

## Course Outline – Fall 2021

### CS 4434A/CS 9636A: Network Security

## 1. General Course Information

### Course Information

CS 4434A/9636A: Network Security  
Tuesday: 9:30am – 12:30pm SEB 2202 [in-person lectures]

### Prerequisites

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

### Antirequisite:

2020-2021 CS 4457A/CS 9657A

Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you may 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.

## 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 12:45pm – 1:45pm [Zoom link will be announced on OWL]  
Office hours (Teaching Assistants- TAs): TA names, hours, and Zoom links will be announced on OWL

## 3. Course Description, schedule, and Delivery Mode

This course will aim at providing a comprehensive understanding of various security issues in an end-to-end network. The list of these topics includes message/user authentication, cryptographic key management, web security, TLS, wireless/5G security, e-mail security, DNS security, IPSec, VPN security, Malware, Firewall, network intrusion detection/prediction/prevention, DoS/DDoS, Cloud and IoT Security.

**Course Schedule:** A detailed course schedule is available on OWL

**Course Delivery Mode:** The delivery mode of this course will be in-person. Lecture materials/slides will be made available on OWL prior to each lecture. The instructor's and TA office hours will be offered over Zoom. Quizzes will be conducted via OWL's Test and Quizzes. Midterm and Final exams will be in-person. Assignments submissions will be via OWL's Assignments. OWL will be used for project proposal submission and final project submission for the graduate students. Final project presentations will be over the zoom (graduate students).

**Contingency plan for an in-person class pivoting to 100% online learning:** In the event of a COVID-19 resurgence/lock-down during the course that necessitates the course delivery moving away from face-to-face interaction, all remaining course content will be delivered entirely online, either synchronously or asynchronously. The grading scheme will **not** change. Any remaining assessments will also be conducted online as determined by the course instructor.

**Important Sessional Dates:**

Classes begin: September 14, 2021

Reading Week: November 1-7, 2021

Classes end: December 7, 2021

## 4. Course Materials

**Suggested Textbook:** Following book is recommended for this course:

William Stallings, "Cryptography and Network Security: Principles and Practice", 8<sup>th</sup> edition, Pearson, 2020, Print ISBN: Print ISBN: 9780135764039, 0135764033

**Lecture notes:** Lecture notes will be made available on OWL prior to each class.

Students should check OWL (<https://owl.uwo.ca>) on a regular basis for news and updates. OWL courser site will be the primary method by which information will be disseminated to all students in the class. Students are responsible for checking OWL on a regular basis.

If students need assistance with the course OWL site, they can seek support on the OWL Help page. Alternatively, they can contact the Western Technology Services Helpdesk. They can be contacted by phone at 519-661-3800 or ext. 83800.

## **5. Methods of Evaluation**

### **Undergraduate Students**

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

- Five assignments worth 30% of the overall mark
- Ten quizzes worth 10% of the overall mark
- One midterm exam worth 15% of the overall mark
- A final exam worth 45% 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 70) and at least 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 exam component (i.e., 50% of 70) and at least 50% in the assignments (i.e., 50% of 30).

There is a final exam for the UG students that is scheduled by the Registrar.

### **Graduate Students**

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

- Ten quizzes worth 10% of the overall mark
- Five assignments worth 30% of the overall mark
- A research project proposal worth 10% of the overall mark
- A final research paper worth 50% of the overall mark (45% research paper + 5% presentation)

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 10), at least a 40% in the assignments (i.e., 40% of 30), and at least 40% in the research project components (i.e., 40% of 60).
- 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 10), at least 50% in the assignments (i.e., 50% of 30), and at least 50% in the research project component (i.e., 50% of 60).

A detailed course schedule is available on OWL, where a list of topics covered on each test is provided. Below is the summary of the individual course components (both UG and Grad):

Table 1: Course grade components and weighting

<b>Course Component</b>	<b>Student Group</b>	<b>Description</b>	<b>Grade weight %</b>
Assignments	Undergrad/Grad	A total of five assignments. Individual effort. See note #1 below	30%
Quizzes	Undergrad/Grad	A total of ten quizzes (T/F, multiple choices)	10%
Midterm	Undergrad	Mixed Format	15%
Final Exam	Undergrad	Mixed format To be administered by Registrar's office	45%
Research Project Proposal	Grad	2-3 pages research project proposal. Group effort. See note #2 below	10%
Final Research Project	Grad	10-15 pages research paper. Group effort. Pls see note #3 below	45% + 5% = 50% (report + presentation)

**Notes:**

1. Assignment (both UG and Grad) must be submitted through OWL by the deadline specified on OWL. All assignments are due by midnight (electronically) of the due date. Late assignments may be handed in but with a penalty of 20% a day. Every effort will be made to have assignments marked and handed back within ten business days of the hand-in date, preferably sooner. Assignment Due Dates are: Oct 4<sup>th</sup> (Assignment 1); Oct 18<sup>th</sup> (Assignment 2); Nov 8<sup>th</sup> (Assignment 3); Nov 22<sup>nd</sup> (Assignment 4); and Dec 6<sup>th</sup> (Assignment 5).

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 of how they plan to approach the problem. Students are required to work in a group (with other graduate students) for their projects. A sample research proposal will be provided to the students.

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 (11 font times new roman, single spaced). This research paper should include: (a) the problem statement; (b) relevant/related work, (c) technical/scientific contribution i.e., why the proposed research will be interesting to the scientific community; (d) a 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 other major research works done so far.

Guideline on research proposal, final project, and presentations will be discussed in class, and the necessary

information will be available on OWL. Graduate students will be allowed to submit their final research paper by December 22, 2020.

## Exams

There is an in-person final exam that is scheduled by the Registrar. There is one in-person midterm (Exam Date: Tuesday Oct 19 2021). There will be a total of ten quizzes. Owl's *tests and quizzes* will be used for this purpose. A detailed schedule of these tests is available on OWL.

## Accommodated Evaluations

There will be no makeup for the Quizzes or the Midterm Exam. If you miss the Quiz or the Midterm Exam, follow the procedure for Academic Accommodation detailed in Section 6 below. If accommodation is approved by your Dean's office, your Final Exam mark will be reweighted to include the weight of the Quiz and Midterm Exam.

# 6. Student Absences

## Academic Consideration for Student Absences

Students who experience an extenuating circumstance (illness, injury or other extenuating circumstance) sufficiently significant to temporarily render them unable to meet academic requirements may submit a request for academic consideration through the following routes:

- (i) Submitting a Self-Reported Absence (SRA) form provided that the conditions for submission are met. To be eligible for a Self-Reported Absence:
  - an absence must be no more than 48 hours
  - the assessments must be worth no more than 30% of the student's final grade
  - no more than two SRAs may be submitted during the Fall/Winter term
- (ii) For medical absences, submitting a Student Medical Certificate (SMC) signed by a licensed medical or mental health practitioner to the Academic Counselling office of their Faculty of Registration.
- (iii) Submitting appropriate documentation for non-medical absences to the Academic Counselling office in their Faculty of Registration.

Note that in all cases, students are required to contact their instructors within 24 hours of the end of the period covered, unless otherwise instructed in the course outline.

Students should also note that individual instructors are not permitted to receive documentation directly from a student, whether in support of an application for consideration on medical grounds, or for other reasons. **All documentation required for absences that are not covered by the Self-Reported Absence Policy must be submitted to the Academic Counselling office of a student's Home Faculty.**

For the policy on Academic Consideration for Student Absences – Undergraduate Students in First Entry Programs, see:

[https://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/accommodation\\_illness.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_illness.pdf)

and for the Student Medical Certificate (SMC), see:

[http://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/medicalform.pdf](http://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf)

### **Religious Accommodation**

When a course requirement conflicts with a religious holiday that requires an absence from the University or prohibits certain activities, students should request accommodation for their absence in writing at least two weeks prior to the holiday to the course instructor and/or the Academic Counselling office of their Faculty of Registration. Please consult University's list of recognized religious holidays (updated annually) at <https://multiculturalcalendar.com/ecal/index.php?s=c-univwo>

### **Absences from Final Examinations**

If students miss the Final Exam, they must contact the Academic Counselling office of their Faculty of Registration as soon as they are able to do so. Academic Counselling office will assess students' eligibility to write the Special Examination (the name given by the University to a makeup Final Exam).

Students may also be eligible to write the Special Exam if they are in a "Multiple Exam Situation" (e.g., more than 2 exams in 23-hour period, more than 3 exams in a 47-hour period).

If a student fails to write a scheduled Special Examination, the date of the next Special Examination (if granted) normally will be the scheduled date for the final exam the next time this course is offered. The maximum course load for that term will be reduced by the credit of the course(s) for which the final examination has been deferred. See the Academic Calendar for details (under [Special Examinations](#)).

## **7. Accommodation and Accessibility**

### **Accommodation Policies**

Students with disabilities work with Accessible Education (formerly SSD), which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The policy on Academic Accommodation for Students with Disabilities can be found at: [https://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/Academic Accommodation disabilities.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Accommodation_disabilities.pdf)

Students will be expected to wear triple layer non-medical masks at all times in the classroom as per Western policy and public health directives. Students who are unable to wear a mask for medical or religious reasons must seek formal accommodation through Accessible Education at [aew@uwo.ca](mailto:aew@uwo.ca). Students are expected not to eat or drink while in class to ensure masks stay in place. Students will be able to eat and drink outside of the classroom during scheduled breaks.

Students unwilling to wear a mask as stipulated by Western policy and public health directives will be referred to the Department, and such actions will be considered a violation of the student Code of Conduct.

## 8. Academic Policies

The website for Registrarial Services is <http://www.registrar.uwo.ca>. In accordance with policy, [https://www.uwo.ca/univsec/pdf/policies\\_procedures/section1/mapp113.pdf](https://www.uwo.ca/univsec/pdf/policies_procedures/section1/mapp113.pdf), 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.

Midterm and Final exams will be **closed book / closed notes** exams and **No electronic devices** will be permitted except **regular calculator**.

**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](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>).

Computer-marked multiple-choice tests and exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

In the event of a pandemic lock-down and in-person exam restrictions, the tests and examinations in this course may be conducted using a remote proctoring service. Under such circumstances, by taking this course, you are consenting to the use of this software and acknowledge that you will be required to provide **personal information** (including some biometric data) and the session will be **recorded**. Completion of this course will require you to have a reliable internet connection and a device that meets the technical requirements for this service. More information about this remote proctoring service, including technical requirements, is available on Western's Remote Proctoring website at: <https://remoteproctoring.uwo.ca>.

## 9. Support Services

Please visit the Science & Basic Medical Sciences Academic Counselling webpage for information on adding/dropping courses, academic considerations for absences, appeals, exam conflicts, and many other academic related matters: <https://www.uwo.ca/sci/counselling/>

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 Accessible Education at (519) 661-2147 if you have any questions regarding accommodations.

Western University is committed to a thriving campus as we deliver our courses in the mixed model of both virtual and face-to-face formats. We encourage you to check out the Digital Student Experience website to manage your academics and well-being: <https://www.uwo.ca/se/digital/>

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/mentalhealth>) 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/>