Module Specification

Data, Schemas and Applications

Version: 2023-24, v4.0, 13 Apr 2023

Contents

Part 1: Information

Module title: Data, Schemas and Applications

Module code: UFCFV4-30-2

Level: Level 5

For implementation from: 2023-24

UWE credit rating: 30

ECTS credit rating: 15

Faculty: Faculty of Environment & Technology

Department: FET Dept of Computer Sci & Creative Tech

Partner institutions: None

Field: Computer Science and Creative Technologies

Module type: Module

Pre-requisites: Web Development and Databases 2022-23, Web Programming 2023-24

Excluded combinations: None

Co-requisites: None

Continuing professional development: No

Professional, statutory or regulatory body requirements: None

Part 2: Description

Overview: Students must complete one of the listed pre-requisites

Features: Not applicable

Educational aims: In addition to the learning outcomes, the educational experience may explore, develop, and practise but not formally discretely assess the following:

Team working and the delegation of responsibility;

Self-study of programming and data manipulation languages.

Outline syllabus: Background. The need to store, transform, locate and present data of many forms (numeric, textual, relational, graphical, visual and auditory). Unstructured text through semi-structured networks to homogeneous relational and non-relational structures. Application areas such as personal, corporate, public and collaborative data bases.

Data Schemas. Separation/Composition of data, schema (including constraints) and meta data and namespaces. Languages for describing schemas - UML models and SQL DDL for tables, data structure diagrams and XML Schema for hierarchical structures. Composition, types and sub-types and inheritance. Data schemas for typical problems.

Data Manipulation. Standard SQL for relational database management systems (RDBMS) such as MySQL for creation, retrieval, updating and deletion operations. XSLT for XML transformation and JavaScript/PHP for DOM manipulation .

Web service and communication standards. Application Programming Interfaces (APIs). RSS,ATOM and XML/JSON generating web services. Representational Sate Transfer (REST). Using data from external services and analysing, reformatting and re-presenting this data. Metadata design, generation and use in the context of the Semantic Web using RDF and SPARQL.

Scripting technologies and presentation. Fundamental principles of software architecture. Server-side processing with PHP including functional programming and MySQL/XML data manipulation. Client side processing with JavaScript and JSON.

Documentation, technical design and security. Documenting schemas, data structures and interactions. Documenting code including APIs. Optimisation techniques. Testing code and applications, according to standards, to ensure

resilience. Common data input and web application vulnerabilities. Using source code repositories and version management.

Part 3: Teaching and learning methods

Teaching and learning methods: Scheduled learning - includes lectures and tutorials. Tutorials will consist of worksheet exercises, use of custom-built online tutor tools and supervised group work on the assignment (B component).

Independent learning – students are expected to undertake preparatory reading related to the weekly topics and to continue the usage of online tutors between contact sessions. Additional work on the group assignment is expected outside of scheduled tutorials.

Contact time: 72 hours

Assimilation and development of knowledge: 148 hours

Exam preparation: 40 hours

Coursework preparation: 40 hours

Total study time: 300 hours

Module Learning outcomes: On successful completion of this module students will achieve the following learning outcomes.

MO1 Derive well-structured and workable schemas from unstructured and qualitative data, capturing domain entities, their attributes and constraints and the relationships between them

MO2 Design and implement a range schemas across a range of data domains using appropriate good design practice

MO3 Perform accurate create, read, update and delete (CRUD) operations on a range of different data structures

MO4 Effectively use web standards for the retrieval and representation of data to derive meaningful and useful structure (form) and information (content) from a variety of web services

MO5 Using relational databases, XML and JSON as a grounding, understand the emergence and uses made of very-large-scale NoSQL key-value pair, document oriented and graph based distributed databases. Analyse through specific examples the isomorphic nature of these databases, how schemas are and can be applied and how these databases are queried, updated, replicated and maintained

MO6 Understand the value of data in an organizational and wider societal context. Appreciate the "context of use" and when and how this data needs to be authenticated, authorised, validated, mined, shared, secured and maintained

Hours to be allocated: 300

Contact hours:

Independent study/self-guided study = 228 hours

Face-to-face learning = 72 hours

Total = 300

Reading list: The reading list for this module can be accessed at readinglists.uwe.ac.uk via the following link https://uwe.rl.talis.com/modules/ufcfv4-30-2.html

Part 4: Assessment

Assessment strategy: Assessment is divided between an exam to test theoretical and analytical data skills and a coursework assignment with group and individual components to evaluate the students' ability to implement data schemas and to retrieve, manipulate and present data.

The examination will typically consist of a multiple choice assessment focusing on technical knowledge and a choice of short answer questions to assess analytical skills. Short answer questions will typically consist of:

Deriving entity models or schema from qualitative data;

Suggesting/evaluating possible technical approaches to a data design or management problem;

Being able to name and define architectural components in a data management application;

Identifying security, management or performance issues in a data management scenario and suggesting improvements or enhancements.

Answers will be assessed for completeness, technical correctness and the application of sound design principles. Thorough answers that show evidence of wider reading and independent learning will score highly.

The coursework assignment will normally be carried out in groups of 3 or 4, with groups having to produce a working data-driven application combining data from various sources. In addition, individuals will be required to produce their own specialised component that extends the basic application. Both parts will require documentation and evaluative commentary.

The coursework will be assessed for a sound underlying data models, efficient data manipulation, programming standards and adequate documentation. Both group and individual tasks that extend beyond basics, showing creativity and effort will be rewarded.

Weekly material presented in lectures and tutorial worksheets will provide the technical basis for the coursework assignment. Substantial tutor input and support will be provided to groups attending tutorial workshops on assignment preparation.

Assessment tasks:

Examination (Online) (First Sit)
Description: Online Examination
Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO3, MO5, MO6

Set Exercise (First Sit)

Description: Data modelling, integration and presentation task with group and individual components

Weighting: 50 %

Final assessment: No

Group work: Yes

Learning outcomes tested: MO2, MO4, MO6

Set Exercise (First Sit)

Description: Completion of worksheets and online tutorials (Pass/fail)

Weighting:

Final assessment: No

Group work: No

Learning outcomes tested: MO2, MO3, MO4

Examination (Online) (Resit)

Description: Online Examination

Weighting: 50 %

Final assessment: Yes

Group work: No

Learning outcomes tested: MO1, MO3, MO5, MO6

Set Exercise (Resit)

Description: Group task with an individual component.

Weighting: 50 %

Final assessment: No

Group work: Yes

Learning outcomes tested: MO2, MO4, MO6

Set Exercise (Resit)

Description: Completion of worksheets and online tutorials (Pass/fail)

Weighting:

Final assessment: No

Group work: No

Learning outcomes tested: MO2, MO3, MO4

Part 5: Contributes towards

This module contributes towards the following programmes of study:

Software Engineering {Dual} [Taylors] BSc (Hons) 2022-23

Software Engineering [Sep][FT][Frenchay][3yrs] - Not Running BSc (Hons) 2022-23

Software Engineering {Dual} [Aug][FT][Taylors][3yrs] BSc (Hons) 2022-23

Software Engineering [Sep][SW][Frenchay][4yrs] - Not Running BSc (Hons) 2022-23

Computing [Sep][SW][Frenchay][4yrs] - Not Running BSc (Hons) 2022-23

Computing {Dual} [Aug][FT][Taylors][3yrs] - Not Running BSc (Hons) 2022-23

Computing {Dual} [Mar][FT][Taylors][3yrs] - Not Running BSc (Hons) 2022-23

Computing {Dual} [Mar][SW][Taylors][4yrs] - Not Running BSc (Hons) 2022-23

Computing {Dual} [Aug][SW][Taylors][4yrs] - Not Running BSc (Hons) 2022-23

Computing [Sep][FT][Frenchay][3yrs] - Not Running BSc (Hons) 2022-23

Software Engineering {Dual} [Mar][FT][Taylors][3yrs] BSc (Hons) 2022-23

Software Engineering [Jan][FT][Northshore][3yrs] - Not Running BSc (Hons) 2022-23

Information Technology Management for Business [Frenchay] BSc (Hons) 2022-23

Software Engineering for Business [Frenchay] BSc (Hons) 2022-23

Business Computing [Frenchay] BSc (Hons) 2022-23

Software Engineering for Business {JEP}[Sep][FT][Neusoft][4yrs] BSc (Hons) 2021-22

Business Computing {Foundation} [Sep][SW][Frenchay][5yrs] BSc (Hons) 2021-22

Business Computing {Foundation} [Feb][FT][GCET][4yrs] BSc (Hons) 2021-22

Business Computing {Foundation} [Oct][FT][GCET][4yrs] BSc (Hons) 2021-22

Business Computing {Foundation} [Sep][FT][Frenchay][4yrs] BSc (Hons) 2021-22

Software Engineering for Business {Foundation} [Sep][SW][Frenchay][5yrs] BSc (Hons) 2021-22

Software Engineering for Business {Foundation} [Sep][FT][Frenchay][4yrs] BSc (Hons) 2021-22

Computing {Foundation} [Sep][SW][Frenchay][5yrs] - Not Running BSc (Hons) 2021-22

Computing {Foundation} [Sep][FT][Frenchay][4yrs] - Not Running BSc (Hons) 2021-22

Software Engineering {Foundation} [Feb][FT][GCET][4yrs] - Withdrawn BEng (Hons) 2021-22

Software Engineering {Foundation} [Oct][FT][GCET][4yrs] - Withdrawn BEng (Hons) 2021-22

Computer Science [Sep][FT][Villa][3yrs] - Not Running BSc (Hons) 2022-23

Computer Science [May][FT][Villa][3yrs] - Not Running BSc (Hons) 2022-23

Computer Science [Jan][FT][Villa][3yrs] - Not Running BSc (Hons) 2022-23