

# CS258-15 Database Systems

**20/21**

**Department**

Computer Science

**Level**

Undergraduate Level 2

**Module leader**

Peter Triantafillou

**Credit value**

15

**Module duration**

10 weeks

**Assessment**

Multiple

**Study location**

University of Warwick main campus, Coventry

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## Description

### Introductory description

This module studies Data Base Management Systems (DBMSs): the science and technology for organising and retrieving large amounts of structures data efficiently. It presents in depth the Relational Model and the declarative language SQL and explains how it can be used to define and interrogate databases. It also shows how to access databases from procedural programs (in Java and C). It discusses the formal underpinnings of Relational Databases, and Relational Algebra and Relational Calculus and how to optimally define the Database using relations/tables. Finally, it also discusses issues pertaining to security and physical data storage.

### Module aims

This module studies Data Base Management Systems (DBMSs): the science and technology for organising and retrieving large amounts of structures data efficiently. It presents in depth the Relational Model and the declarative language SQL and explains how it can be used to define and interrogate databases. It also shows how to access databases from procedural programs (in Java and C). It discusses the formal underpinnings of Relational Databases, and Relational Algebra and Relational Calculus and how to optimally define the Database using relations/tables. Finally, it also discusses issues pertaining to security and physical data storage.

## 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.

- Overview of databases and database management systems
- The Relational Model and Relational DBMSs
- The SQL declarative Programming Language
- Programming DBs - using SQL from C and Java programs
- Theoretical underpinnings: Normalisation theory, Relational Algebra and Relational Calculus
- Security
- Physical DB storage

## Learning outcomes

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

- - Create appropriate efficient database designs for a range of applications.
- - Use notations such as SQL to implement a database design.
- - Translate between informal queries and their expression in more formal notations.
- - Construct appropriate queries in standard notations for a range of typical queries needed in common applications.
- - Identify and express relevant integrity constraints for a given database design.
- - Recognise the main security threats to databases, and identify appropriate control measures.

## Indicative reading list

Please see Talis Aspire link for the most up to date list.

[View reading list on Talis Aspire](#)

## Subject specific skills

Understanding of:

- data modelling within the relational model/DBs environment – schema definition, logical DB design and the process of normalization for this goal;
- declarative programming languages (SQL) as a data manipulation and data definition language and how to use SQL from procedural programming languages (C, Java);
- formal languages for the relational model: Relational Calculus and Relational Algebra;
- data security within the DBMS context, and
- data storage

## Transferable skills

Include:

- data management for large-scale analytics
  - association of declarative and procedural languages and 2-/3-tier architectures for information systems
  - security issues at large
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## Study

### Study time

Type	Required
Lectures	30 sessions of 1 hour (20%)
Seminars	8 sessions of 1 hour (5%)
Private study	112 hours (75%)
Total	150 hours

### Private study description

Private study consists of:

- background reading,
- studying taught material from lecture notes/slides and additional textbooks
- acquiring deeper comprehension of lab exercises
- carrying out the module's individual project.

### Costs

No further costs have been identified for this module.

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## Assessment

You do not need to pass all assessment components to pass the module.

Students can register for this module without taking any assessment.

### Assessment group D1

	Weighting	Study time	Eligible for self-certification
Unsupervised practical Assignment	30%		Yes (extension)
Online Examination	70%		No

Exam

~Platforms - AEP

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- Online examination: No Answerbook required

## Assessment group R

	Weighting	Study time	Eligible for self-certification
Online Examination - Resit CS258 resit examination	100%		No
~Platforms - AEP			

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- Online examination: No Answerbook required

## Feedback on assessment

Individual written feedback on each assignment.

[Past exam papers for CS258](#)

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## Availability

### Courses

This module is Core for:

- Year 2 of UCSA-G500 Undergraduate Computer Science
- UCSA-G503 Undergraduate Computer Science MEng
  - Year 2 of G500 Computer Science
  - Year 2 of G503 Computer Science MEng
- Year 2 of UCSA-I1N1 Undergraduate Computer Science with Business Studies
- Year 2 of USTA-G302 Undergraduate Data Science
- Year 2 of USTA-G304 Undergraduate Data Science (MSci)

This module is Optional for:

- Year 2 of UCSA-G406 Undergraduate Computer Systems Engineering
- Year 2 of UCSA-G408 Undergraduate Computer Systems Engineering

This module is Option list B for:

- Year 2 of UCSA-G4G1 Undergraduate Discrete Mathematics
- UCSA-G4G3 Undergraduate Discrete Mathematics
  - Year 2 of G4G1 Discrete Mathematics
  - Year 2 of G4G3 Discrete Mathematics