SUBJECT OUTLINE

41001 Cloud Computing and Software as a Service

Course area	UTS: Information Technology
Delivery	Session 1 2021; City
Credit points	6cp
Requisite(s)	48440 Software Engineering Practice OR 31244 Applications Programming OR 31281 Systems Development Project OR 31061 Database Principles OR 48024 Applications Programming
Result type	Grade and marks

Subject coordinator

Associate Professor Farookh Khadeer Hussain
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Teaching staff

Details of the subject's coordinator, lecturer and tutors:

Subject's coordinator and lecturer's details are below:

Associate Professor Farookh Khadeer Hussain

Phone: (02) 9514 1856

E-mail: Farookh.Hussain@uts.edu.au

Subject Tutor's Details:

Please refer to the lecture slides for the tutor's details.

Subject description

This subject introduces students to cloud computing fundamentals. Following a brief introduction to cloud computing, the following topics are covered: cloud architecture, infrastructure-as-a-service, platform-as-a-service, software-as-a-service, virtualisation and multi-tenancy. For the first assignment, students are expected to work in a group and develop a research report that critically analyses an aspect of cloud computing. Subsequently, students are exposed to cloud-based software engineering skills using an existing cloud platform. For the second assignment, students are expected to work in a group and develop a cloud-based software application.

Subject learning objectives (SLOs)

Upon successful completion of this subject students should be able to:

1. Articulate the need for cloud computing, elements of cloud computing for e-business, e-government, e-banking, e-health and e-learning.
2. Describe the architecture of different types of Cloud Services (IaaS, PaaS and SaaS), different types of Virtualization and their industrial use.
3. Critically understand the current issues in Cloud Computing for informed business decision making.
4. Create a Cloud Computing prototye that will be on a Cloud platform for areas such as e-government, e-banking, e-health and e-learning.

Course intended learning outcomes (CILOs)

This subject also contributes specifically to the development of the following Course Intended Learning Outcomes (CILOs):

- Socially Responsible: FEIT graduates identify, engage, interpret and analyse stakeholder needs and cultural perspectives, establish priorities and goals, and identify constraints, uncertainties and risks (social, ethical, cultural, legislative, environmental, economics etc.) to define the system requirements. (B.1)
- Design Oriented: FEIT graduates apply problem solving, design and decision-making methodologies to develop components, systems and processes to meet specified requirements. (C.1)
- Technically Proficient: FEIT graduates apply abstraction, mathematics and discipline fundamentals, software, tools and techniques to evaluate, implement and operate systems. (D.1)
- Collaborative and Communicative: FEIT graduates work as an effective member or leader of diverse teams, communicating effectively and operating within cross-disciplinary and cross-cultural contexts in the workplace. (E.1)

Teaching and learning strategies

This subject will consist of two formal contact sessions per week: 1.5 hours of lecture supplemented by 1.5 hours of lab/tutorial work. The teaching and learning approach used in this subject includes theoretical discussion of topics (during the lectures) supplemented with practical exercises and example (during the labs or tutorials). There will be 10 weekly 1.5 hours classes. The tutorials will consist of a range of critical thinking and collaborative tasks, including group discussions and group presentations. Students are required to form groups (of three) and work as a group during the tutorials on the tutorial case study. During the tutorial students will receive verbal feedback from the tutor (and other fellow students). Students may choose to extend the formed tutorial group for the assignment. In the labs each week students are required to program or build a mini-application in the Cloud. Students can choose to work either in a group or individually during the labs. Similar to the tutorials, students will receive verbal feedback from the tutor specifically on their lab work. Both the tutorial and labs will focus on concepts covered during the classes in the week before.

The subject coordinator/lecturer will release content on certain topics, for pre-reading by the students prior to coming to the class. Students are expected to consult the program section and peruse through the pre-reading section prior to coming to the lecture, labs and tutorials. Students bring conceptual understandings of pre-reading material to classes, tutorials and labs to enable deeper understanding through discussions and feedback.The lectures, tutorials and labs will build on the pre-readings provided to the students. All the pre-reading will be made available on Canvas.

During Week 1, students are expected to view the videos made available by the subject coordinator on Canvas. Subsequently, in order to provide the students with feedback on their understanding of the content covered during the preparation, they will be required to complete an online quiz. Feedback provided is automated and numerical.

Content (topics)

1. Cloud computing fundamentals
2. Cloud architecture model
3. Infrastructure as a Service - IaaS
4. Platform as a Service - PaaS
5. Software as a Service - SaaS
6. Virtualization and multi-tenancy in cloud computing
7. Cloud data objects and validations
8. Cloud application and data security management
9. Cloud application workflow development

Program

Week/Session	Dates	Description

1	22 February 2021	Introduction to the subject and Overview of Cloud Architecture **Notes:** Please refer to Canvas for video/s on the basics of Cloud Computing during this week. **Some of the activities to be performed during Week 1** 1. Tutorial: No tutorial this week 2. Video/s on Cloud Computing will be released on Canvas 3. Students need to form groups of three each. Students will be required to register the details of their group.
2	1 March 2021	Platform as a Service (PaaS) and Software as a Service (SaaS) **Notes:** 1. Tutorial: No tutorial this week 2. Pre-reading on Cloud architecture will be released on Canvas 3. Assignment 1 will be released this week.
3	8 March 2021	Virtualisation in Cloud environments **Notes:** Lab: An introduction to the AWS environment will be provided during the lab. Note: Students are required to bring their own laptops for this lab.
4	15 March 2021	AWS - Using Elastic Beanstalk (EBS) Note: Students are required to bring their laptops for this class. The lectures during Week 4, Week 5 and Week 6 are intended to provide an introduction of selected AWS services. **Notes:** Lab: AWS EBS lab Note: Students are required to bring their own laptops for this lab
5	22 March 2021	No lecture is scheduled during this week due to the Good Friday holiday **Notes:** No lecture is scheduled during this week due to the Good Friday holiday

6	29 March 2021	AWS - Customising Elastic Beanstalk (EBS) Note: Students are required to bring their laptops for this class. **Notes:** Lab: Lab on customising AWS EBS
Mid-StuVAC	5 April 2021	AWS - AWS Storage Services **Notes:** Lab: Lab on selected AWS Storage Services Note: Students are required to bring their laptop for this lab.
7	12 April 2021	Cloud data objects, validations and interface **Notes:** 1. Assignment 1 is due 2. Lab on Cloud data objects, validations and interface 3. Assignment 2 will be handed out during this week. Students need to form groups of three. Students are required to register the details of their group.
8	19 April 2021	Cloud application and data security management **Notes:** Lab on developing secure Cloud applications and data security management
9	26 April 2021	Workflow development, automation and deployment in the Cloud **Notes:** Lab session on developing and automating Workflows in the Cloud
10	3 May 2021	Developing Approvals and deploying them in the Cloud **Notes:** Lab session on developing Approvals and deploying them in the Cloud
11	10 May 2021	Guest lecture/industry presentation **Notes:** No tutorial or lab is scheduled this week.

12	17 May 2021	Assignment 2 group presentations and discussions

Notes:

1. Assignment 2 is due today
2. During this session feedback will be provided by the lecturer/tutor and the students as well.

Assessment

Each student in a group assessment is expected to take a fair share of the work. For the group assessment in this Subject, students will be assessed as a team, where each member of the team will receive the same mark for the assignment. However, where there are problems with the performance of individuals in the group, there will be peer assessment using SPARK for fair distribution of individual marks and to give students feedback on their work. Students will receive feedback during tutorials and labs to allow them to evaluate their progress in the subject.

Assessment task 1: Research Essay

Objective(s): This assessment task addresses the following subject learning objectives (SLOs):

1, 2 and 3

This assessment task contributes to the development of the following Course Intended Learning Outcomes (CILOs):

B.1, C.1 and E.1

Type: Essay

Groupwork: Group, individually assessed

Weight: 10%

Task: A list of cloud-computing topics will be given by the lecturer. Each group needs to select one topic, conduct research on it and write an essay based on their findings. The group is expected to read at least 5 references relevant to the topic prior to writing the report. The suggested structure of the report will be discussed during the lecture.

Length: Approximately five (5) A4 pages.

Due: 6.00pm Friday 16 April 2021
See also Further information.

Further information: This assessment item is also termed as Assignment 1. It will be released in Week 1. It will be made available via Canvas.

Mode of assessment item 1: This assessment item is to be carried out in groups of three students each.

Method of submission: Submit a PDF version of your assignment via Turnitin. Your submission file name/title should have the following structure:

41001 - Cloud Computing and Software as a Service – Assignment 1- <Your group ID>

Feedback will be provided on the submitted assignment within 2 weeks of submission.

Assessment task 2: Software as a Service (SaaS) Development

Intent: This task is based on the Cloud-based software development skills that are covered in the lectures and the labs.

Objective(s): This assessment task addresses the following subject learning objectives (SLOs):

4

This assessment task contributes to the development of the following Course Intended Learning Outcomes (CILOs):

B.1, C.1 and E.1

Type: Project

Groupwork: Group, individually assessed

Weight: 25%

Task: A case study pertaining to SaaS development will be given to the students. Students will work in groups of three each to engineer a prototype SaaS using the Force.com platform.

Length: N/A.

Due: 5.00pm Friday 21 May 2021
See also Further information.

Further information: This assessment task is linked to assessment tasks 3 and 4. They will collectively be termed as Assignment 2. Feedback will be provided on the submitted assignment within 2 weeks of submission.

Please contact the subject coordinator/subject lecturer/tutor for any further information. Additionally, please note that this is group assessment. If you are facing any issues within your group, please contact the subject coordinator/subject lecturer.

Mode of the assessment item: To be carried out in groups of three students each.

Method of submission: Include a section in the Report (Assessment item 3), mentioning your Force.com credentials. Additional information will be provided in the assignment hand out.

Assessment task 3: Report on Software as a Service (SaaS) Development

Objective(s): This assessment task addresses the following subject learning objectives (SLOs):

4

This assessment task contributes to the development of the following Course Intended Learning Outcomes (CILOs):

E.1

Type: Report

Groupwork: Group, individually assessed

Weight: 10%

Task: Students (working in groups three each) are expected to write a project report (the key descriptors of which will be discussed during the lecture) on the SaaS development exercise carried out as a part of Assessment Item 2.

Length: There is no word limit.

Due: 5.00pm Friday 21 May 2021
See also Further information.

Further information: This assessment item is part of Assignment 2. Feedback will be provided on the submitted assignment within 2 weeks of submission. Please contact the subject coordinator/subject lecturer/tutor for any further information. Additionally, please note that this item is a group assessment. If you are facing any issues within your group, please contact the subject coordinator/subject lecturer.

Mode of the assessment item: Group of three students each

Method of submission: Submit a PDF version of your report via Turnitin. Your submission file name/title should have the following structure:

41001- Cloud Computing and Software as a Service – Assignment 2- <Your group ID>

Assessment task 4: Presentation

Objective(s): This assessment task addresses the following subject learning objectives (SLOs):

4

This assessment task contributes to the development of the following Course Intended Learning Outcomes (CILOs):

C.1 and E.1

Type: Presentation

Groupwork: Group, individually assessed

Weight: 20%

Task: Students (working in groups of three each) are expected to deliver a presentation outlining their learning experiences with the SaaS development exercise (Assessment item 2). Suggested presentation outline will be provided during the lecture.

Length: There is no word limit.

Due: Week 12
The venue and time allocated to each group for presentation will be provided in Week 11.
See also Further information.

Further information: This assessment item part of Assignment 2. Feedback will be provided on the submitted assignment within 2 weeks of submission. Please contact the subject coordinator for any further information. Additionally, please note that this item is a group assessment. If you are facing any issues within your group, please contact the subject coordinator.

Mode of the assessment item: To be carried by groups of three students. Additional information will be provided in the assignment hand out.

Assessment task 5: Final Assessment

Objective(s): This assessment task addresses the following subject learning objectives (SLOs):

1, 2 and 4

This assessment task contributes to the development of the following Course Intended Learning Outcomes (CILOs):

B.1, C.1 and D.1

Type: Project

Groupwork: Individual

Weight: 35%

Task: A case study pertaining to application development using Amazon Web Services (AWS) will be given to the students. Students will individually of three each to develop the application. Students will complete this assessment individually.

Due: 6.00pm Thursday 10 June 2021
Please refer to the provided assessment item description for further information.

Moderation of marks
While marks shall be determined and allocated by the lecturer/tutor/markers according to the assessment criteria, nonetheless final allocation of marks for each of the assessment Items shall be overseen by the Subject Coordinator who shall have final say on the declared mark.

Assessment feedback
Feedback on assignments shall be provided with marks to each team by the tutor/marker during the assessment item review session or within 2 weeks after the assignment due or submission date.

Examination material or equipment
The final examination will be an open book exam.

Minimum requirements
In order to pass the subject, a student must achieve an overall mark of 50% or more.

Required texts
This is a dynamic and practical subject. There is no fixed or single textbook for this subject. The content covered in this subject is grounded in state-of-the-art knowledge and practices. However, students may choose to buy and consult the relevant recommended texts below. Please note that the below texts are for reference only and it is essential to attend lectures to follow the subject content.

Recommended texts
All lecture slides and assignment handouts will be made available via Canvas (https://canvas.uts.edu.au/**)**

The following references are recommended for this subject:

Rhoton, J. (2010), Cloud computing explained, Recursive Press, UK.

Shroff, G. (2010), Enterprise cloud computing: technology, architecture, application, Cambridge University Press, UK.

Choi, P., McGuire, C., and Roth, C. (2011), Force.com Platform Fundamentals: An Introduction to Custom Application Development in the Cloud

Some journal articles, conference papers and other reference material will be either provided in the class or made available via CAnvas.

Other resources

(a) Announcements will be made via Canvas (https://canvas.uts.edu.au/). Students are required to check Canvas regularly for any announcements etc. Please familiarize yourself with the working of Canvas.

(b) All lecture slides, assignments, tutorial work plans will be made available via Canvas (https://canvas.uts.edu.au/).

Graduate attribute development

For a full list of the faculty's graduate attributes refer to the FEIT Graduate Attributes webpage.

For the contribution of subjects taken in the Bachelor of Engineering (Honours) or Master of Professional Engineering to the Engineers Australia Stage 1 Competencies, see the faculty's Graduate Attributes and the Engineers Australia Stage 1 Competencies webpage.

Assessment: faculty procedures and advice

Marking criteria

Marking criteria for each assessment task will be available on the Learning Management System: Canvas.

Extensions

When, due to extenuating circumstances, you are unable to submit or present an assessment task on time, please contact your subject coordinator before the assessment task is due to discuss an extension. Extensions may be granted up to a maximum of 5 days (120 hours). In all cases you should have extensions confirmed in writing.

Special consideration

If you believe your performance in an assessment item or exam has been adversely affected by circumstances beyond your control, such as a serious illness, loss or bereavement, hardship, trauma, or exceptional employment demands, you may be eligible to apply for Special Consideration.

Late penalty

For Graded subjects:

Work submitted late without an approved extension is subject to a late penalty of 10 per cent of the total available marks deducted per calendar day that the assessment is overdue (e.g. if an assignment is out of 40 marks, and is submitted (up to) 24 hours after the deadline without an extension, the student will have four marks deducted from their awarded mark). Work submitted after five calendar days is not accepted and a mark of zero is awarded.

For some assessment tasks a late penalty may not be appropriate – these are clearly indicated in the subject outline. Such assessments receive a mark of zero if not completed by/on the specified date. Examples include:

a. weekly online tests or laboratory work worth a small proportion of the subject mark, or
b. online quizzes where answers are released to students on completion, or
c. professional assessment tasks, where the intention is to create an authentic assessment that has an absolute submission date, or
d. take-home papers that are assessed during a defined time period, or
e. pass/fail assessment tasks.

For Pass/Fail subjects:

Work submitted late without an approved extension will only be assessed at the subject coordinator's discretion. Students who do not submit assessment tasks by the due dates may be referred to the Responsible Academic Officer under Student Rule 3.8.2, and a fail result may be recorded for the subject.

Querying results

If you believe an error may have been made in the calculation of your result in an assessment task or the final result for the subject, it is possible to query the result with the Subject Coordinator within five (5) working days of the date of release of the result.

Academic liaison officer

Academic liaison officers (ALOs) are academic staff in each faculty who assist students experiencing difficulties in

their studies due to: disability and/or an ongoing health condition; carer responsibilities (e.g. being a primary carer for small children or a family member with a disability); and pregnancy.

ALOs are responsible for approving adjustments to assessment arrangements for students in these categories. Students who require adjustments due to disability and/or an ongoing health condition are requested to discuss their situation with an accessibility consultant at the Accessibility Service before speaking to the relevant ALO.

Statement about assessment procedures and advice

This subject outline must be read in conjunction with the Coursework Assessments policy and procedures.

Statement on copyright

Teaching materials and resources provided to you at UTS are protected by copyright. You are not permitted to re-use these for commercial purposes (including in kind benefit or gain) without permission of the copyright owner. Improper or illegal use of teaching materials may lead to prosecution for copyright infringement.

Statement on plagiarism

Plagiarism and academic integrity

At UTS, plagiarism is defined in Rule 16.2.1(4) as: 'taking and using someone else's ideas or manner of expressing them and passing them off as ... [their] own by failing to give appropriate acknowledgement of the source to seek to gain an advantage by unfair means'.

The definition infers that if a source is appropriately referenced, the student's work will meet the required academic standard. Plagiarism is a literary or an intellectual theft and is unacceptable both academically and professionally. It can take a number of forms including but not limited to:

- copying any section of text, no matter how brief, from a book, journal, article or other written source without duly acknowledging the source
- copying any map, diagram, table or figure without duly acknowledging the source
- paraphrasing or otherwise using the ideas of another author without duly acknowledging the source
- re-using sections of verbatim text without using quote marks to indicate the text was copied from the source (even if a reference is given).

Other breaches of academic integrity that constitute cheating include but are not limited to:

- submitting work that is not a student's own, copying from another student, recycling another student's work, recycling previously submitted work, and working with another student in the same cohort in a manner that exceeds the boundaries of legitimate cooperation
- purchasing an assignment from a website and submitting it as original work
- requesting or paying someone else to write original work, such as an assignment, essay or computer program, and submitting it as original work.

Students who condone plagiarism and other breaches of academic integrity by allowing their work to be copied are also subject to student misconduct Rules.

Where proven, plagiarism and other breaches of misconduct are penalised in accordance with UTS Student Rules Section 16 – Student misconduct and appeals.

Avoiding plagiarism is one of the main reasons why the Faculty of Engineering and IT is insistent on the thorough and appropriate referencing of all written work. Students may seek assistance regarding appropriate referencing through UTS: HELPS.

Work submitted electronically may be subject to similarity detection software. Student work must be submitted in a format able to be assessed by the software (e.g. doc, pdf (text files), rtf, html).

Further information about avoiding plagiarism at UTS is available.

Retention of student work

The University reserves the right to retain the original or one copy of any work executed and/or submitted by a student as part of the course including, but not limited to, drawings, models, designs, plans and specifications, essays, programs, reports and theses, for any of the purposes designated in Student Rule 3.9.2. Such retention is not to affect any copyright or other intellectual property right that may exist in the student's work. Copies of student work may be retained for a period of up to five years for course accreditation purposes. Students are advised to contact their subject

coordinator if they do not consent to the University retaining a copy of their work.

Statement on UTS email account

Email from the University to a student will only be sent to the student's UTS email address. Email sent from a student to the University must be sent from the student's UTS email address. University staff will not respond to email from any other email accounts for currently enrolled students.