<table>
<thead>
<tr>
<th>Module Code</th>
<th>CS4LL1</th>
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<tbody>
<tr>
<td>Module Name</td>
<td>Information Management II</td>
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<tr>
<td>Module Short Title</td>
<td>N/a</td>
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<tr>
<td>ECTS weighting</td>
<td>5</td>
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<tr>
<td>Semester/term taught</td>
<td>Michaelmas Term</td>
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</table>
| Contact Hours | Lecture hours: 27  
Lab hours: 0  
Tutorial hours: 6  
Total hours: 33 |
| Module Personnel | Lecturing staff: Prof. Séamus Lawless  
Prof. Vincent Wade |
| Learning Outcomes | Having completed the course the student will be able to:  
- Define and comprehend the theoretical and practical issues in the management, retrieval, organisation, indexing and storage of large quantities of data  
- Model data and analyse data relationships for exploitation within database management systems  
- Program a database management system for database creation, information retrieval and database management  
- Analyse and assess various database concurrency protocols and algorithms to assess their performance and relative appropriateness in differing operating environments.  
- Evaluate existing concurrency control algorithms and appropriate data structures for data management.  
- Understand data integrity and security and the approaches used to manage and maintain both.  
- Compare and contrast different Database management paradigms such as relational, NoSQL, in-memory and native web/linked data stores. |
| Module Learning Aims | This course is focused on the modelling of information and database system technology. More specifically, it focuses on state-of-the-art database technology, from both the user and systems perspectives.  

From a system engineering perspective, the course examines the concepts and algorithms for: transaction processing, concurrency control, metadata representation, database security policies, integration of databases on the web and emerging database technologies.  

From an information designer's perspective, the course examines the theoretical model underpinning relational databases, functional dependency theory and normalisation (for information modelling), functional dependency modelling, implementation of databases and database applications.  

Thus the course is intended to enable the students to design information models and implement these models in state of the art databases (relational and native web databases), as well as be able to analyse and evaluate approaches to information organisation, storage, transaction support and management. |
Specific topics addressed in this module include:
- Overview of database systems and users
- Database system concepts and architecture
- Relational database management
- Relational model
- Functional dependency theory and normalisation
- On-line module on SQL (relational database query language)
- SQL/PL (SQL as a programming language)
- Transaction processing
- Query processing
- Concurrency control
- Database recovery
- Security and authorisation
- Software engineering for database applications and database development
- Web databases
- NoSQL and In-Memory Databases

**Recommended Reading List**

**Module Pre Requisite**
None

**Module Co Requisite**
None

**Assessment Details**
- % Exam: 75
- % Coursework: 25

Alongside the lectures, a full online course on the application of database language SQL is delivered. This online course must be taken by all students taking this module. Project work which integrates the lectures, tutorials and online course accounts for 25% of the module’s overall mark. This project work mark includes measured usage of the online course as well as project submissions. Attendance at all lectures and tutorials is compulsory.