanced data processing modules such as data science modules.

Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

Data model,
Three-tier architectures,
Entity-relationship model,
Conversion of binary relationships,
Sub-classing,
Weak entity sets,
Relational model,
Relational data model,
Relational algebra,
Multi- statements transaction,
System constraints,
Queries on multiple tables,
Normalization,
Normalization process,
3rd normal form,
Object-oriented Databases,
Distributed databases,
Client/server Systems,
Data warehouses,
Object-oriented databases,
Conceptual design,
Logical database design,
Physical database design,
Generalization and aggregation,
Data quality,
Data security,
SQL, NoSQL

Learning outcomes

By the end of the module, students should be able to:

- Recall the role of data management systems in managing organisational data and information. [CITP:2.1.1]
- Describe how to use database management systems to perform basic queries to synthesise information and present it concisely. [CITP:2.1.2]
- Apply different data sources, formats, and structures to extract data from different sources. [CITP:2.1.2]
- Describe how to use different database management systems to handle structured and unstructured data, the relevant legal, ethical, social and security standards to a database system solution. [AHEP:4-C6][CITP:2.1.5,2.1.13]

- Reflect the approaches to data processing, including data modelling and data-driven decision making such as reducing data redundancy. [AHEP:4-C3]

Indicative reading list

[View reading list on Talis Aspire](#)

Subject specific skills

Contributes to the occupational standard for Digital and Technology Solutions Professional (ST0119):
Extract data from a range of sources. For example, databases, web services, open data (S54)

In addition, the module will develop students in terms of the following skills and knowledge:

- Reporting techniques, including how to synthesise information and present concisely, as appropriate to the target audience.
- Understanding data formats, structures, architectures and data delivery methods including "unstructured" data.
- Understanding sources of data such as files, operational systems, databases, web services, open data, government data, news and social media.
- Knowing approaches to data processing and storage, database systems, data warehousing and online analytical processing, data-driven decision making and the good use of evidence and analytics in making choices and decisions.
- Being able to extract data from a range of sources. For example, databases, web services, open data.

Transferable skills

Team working, problem-solving, oral and written communication, critical thinking, information literacy.

Study

Study time

Type	Required
Lectures	15 sessions of 1 hour (10%)
Tutorials	15 sessions of 1 hour (10%)
Demonstrations	(0%)
Work-based learning	(0%)
Online learning (scheduled sessions)	10 sessions of 1 hour (7%)
Total	150 hours

Type	Required
Online learning (independent)	10 sessions of 1 hour (7%)
Other activity	10 hours (7%)
Private study	30 hours (20%)
Assessment	60 hours (40%)
Total	150 hours

Private study description

- Finishing basic workbook exercises, and spending time on more complex questions
- Expanding the understanding of DBMS in addition to relational databases
- Analysing practical and work-related data sets and problems

Other activity description

- Reading relevant chapters in the module reading list
- Investigations into current database technologies
- Expanding theoretical understanding of ethical and security considerations for database systems

Costs

No further costs have been identified for this module.

Assessment

You must pass all assessment components to pass the module.

Assessment group D

	Weighting	Study time	Eligible for self-certification
Post Module Assessment	60%	36 hours	Yes (extension)

Post Module Assessment – 2400-word report on the design of a database project for a given scenario.

	Weighting	Study time	Eligible for self-certification
Examination	40%	24 hours	No

In Module Assessment - Computer-based exam using database management tools
Reassessment: locally-timetabled examination

Feedback on assessment

Feedback will be given as appropriate to the assessment type:
– In Module Assessment: written cohort-level feedback.

– Post Module Assessment: written summative feedback on post module assessment.

[Past exam papers for WM194](#)

Availability

Courses

This module is Core for:

- Year 1 of DWMS-H655 Undergraduate Digital and Technology Solutions (Cyber) (Degree Apprenticeship)
- Year 1 of DWMS-H652 Undergraduate Digital and Technology Solutions (Data Analytics) (Degree Apprenticeship)
- Year 1 of DWMS-H653 Undergraduate Digital and Technology Solutions (Network Engineering) (Degree Apprenticeship)
- Year 1 of DWMS-H654 Undergraduate Digital and Technology Solutions (Software Engineering) (Degree Apprenticeship)