<table>
<thead>
<tr>
<th>Module Code</th>
<th>CS7IS1</th>
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<tbody>
<tr>
<td>Module Name</td>
<td>Knowledge and Data Engineering</td>
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<tr>
<td>Module Short Title</td>
<td>Knowledge and Data Engineering</td>
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<tr>
<td>ECTS weighting</td>
<td>5</td>
</tr>
<tr>
<td>Semester/term taught</td>
<td>MT</td>
</tr>
<tr>
<td>Contact Hours</td>
<td>2 lecture hours per week</td>
</tr>
<tr>
<td>Module Personnel</td>
<td>Dr. Rob Brennan</td>
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**Learning Outcomes**

On successful completion of this module a student should be able to:

- IS1LO1 Compare and contrast different approaches to modelling information and knowledge (ISLO2)
- IS1LO2 Model information and produce rich semantic models and ontologies (ISLO1, ISLO4)
- IS1LO3 Describe how the formal models that underlie semantic data enable inference and reasoning
- IS1LO4 Survey the state of the art in semantic technologies and applications
- IS1LO5 Demonstrate a clear understanding of the principles underlying information interoperability and transformation.
- IS1LO6 Apply semantic modelling and transformation techniques to a range of applied problems.
- IS1LO7 Use sophisticated querying approaches to facilitate distributed information retrieval and aggregation

**Module Learning Aims**

The module is designed to explore the management, delivery and inter-operability of knowledge, information and data through knowledge and data engineering. The module encourages students to perceive the challenges, technologies and solutions, in handling distributed, multi modal, heterogeneous information and knowledge models and using those models to drive adaptation within applications and systems.

The module focuses on advanced technologies (in particular semantic web technologies), to provide adaptive, agile handling of heterogeneous, ubiquitous information. The module includes such areas as integration of heterogeneous information repositories, schema (RDF) and semantic (e.g. ontology) representation and querying.

The main themes of the module are:

- Standards-based approaches to publishing, sharing and reusing structured data or knowledge on the web
- Managing, integrating and transforming disparate information from heterogeneous sources
- Representing, managing, and reasoning about semantics of information (and services)

**Module Content**

Specific topics addressed in this module include:

- Semantic Web
- Linked Data
- Semantic Model Design
- Representing Semantics in metadata
- Semantic based querying in a distributed environment (SPARQL)
- Semantic based reasoning
- Semantic Interoperability/Mapping
- Representing Data Provenance

**Recommended Reading List**

- Programming the Semantic Web, by T. Segaran, C. Evans and J. Taylor, O'Reilly 2009
| Module Pre Requisite | 1. Undergraduate courses in object-oriented programming/modelling/systems design or undergraduate courses in database/information modelling.  
| | 2. Undergraduate courses in web systems/web servers/http/distributed systems. |
| Module Co Requisite | None |
| Assessment Details | Exam: 70%  
Coursework: 30%  
The exam for this module will take place in January. |
| Module approval date |  |
| Approved By |  |
| Academic Start Year | 2017-18 |
| Academic Year of Data | 2017-18 |