Module Definition Form (MDF)

Module code: MOD004979	**Version:** 4 **Date Amended:** 20/Mar/2024

1. Module Title
Semantic Data Technologies

2a. Module Leader
Arooj Fatima

2b. School
School of Computing and Information Sciences at Anglia Ruskin University

2c. Faculty
Faculty of Science and Engineering

3a. Level
7

3b. Module Type
Standard (fine graded)

4a. Credits
30

4b. Study Hours
300

5. Restrictions

Type	Module Code	Module Name	Condition
Pre-requisites:	None		
Co-requisites:	None		
Exclusions:	None		
Courses to which this module is restricted:			

LEARNING, TEACHING AND ASSESSMENT INFORMATION

6a. Module Description

Businesses, large organisations, and government departments are increasingly producing and publishing large semi structured or unstructured data, on the web, generated collection from their own activities and from the wider internet and social media. Such a huge amount of data poses many challenges and one of these challenges is to search data effectively using syntax-based search.

Semantic web technologies have provided the tools, methodologies and theoretical underpinnings to enable data to be automatically interpreted by machines for knowledge-based tasks. Semantic data technologies help to create structured or semi-structured data with well-defined meanings. These technologies are being used by the search engines to make searches more effective. To create domain specific applications to search data, we need to process user queries which are written in natural language. Natural Language Processing (NLP) is the automatic processing of text written in a natural (human) language such as English. NLP encompasses a wide range of tasks, from low-level tasks, such as segmenting text into sentences and words, to high-level complex applications such as semantic annotation. The combination of Natural Language Processing and Semantic Web technologies is able to deal with a broad range of structured and unstructured data, which cannot be addressed by traditional relational tools.

This module will provide the knowledge and skills for students to structure semantic data, develop ontological models and use these to create knowledge based applications which utilise NLP techniques. After completing this module, the students will be able to design semantic models and implement applications that utilise NLP methods. The knowledge and skills learned in this module complement those of information system analysis design and data base implementation as well as advanced application development, providing a theoretical and practical base for enterprise-wide data handling. Therefore, students ideally should have knowledge of the design and development of web, database and software applications.

6b. Outline Content

- Conceptual data modelling and analysis - RDF and RDF schema - Ontology construction and evaluation, - OWL - SPARQL - Semantic application development and supporting tools. - Intelligent data analysis – Natural Language Processing – segmentation, words and tokens, text normalisation.

6c. Key Texts/Literature

The reading list to support this module is available at: https://readinglists.aru.ac.uk/

6d. Specialist Learning Resources

Software: Students should have access to Python package (or equivalent), the Protégé Ontology editor (or equivalent) and the Apache Jena framework (or equivalent SPARQL implementation).

7. Learning Outcomes (threshold standards)		
No.	**Type**	**On successful completion of this module the student will be expected to be able to:**
1	Knowledge and Understanding	Demonstrate an in-depth knowledge of semantic data representation technologies.
2	Knowledge and Understanding	Understand and critically appraise the uses of semantic mark up and ontologies for big data, internet and knowledge based applications.
3	Knowledge and Understanding	Understand the theoretical underpinnings and their application in semantic based reasoning.
4	Intellectual, practical, affective and transferrable skills	Apply conceptual modelling principles to create semantic data models.
5	Intellectual, practical, affective and transferrable skills	Utilise semantic models to implement knowledge based applications in a variety of domains.
6	Intellectual, practical, affective and transferrable skills	Reflect critically on their own and others designs for semantic based applications.

8a. Module Occurrence to which this MDF Refers				
Year	**Occurrence**	**Period**	**Location**	**Mode of Delivery**
2026/7	ZZF	Template For Face To Face Learning Delivery		Face to Face

8b. Learning Activities for the above Module Occurrence			
Learning Activities	**Hours**	**Learning Outcomes**	**Details of Duration, frequency and other comments**
Lectures	24	1-3	Lecture 2 hr x 12 weeks
Other teacher managed learning	24	4-6	Practical session 2 hr x 12 weeks
Student managed learning	252	1-6	Independent study 21 hours per week
TOTAL:	300		

9. Assessment for the above Module Occurrence

The assessment for some modules includes a presentation (see below for details on how this particular module is assessed). We recognise that presenting, especially to a large group, can cause significant anxiety or distress for some students. If this may affect you, please contact your Module Leader or the Disability and Neurodiversity Service as early as possible. We will work with you to consider appropriate reasonable adjustments. Depending on your individual needs, these might include, for example, presenting to a smaller group or presenting only to a member of academic staff.

Assessment No.	Assessment Method	Learning Outcomes	Weighting (%)	Fine Grade or Pass/Fail	Qualifying Mark (%)
010	Coursework	1-6	100 (%)	Fine Grade	40 (%)
Report, equivalent to 5000 words					

In order to pass this module, students are required to achieve an overall mark of 40% (for modules at levels 3, 4, 5 and 6) or 50% (for modules at level 7*).

In addition, students are required to:
(a) achieve the qualifying mark for each element of fine graded assessment as specified above
(b) pass any pass/fail elements

[* the pass mark of 50% applies for all module occurrences from the academic year 2024/25 – see Section 3a of this MDF to check the level of the module and Section 8a of this MDF to check the academic year]