Western University
Faculty of Engineering
Department of Electrical and Computer Engineering

SE4455B / ECE9016B: Cloud Computing

Course Outline 2020-21

Description:
Cloud Computing is a recently emerged and rapidly changing and growing field in which computing resources and applications are offered as services as opposed to products. LinkedIn identified Cloud Computing is one of the most in-demand skills in 2020. This course incorporates a mix of the underlying theory, introductory hands-on exercises and case-studies based on real-life experience, delivered using the agile teaching methodology supported by the interactive learning platform TopHat in conjunction with OWL.

Instructor: Dr. Shaimaa Ali
TEB 251, 519-661-2111 ext. 81268, sali242@uwo.ca
Consultation hours: Fridays 3:00pm – 4:00pm (Online via Zoom)

Academic Calendar Copy:

The course concentrates on the fundamental elements of cloud computing such as resource virtualization and distributed systems including the main concepts of cloud infrastructures. Laboratory activities will allow students to be exposed to fundamental technologies used by cloud computing such as virtual machines, virtual machine monitors, resource allocations, etc.
Contact Hours: 3 lecture hours, 2 laboratory hours, 0.5 course.

Prerequisite(s): (ECE 4436A/B, SE 3313A/B, SE 3314A/B), or (Computer Science 3357A/B, Computer Science 3305A/B).

Corequisite(s): Computer Science 4457A/B, only for Computer Science students.

Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you will be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

CEAB Academic Units: Engineering Science 75%, Engineering Design 25%.

Required Textbook:

Shaimaa Ali, Fawzy Manaa, Yao Zhou, "**The Cloud and Beyond: Practical cloud computing from beginner to industry-ready**", Online-Interactive book on Top Hat, ISBN: 978-1-77412-534-2.

General Learning Objectives (CEAB Graduate Attributes)

Knowledge Base	I	Use of Engineering Tools	I	Impact on Society and the Environment	
Problem Analysis		Individual and Team Work		Ethics and Equity	
Investigation		Communication Skills		Economics and Project Management	
Design		Professionalism		Life-Long Learning	A

Topics and Specific Learning Objectives	CEAB Graduate Attributes Indicators
Introduction to Cloud Computing. At the end of this section, students will be able to:	
• Understand the promise and opportunities of cloud computing along with its challenges.	KB4
• Describe the technological principles that have enabled cloud computing.	KB4
• Identify core features of cloud computing, such as, elasticity, multi-tenant, on-demand, ubiquitous access, usage metering, self-service, etc.	KB4
Introduction to Resource Virtualization. At the end of this section, students will be able to:	
• Describe the need, pros and cons of resource virtualization.	KB4
• Name the types of virtualization of computing and describe the hardware/software support required.	KB4
• Describe types of network virtualization and its applications in cloud computing.	KB4
• Describe the basic principles of virtualization of storage.	KB4
Cloud Computing Architecture and management. At the end of this section, students will be able to:	
• Describe cloud architecture layers (client, network, management, hardware) and their function.	KB4
• Describe cloud service models such as infrastructure, platform and software as a service (IaaS, PaaS, SaaS) and provide examples.	KB4
• Make a cost/benefit/risk analysis for a given case of IaaS, PaaS and SaaS.	
• Classify and describe the type of Clouds (Public clouds, Private clouds, Hybrid or heterogeneous clouds, Community clouds).	KB4
Cloud Resource Management and Scheduling: At the end of this section, students will be able to:	
• Understand the policies and mechanisms for cloud resource management, and the resource allocation control theoretic approaches.	Not Assessed
• Analyze cloud-based scheduling algorithms, such as the fair queuing, start-time fair queuing, and borrowed virtual time scheduling algorithms.	Not Assessed
Industrial Cloud Platforms and New Applications Developments: At the end of this section, students will be able to:	
• Apply several different options for building enterprise cloud computing applications using the cloud computing solutions offered as Infrastructure-	ET1, ET2

as-a-Service (IaaS) and Platform-as-a-Service (PaaS) services in the market, such as Amazon Web Services, Google AppEngine, Microsoft Azure, Heroku, and RightScale.	
• Detailing the development architecture of cloud-based applications ranging from scientific to engineering, gaming, and social networking domains.	ET1, ET2

Evaluation

Course Component	Weight
Case-Studies (5%, 10%, 15%)	30%
Quizzes (2)	10%
Laboratory (5)	20%
Chapters review questions (9 chapters)	5%
Self-Learning (3)	15%
Final Examination	20%

Final Examination: The final examination will take place during the regular examination period.

Late Submission Policy:
For the labs, the case-studies and self-learning components, late submissions will be allowed for up-to 3 days after the due date with 10% late penalty for each day.

Self-Reported Absence:
No weight-shifting is allowed for self-reported absence, it would spare you one day only.

Special Accommodation:
Special accommodations would only be considered upon recommendation from the accommodations center.

Online Activities:

The course will be held in a hybrid approach which means that there will be an asynchronous component in which the contents of the course will be available as chapter readings and recorded presentations.

Because of the size of the class and the safety requirements, there'll be only one hour held synchronously that will be repeated 3 times. At the beginning of the semester, I'll create 3 groups on owl one for each of the scheduled class hours and you can choose the group that fits your schedule. This synchronous session will also be recorded and available to view at a later time.

Top Hat

This semester, we will use Top Hat Pro, a student learning platform, to access this course's digital interactive textbook, ***The Cloud and Beyond: Practical Cloud Computing from Beginner to Industry Ready***. You will be able to see the chapters as soon as I assign them to you, so please don't panic if you don't see the textbook content in your platform just yet!

If you already have a Top Hat account, go to https://app.tophat.com/e/656022 (using Google Chrome browser) to be taken directly to our course. If you are new to Top Hat, follow the link in the email invitation you received or...

- Go to https://app.tophat.com/register/student (using Google Chrome browser)
- Click "Search by school" and input the name of our school
- Search for our course with the following join code: 656022

The cost of the textbook is $35 and will be applied at checkout when enrolling in our Top Hat Pro course. Top Hat Pro may also require a paid subscription.

Should you require assistance with Top Hat Pro at any time please contact their Support Team directly by way of email (support@tophat.com), the in-app support button, or by calling 1-888-663-5491. Specific user information may be required by their technical support team when troubleshooting issues.

Recording Online Activities: All of the remote learning sessions for this course will be recorded. The data captured during these recordings may include your image, voice recordings, chat logs and personal identifiers (name displayed on the screen). The recordings will be used for educational purposes related to this course, including evaluations. The recordings may be disclosed to other individuals participating in the course for their private or group study purposes. Please contact the instructor if you have any concerns related to session recordings. Participants in this course are not permitted to record the sessions, except where recording is an approved accommodation, or the participant has the prior written permission of the instructor.

Use of English: In accordance with Senate and Faculty Policy, students may be penalized up to 10% of the marks on all assignments, tests, and examinations for improper use of English. Additionally, poorly written work (except final examination) may be returned without grading. If resubmission of the work is permitted, it may be graded with marks deducted for poor English and/or late submission.

Attendance: Any student who, in the opinion of the instructor, is absent too frequently from class, laboratory, or tutorial periods will be reported to the Dean (after due warning has been given). On the recommendation of the department, and with the permission of the Dean, the student will be debarred from taking the regular final examination in the course.

Absence Due to Illness or Other Circumstances: Students should immediately consult with the instructor or department Chair if they have any problems that could affect their performance in the course. Where appropriate, the problems should be documented (see the attached "Instructions for Students Unable to Write Tests or Examinations or Submit Assignments as Scheduled"). The student should seek advice from the instructor or department Chair regarding how best to deal with the problem. Failure to notify the instructor or department Chair immediately (or as soon as possible thereafter) will have a negative effect on any appeal.

For more information concerning medical accommodations, see the relevant section of the Academic Handbook:
http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf

For more information concerning accommodations for religious holidays, seethe relevant section of the Academic Handbook:
http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_religious.pdf

Missed Midterm Examinations: If a student misses a midterm examination, she or he must follow the Instructions for Students Unable to Write Tests and provide documentation to Undergraduate Services Office within 24 hours of the missed test. If accommodation is granted, the department will decide whether to provide a make-up test or allow reweighting of the test, where reweighting means the marks normally allotted for the midterm will be added to the final exam. If no reasonable justification for missing the test can be found, then the student will receive a mark of zero for the test.

If a student is going to miss the midterm examination for religious reasons, they must inform the instructor in writing within 48 hours of the announcement of the exam date or they will be required to write the exam.

Cheating and Plagiarism: Students must write their essays and assignments in their own words. Whenever students take an idea or a passage from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. University policy states that cheating, including plagiarism, is a scholastic offence. The commission of a scholastic offence is attended by academic penalties, which might include expulsion from the program. If you are caught cheating, there will be no second warning.

All required papers may be subject to submission for textual similarity review to commercial plagiarism-detection software under license to the University for the detection of plagiarism. All papers submitted will be included as source documents on the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between the University of Western Ontario and Turnitin.com (http://www.turnitin.com).

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, in the relevant section of the Academic Handbook:
http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf

Use of Electronic Devices:

Use of Personal Response Devices ("Clickers"):

Policy on Repeating All Components of a Course: Students who are required to repeat an Engineering course must repeat all components of the course. No special permissions will be granted enabling a student to retain laboratory, assignment, or test marks from previous years. Previously completed assignments and laboratories cannot be resubmitted by the student for grading in subsequent years.

Internet and Electronic Mail: Students are responsible for regularly checking their Western e-mail and the course web site (https://owl.uwo.ca/portal/) and making themselves aware of any information that is posted about the course.

Accessibility: Please contact the course instructor if you require material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 519-661-2111 ext. 82147 for any specific question regarding an accommodation.

Support Services: Office of the Registrar, http://www.registrar.uwo.ca/
Student Development Centre, http://www.sdc.uwo.ca/

Engineering Undergraduate Services, http://www.eng.uwo.ca/undergraduate/
USC Student Support Services, http://westernusc.ca/services/

Students who are in emotional/mental distress should refer to Mental Health @ Western, http://www.health.uwo.ca/mental_health/, for a complete list of options about how to obtain help.