CS 4457A / 9657A: Computer Networks II

The University of Western Ontario
Course Outline – Fall 2019

1. General Course Information
Course Information

CS 4457A / 9657A: Computer Networks II
Tuesday: 9:30am – 12:30pm, TC-203

Prerequisites

Computer Science 3305A/B, Computer Science 3357A/B

Although this course is primarily designed for the senior year undergrad and graduate students who have background in computer networks and operating systems (such as 3357A/B, 3305A/B) it also welcomes interested students from other relevant disciplines such as electrical and computer engineering, systems engineering, mathematics, statistics, and Combinatorics & Optimization. If the students do not have background in the area of communication networks they are encouraged to discuss their interest with the course instructor to evaluate their eligibility for this course.

2.   Instructor

Name – Dr. Anwar Haque
Office Location – Middlesex College: MC 415
Phone Number – 519-661-2111 Ext. 87428
E-Mail – ahaque32@uwo.ca

Office Hours (Instructor): Tuesday 12:30pm – 1:30pm
Office hours (Teaching Assistants- TAs): To be announced on the course website.

3.   Course Description

The Internet and other modern communications services provided by telco companies (e.g., Bell Canada, Telus, Rogers) are part of today's modern society. Today's Telco industry serves as a technological backbone for any digital services and smart infrastructure one could imagine e.g., content delivery, smart cities, e-health.

This course will first introduce the core technical functionalities within a Telco industry; and then deep dive into a number of network performance and resource management topics. The list of these topics may include Quality of Service (QoS), Quality of Experience (QoE), Network Function Virtualization (NFV), Software Defined Networks (SDN), Network security, Internet traffic forecast, Network capacity planning, Network cost modeling, and smart services that use the communication

networks infrastructure. The course will also introduce network simulation basics and provide a brief training on how to perform empirical analysis for networks using networks simulator such as Miniet (http://mininet.org/). While exploring the technical details of these individual domains the course will also introduce some of the core research challenges in these fields. Students will gain real life knowledge and experience through discussion, assignments, and various research projects. The learning component for the Undergraduate students will be tested via a number of assignments and a final exam. Graduate students will be mainly involved in exploring a real-world complex Telco research topic and working on a full fledge research paper that addresses a specific research problem. In addition, this course is expected to assist the graduate students (who yet to identify their thesis topic) to find an interesting real-world research problem that could be a good fit for their thesis.

4.   Course Materials

Required Textbook: No required text book, but the list of research reading papers and relevant materials will be provided on the course website.

Lecture notes: Lecture notes will be made available on the course website prior to each class.

Course Website: http://www.csd.uwo.ca/Courses/CS4457a
Students should check the course website and OWL (https://owl.uwo.ca) on a regular basis for news and updates. Course website will be the primary method by which information will be disseminated to all students in the class. Students are responsible for checking the course website on a regular basis.

5.   Methods of Evaluation

<u>Undergraduate Students</u>

There are two basic components (Assignments and Final Exam) that will be used to determine UG student's mark in the course:

- Three programming assignments worth 50% of the overall mark

- A final exam worth 50% of the overall mark

The following rules are designed to ensure that students meet certain minimum standards:

- To be eligible to pass the course, a student must receive at least 40% in the exam components (i.e., 40% of 50) and at least a 40% in the assignments (i.e., 40% of 50).

- To be eligible to receive an overall grade of 60% or higher in the course, a student must receive at least 50% in the exam component (i.e., 50% of 55) and at least 50% in the assignments (i.e., 50% of 45).

There is a final exam for the UG students that is scheduled by the Registrar. This will be closed book / closed notes exam; and no electronic devices are allowed except regular calculator.

Graduate Students

There are two basic components (Assignments and Research project) and that will be used to determine a graduate student's mark in the course:

- Two programming assignments worth 30% of the overall mark

- A research project proposal worth 20% of the overall mark

- A final research paper worth 50% of the overall mark

The following rules are designed to ensure that students meet certain minimum standards:

- To be eligible to pass the course, a student must receive at least 40% in the research project components (i.e., 40% of 70) and at least a 40% in the assignments (i.e., 40% of 30).

- To be eligible to receive an overall grade of 60% or higher in the course, a student must receive at least 50% in the research project component (i.e., 50% of 70) and at least 50% in the assignments (i.e., 50% of 30).

Below is the summary of the individual course components (both UG and Grad):

Table 1: Course grade components and weighting

Course Component	Student Group	Description	Grade weight %
Assignment #1 Due date: Sept 30	Undergrad	ISP Functional Areas Individual effort. See note #1 below	15%
Assignment #2 Due date: Oct 21	Undergrad	Network QoS-QoE / Network Cost Modeling / Network Security Individual effort. See note #1 below	15%
Assignment #3 Report Due date: Nov 25	Undergrad	Network Simulation Individual effort. See note #1 below	20%
Final Exam	Undergrad	Closed book final exam	50%
Research Paper Review (Assignment #1) Report Due date: Sept 30	Grad	1 x research paper review. Individual effort. See note #1 below	15%
Research Paper Review (Assignment #2) Report Due date: Oct 14	Grad	1 x research paper review. Individual effort. See note #1 below	15%
Research Project Proposal Report Due date: Oct 21	Grad	2-3 pages research project proposal. Group effort. See note #2 below	20%

Final Research Project Report Due date: Dec 23	Grad	10-15 pages research paper. Group effort. Pls see note #3 below	35% + 15% = 50% (report + presentation)

Notes:

1. Assignment (both UG and Grad) must be submitted through OWL by the deadline specified in the course website. All assignments are due by midnight (electronically) of the due date. Every effort will be made to have assignments marked and handed back within 2 weeks of the hand-in date, preferably sooner.

2. Grad Research Proposal: Graduate students are expected to write a research proposal to outline their final research papers. This proposal paper could be a 2-3 page that includes (a) the specific research problem that students planning to explore; (b) related work (other research works in this area); (c) scientific importance / significance of the proposed research plan (why this is an important area to explore); and (d) a brief outline on how they plan to approach the problem. Students are required to work in a group (with other graduate students) for their projects.

3. Grad Final Research Project: Based on the research proposal submitted by the graduate students they are expected to work on a full fledge research paper of 10 to 15 pages in length. This research paper should include (a) the problem statement; (b) relevant work, (c) technical / scientific contribution why the proposed research will be interesting to the scientific community; (d) detailed description of the proposed idea /solution/ framework; (e) validation of the proposed solution through some analysis; and (f) brief discussion on the main contribution of this paper in relevance to major research works done so far.

Guideline on research paper review (Assignments for Grad students), research proposal, final project, and presentations will be discussed in class, and necessary information will be available on course website. Graduate students will be allowed to submit their final research paper by Dec 23rd 2019.

6. Accommodation and Accessibility

If you are unable to meet a course requirement due to illness or other serious circumstances, you must seek approval for the absence as soon as possible. Approval can be granted either through a self-reporting of absence or via the Dean's Office/Academic Counselling unit of your Home Faculty. If you are a Science student, the Academic Counselling Office of the Faculty of Science is located in NCB 280, and can be contacted at scibmsac@uwo.ca.

For further information, please consult the university's policy on academic consideration for student absences:https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Consideration_for_absences.pdf.

If you miss the Final Exam, please contact your faculty's Academic Counselling Office as soon as you are able to do so. They will assess your eligibility to write the Special Exam (the name given by the university to a makeup Final Exam).

You may also be eligible to write the Special Exam if you are in a "Multiple Exam Situation" (see http://www.registrar.uwo.ca/examinations/exam_schedule.html).

7.   Academic Policies

The website for Registrarial Services is http://www.registrar.uwo.ca.

In accordance with policy, http://www.uwo.ca/its/identity/activatenonstudent.html, the centrally administered e-mail account provided to students will be considered the individual's official university e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at his/her official university address is attended to in a timely manner.

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf.

All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in 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)

8.   Support Services

Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Student Accessibility Services (SAS) at 661-2147 if you have any questions regarding accommodations.

The policy on Accommodation for Students with Disabilities can be found here: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_disabilities.pdf

The policy on Accommodation for Religious Holidays can be found here: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_religious.pdf

Learning-skills counsellors at the Student Development Centre (http://www.sdc.uwo.ca) are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling.

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. Additional student-run support services are offered by the USC, https://westernusc.ca/your-services/