ITEC830

Web Data Technologies

S2 Evening 2017

Dept of Computing

Contents

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General Information

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Credit points
4

Prerequisites
ITEC644 or ITEC648

Corequisites

Co-badged status
COMP796

Unit description
A thorough introduction to the fundamentals of web data technologies, emphasising the use of XML (eXtensible Markup Language) as a tool for structuring, transporting and storing complex dynamic information, and alternatives to XML such as JSON. Topics include document computing (XML, XSLT, DOM, XPath and XQuery), semantic web data formats (RDF/XML, RDFa, JSON-LD) and related formats and standards, designing and application of meta-data, and XML databases.

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at https://www.mq.edu.au/study/calendar-of-dates

Learning Outcomes

On successful completion of this unit, you will be able to:

Explain the differences of the most important Web data formats (e.g.: XML, RDF, JSON).
Design and develop functional end-to-end applications that feature XML and related technologies.
Critically evaluate the most appropriate Web data formats for a range of applications.
Compare existing and assess emerging Semantic Web Technologies.

Assessment Tasks

Name	Weighting	Hurdle	Due
Six Practical Tasks	10%	No	Week 2, 4, 6, 8, 10, 12
Assignment 1	15%	No	Week 8
Assignment 2	15%	No	Week 12
Final Examination	60%	No	Examination period

Six Practical Tasks

Due: **Week 2, 4, 6, 8, 10, 12**
Weighting: **10%**

These are six individual practical programming tasks, each worth 2 marks. Note that you can only get 10 marks in total for these six tasks; that means you can get full marks if you submit 5 perfect solutions.

You have to submit the solutions to these tasks via iLearn at a specific date. No extensions will be granted. Students who have not submitted the solution prior to the deadline will be awarded a mark of 0 for the task, except for cases in which an application for special consideration is made and approved.

On successful completion you will be able to:

- Explain the differences of the most important Web data formats (e.g.: XML, RDF, JSON).
- Design and develop functional end-to-end applications that feature XML and related technologies.
- Critically evaluate the most appropriate Web data formats for a range of applications.
- Compare existing and assess emerging Semantic Web Technologies.

Assignment 1

Due: **Week 8**
Weighting: **15%**

In this individual assignment students will use XSLT technologies to extract information from

different XML documents and transform this information into an HTML format that can be displayed in a web browser with the help of a cascading stylesheet.

Students have to submit the solution to this assignment via iLearn at a specific date. No extensions will be granted. Students who have not submitted the solution prior to the deadline will be awarded a mark of 0 for the task, except for cases in which an application for special consideration has been made and approved.

On successful completion you will be able to:

- Explain the differences of the most important Web data formats (e.g.: XML, RDF, JSON).
- Design and develop functional end-to-end applications that feature XML and related technologies.
- Critically evaluate the most appropriate Web data formats for a range of applications.

Assignment 2

Due: **Week 12**
Weighting: **15%**

In this individual assignment students will review the state-of-the-art of a Semantic Web technology and summarise their findings in a survey paper. Additionally, students will give a 15-minute oral presentation that introduces the selected technology to a general audience which is not familiar with that technology.

Students have to submit the survey paper and the slides used for the presentation via iLearn at a specific date and give an oral presentation in class. No extensions will be granted. Students who have not submitted the survey paper and the slides for the oral presentation prior to the deadline and do not present the results of their research in class will be awarded a mark of 0 for this assignment, except for cases in which an application for special consideration has been made and approved.

On successful completion you will be able to:

- Explain the differences of the most important Web data formats (e.g.: XML, RDF, JSON).
- Design and develop functional end-to-end applications that feature XML and related technologies.
- Critically evaluate the most appropriate Web data formats for a range of applications.

Final Examination

Due: **Examination period**
Weighting: **60%**

The final examination will be a three-hour examination held during the usual University examination period and will cover all topics of this unit.

On successful completion you will be able to:

- Explain the differences of the most important Web data formats (e.g.: XML, RDF, JSON).
- Design and develop functional end-to-end applications that feature XML and related technologies.
- Critically evaluate the most appropriate Web data formats for a range of applications.
- Compare existing and assess emerging Semantic Web Technologies.

Delivery and Resources

Delivery

ITEC830 is taught via lectures and practical sessions in the laboratory. Lectures are used to introduce new material, give examples of the use of XML technologies and related technologies and put them in a wider context. While lectures are largely one to many presentations, you are encouraged to ask the lecturer questions to clarify anything you might not be sure of. Practical sessions give you an opportunity to practice your design and programming skills under the supervision of a practical demonstrator. Each week you will be given a number of problems to work on and a number of these problems will be assessed; it is important that you keep up with these tasks as doing so will help you understand the material in the unit and prepare you for the work in assignments.

Each week you should:

- Attend lectures, take notes, ask questions.
- Attend the practical sessions, solve as many of the practical problems as you can and seek feedback from the practical demonstrator on your work.
- Read appropriate sections of the recommended textbook, add to your notes and prepare questions for your lecturer or tutor.
- Work on any assignments that have been released.

Lecture notes will be made available each week but these notes are intended as an outline of the lecture only and are not a substitute for your own notes or assigned reading material.

Resources

There is no required textbook for ITEC830 but a recommended one that is available as eBook in Macquarie University's library:

- Joe Fawcett, Danny Ayers, Liam R. E. Quin. *Beginning XML*. 5th Edition, John Wiley & Sons, Inc. 2012.

Additionally, we will provide notes or references to freely available material where relevant.

We will use the following software in ITEC830:

- XML Copy Editor 1.2.x
- Python 3.6.x (and various Python modules)

    - rdflib 4.2.2
    - lxml 3.8.0
    - feedparser 5.1.3
- BaseX 8.6.4
- Saxon 9.7 (Home Edition)
- MongoDB 3.4
- Protege 5.2.0

Note that we only use software that is available for free. That means you can download this software and use it at home as well as in the computer labs.

Unit Schedule

WEEK	TOPIC	Recommended Reading
1	XML Introduction	Beginning XML, Fawcett et al., 2012: Chapters 1-3
2	XML DTD, Validation	Beginning XML, Fawcett et al., 2012: Chapters 4
3	XML Schema	Beginning XML, Fawcett et al., 2012: Chapter 5
4	XML XPath	Beginning XML, Fawcett et al., 2012: Chapter 7
5	XML XSLT	Beginning XML, Fawcett et al., 2012: Chapter 8
6	XML XQuery	Beginning XML, Fawcett et al., 2012: Chapter 9
7	XML DOM and SAX	W3C DOM
8	JSON	JSON
9	RDF, RDFS, SPARQL	RDF Primer
10	Linked Data	W3C Linked Data
11	Description Logic	Description Logic Primer
12	OWL	OWL 2 Primer (Second Edition)
13	Review for Exam	

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central. Students should be aware of the following policies in particular with regard to Learning and Teaching:

Academic Honesty Policy http://mq.edu.au/policy/docs/academic_honesty/policy.html

Assessment Policy http://mq.edu.au/policy/docs/assessment/policy_2016.html

Grade Appeal Policy http://mq.edu.au/policy/docs/gradeappeal/policy.html

Complaint Management Procedure for Students and Members of the Public http://www.mq.edu.a

u/policy/docs/complaint_management/procedure.html

Disruption to Studies Policy (in effect until Dec 4th, 2017): http://www.mq.edu.au/policy/docs/disruption_studies/policy.html

Special Consideration Policy (in effect from Dec 4th, 2017): https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policies/special-consideration

In addition, a number of other policies can be found in the Learning and Teaching Category of Policy Central.

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/support/student_conduct/

Results

Results shown in *iLearn*, or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in eStudent. For more information visit ask.mq.edu.au.

Department of Computing Special Consideration Policy

If you apply for Special Consideration and it is judged by the Department of Computing that your performance on an examination has been affected adversely by the circumstances documented in the consideration request, you will be required to sit a Supplementary Examination. The Supplementary Examination will normally be scheduled after the official examination period, but may be earlier in the case of a mid-semester examination. For details see the Special Consideration policy specific to the Department of Computing.

Student Support

Macquarie University provides a range of support services for students. For details, visit http://students.mq.edu.au/support/

Learning Skills

Learning Skills (mq.edu.au/learningskills) provides academic writing resources and study strategies to improve your marks and take control of your study.

- Workshops
- StudyWise
- Academic Integrity Module for Students
- Ask a Learning Adviser

Student Services and Support

Students with a disability are encouraged to contact the Disability Service who can provide appropriate help with any issues that arise during their studies.

Student Enquiries

For all student enquiries, visit Student Connect at ask.mq.edu.au

IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the Acceptable Use of IT Resources Policy. The policy applies to all who connect to the MQ network including students.

Graduate Capabilities

PG - Capable of Professional and Personal Judgment and Initiative

Our postgraduates will demonstrate a high standard of discernment and common sense in their professional and personal judgment. They will have the ability to make informed choices and decisions that reflect both the nature of their professional work and their personal perspectives.

This graduate capability is supported by:

Learning outcome

- Critically evaluate the most appropriate Web data formats for a range of applications.

Assessment tasks

- Six Practical Tasks
- Assignment 1
- Assignment 2
- Final Examination

PG - Discipline Knowledge and Skills

Our postgraduates will be able to demonstrate a significantly enhanced depth and breadth of knowledge, scholarly understanding, and specific subject content knowledge in their chosen fields.

This graduate capability is supported by:

Learning outcomes

- Explain the differences of the most important Web data formats (e.g.: XML, RDF, JSON).
- Design and develop functional end-to-end applications that feature XML and related technologies.
- Critically evaluate the most appropriate Web data formats for a range of applications.
- Compare existing and assess emerging Semantic Web Technologies.

Assessment tasks

- Six Practical Tasks
- Assignment 1
- Assignment 2
- Final Examination

PG - Critical, Analytical and Integrative Thinking

Our postgraduates will be capable of utilising and reflecting on prior knowledge and experience, of applying higher level critical thinking skills, and of integrating and synthesising learning and knowledge from a range of sources and environments. A characteristic of this form of thinking is the generation of new, professionally oriented knowledge through personal or group-based critique of practice and theory.

This graduate capability is supported by:

Learning outcomes

- Design and develop functional end-to-end applications that feature XML and related technologies.
- Critically evaluate the most appropriate Web data formats for a range of applications.

Assessment tasks

- Six Practical Tasks
- Assignment 1
- Assignment 2
- Final Examination

PG - Research and Problem Solving Capability

Our postgraduates will be capable of systematic enquiry; able to use research skills to create new knowledge that can be applied to real world issues, or contribute to a field of study or practice to enhance society. They will be capable of creative questioning, problem finding and problem solving.

This graduate capability is supported by:

Learning outcome

- Design and develop functional end-to-end applications that feature XML and related technologies.

Assessment tasks

- Six Practical Tasks
- Assignment 1

- Assignment 2
- Final Examination

PG - Effective Communication

Our postgraduates will be able to communicate effectively and convey their views to different social, cultural, and professional audiences. They will be able to use a variety of technologically supported media to communicate with empathy using a range of written, spoken or visual formats.

This graduate capability is supported by:

Learning outcomes

- Critically evaluate the most appropriate Web data formats for a range of applications.
- Compare existing and assess emerging Semantic Web Technologies.

Assessment tasks

- Six Practical Tasks
- Assignment 1
- Assignment 2
- Final Examination

PG - Engaged and Responsible, Active and Ethical Citizens

Our postgraduates will be ethically aware and capable of confident transformative action in relation to their professional responsibilities and the wider community. They will have a sense of connectedness with others and country and have a sense of mutual obligation. They will be able to appreciate the impact of their professional roles for social justice and inclusion related to national and global issues

This graduate capability is supported by:

Learning outcome

- Compare existing and assess emerging Semantic Web Technologies.

Assessment tasks

- Six Practical Tasks
- Final Examination

Changes from Previous Offering

The are no major changes on the contents of the unit. The only change is on the assessment weights and grading standards in conformance with the new grading policy at Macquarie University.

Grading Standards

We will use standards based assessment to reflect the level of performance students achieve in this unit. The standard levels (HD, D, CR, and P) summarize different levels of achievement in relation to learning outcomes (LO1-LO4) and are defined below.

Grade	LO1	LO2	LO3	LO4
	Explain the main XML technologies such as: XML, XML Schema, XPath, XSLT, and XQuery.	**Design and develop functional end-to-end applications that feature XML technologies.**	**Critically evaluate the most appropriate XML technologies for a range of applications.**	**Compare existing and assess emerging Semantic Web Technologies.**
HD	Demonstrate extensive knowledge and understanding of XML technologies. Show deep insight into how these technologies depend on each other.	Can design and implement XML-based applications that are fully compliant with a given specification. Show sophisticated programming skills and write excellent code documentation.	Suggest the best combination of XML technologies for novel application scenarios. Provide convincing and creative arguments for the selection of these technologies.	Outstanding Semantic Web survey. In-depth understanding and very clear presentation of this topic. Excellent writing skills with a highly realistic assessment of emerging technologies.
D	Demonstrate good knowledge and understanding of XML technologies. Able to explain how these technologies depend on each other.	Can design and implement XML-based applications that are compliant with a given specification. Show good programming skills and write good code documentation.	Propose a good combination of XML technologies for novel application scenarios. Provide good arguments for the selection of these technologies.	Good Semantic Web survey. Thorough understanding and clear presentation of the topic. Good writing skills with a realistic assessment of emerging technologies.
CR	Demonstrate satisfactory knowledge and understanding of XML technologies. Able to explain how these technologies depend on each other in most cases.	Can design and implement XML-based applications that follow a given specification. Show sound programming skills and write understandable code documentation.	Put forward a combination of XML technologies for novel application scenarios. Provide satisfactory arguments for the selection of these technologies.	Satisfactory Semantic Web survey. Sound understanding and acceptable presentation of the topic. Sufficient writing skills with a mostly realistic assessment of emerging technologies.
P	Demonstrate basic knowledge and underderstanding of XML technologies. Able to sketch how some of these technologies are used in isolation.	Can design and implement XML-based applications that mostly follow a given specification. Show basic programming skills and write elementary code documentation.	Communicate how standard XML technologies for novel application scenarios can be used. Provide basic arguments for the use of these technologies.	Basic Semantic Web survey. Fundamental understanding and presentation of the topic. Basic level writing skills with unrealistic assessment of emerging technologies.

These assessment standards will be used to give a numeric mark out of 100 to each assessment submission during marking. The mark will correspond to a letter grade for that task according to the University guidelines. The final raw mark for the unit will be calculated by combining the marks for all assessment tasks according to the percentage weightings shown in the assessment summary.

Your final mark will be calculated as the weighted sum of the marks of each individual assessment. The final mark will determine the grade according to the following thresholds:

Grade	Mark
HD	85 marks or more
D	75 marks or more
CR	65 marks or more
P	50 marks or more
F	Less than 50 marks

All assignments and submissions to practical tasks should be handed in via iLearn by the time stated in the relevant specification.

If you cannot submit on time because of illness or other circumstances, please contact the lecturer **before** the due date, otherwise we cannot accept your submission.