



# THE UNIVERSITY OF WINNIPEG

## APPLIED COMPUTER SCIENCE

**Course Number: ACS-3921-001/ACS-4921-001/GACS-4921-001**

**Course Name: Computer Security and Privacy**

### Instructor Information

**Professor:** Talal Halabi

**E-mail:** [t.halabi@uwinnipeg.ca](mailto:t.halabi@uwinnipeg.ca)

**Office Hours:** Friday: 8:30 - 9:30 (via Zoom)

**Class Meeting Time:** Tuesday & Thursday: 8:30 – 9:45 (via Zoom)

**Course Web Page:** Will be available on Nexus

### Important Dates

First Class:	Sep 8 <sup>th</sup> , 2020
Midterm Exam:	October 22 <sup>nd</sup> , 2020
Reading Week (No Classes):	October 11 <sup>th</sup> – Oct 17 <sup>th</sup> , 2020
Final Withdrawal Date w/o academic penalty:	Nov 17 <sup>th</sup> , 2020
(A minimum of 20% of the work on which the final grade is based will be evaluated and available to the student before the voluntary withdrawal date)	
Last Class:	Dec 3 <sup>rd</sup> , 2020
Submission of reports:	Nov 29 <sup>th</sup> , 2020
Presentations:	Dec 3 <sup>rd</sup> , 2020
Final Exam:	TBD

### Course Objectives/Learning Outcomes

This course introduces students to the security and privacy issues in computer and network systems and related technologies. It covers the fundamentals of computer security such as encryption methods, public key cryptography, hash function and signature schemes, key exchange protocols, authentication and access control models, malicious software, system and network security. The course also examines issues related to the management of IT security like risk assessment, security controls, security audits, privacy and ethics. ACS-4921 students will also undertake a comprehensive case study on a topic related to computer security and privacy.

## **Remote Learning**

All course material including lecture notes, slides, and assignment details will be available on Nexus.

Students must be available via Zoom during the lecture times.

- Students must display their real/full name
- Use of Video is optional
- Participants must be muted when not speaking
- Students may interact via chat, voice or gestures

Students can find answers to frequently asked questions related to remote learning here:

<https://www.uwinnipeg.ca/covid-19/remote-learning-faq.html>.

Note: a permitted or necessary change in mode of delivery may require adjustments to important aspects of course outlines, like class schedule and the number, nature, and weighting of assignments and/or exams.

## **Evaluation Criteria For ACS-3921 Students**

### ***Assignments: 40%***

- There will be 4 assignments worth 10% each.
- Due at 11:59:59 pm on due day.
- No late assignment will be accepted, or under special circumstances accepted with 20% off for each late day.
- Assignments are only submitted electronically via Nexus as PDF (Portable Document Format) files.
- Multiple submissions are not permitted. Students may submit a partially completed assignment and will receive credit for those attempted problems.
- Assignments will be done by a group of two students. Only one of the group members submits the assignment, in which the names of both students should appear.
- Assignments must be typed. No handwritten assignments will be accepted.

### ***Midterm Exam: 20%***

- Open-book online midterm exam.

### ***Final Exam: 40%***

- Open-book online final exam.
- The final exam is comprehensive and covers all material discussed in the course.

## **Evaluation Criteria For ACS-4921 and GACS-4921 Students**

### ***Assignments: 32%***

- There will be 4 assignments worth 8% each.

- Due at 11:59:59 pm on due day.
- No late assignment will be accepted, or under special circumstances accepted with 20% off for each late day.
- Assignments are only submitted electronically via Nexus as PDF (Portable Document Format) files.
- Multiple submissions are not permitted. Students may submit a partially completed assignment and will receive credit for those attempted problems.
- Assignments will be done by a group of two students. Only one of the group members submits the assignment, in which the names of both students should appear.
- Assignments must be typed. No handwritten assignments will be accepted.

**Midterm Exam: 18%**

- Open-book online midterm exam.

**Case Study (20%)**

- Students will be required to do a comprehensive case study. Topics will be related to computer security and privacy.
- The case study will involve reading scientific articles from the literature and providing a theoretical report that answers a set of analytical questions, with suggestions for further work.
- The case study will be done as a group project. There will be additional evaluation criteria for each individual student based on their contribution to the overall project in the group.
- The case study topics to be determined in class.
- The case study will be evaluated based on thoroughness of the research, the level of details in the findings, lessons learned, the level of understanding of the students, and the quality of the presentation.
- The case study will consist of a term report (up to five pages) and only submitted by email as PDF (Portable Document Format) files to my University of Winnipeg email account – [t.halabi@uwinnipeg.ca](mailto:t.halabi@uwinnipeg.ca) on the due day no later than 11:59:59 pm.
- Students will be required to deliver an online presentation of the studied scientific paper and the findings of their case study at the end of term.

**Final Exam: 30%**

- Open-book online final exam.
- The final exam is comprehensive and covers all material discussed in the course.

**Test / Exam Requirements**

- Photo ID is required for the final exam
- Midterm and final exams will be delivered via Nexus. Students must have video capability and be prepared to present their student ID
- Midterm and final exams are open book. Students are permitted to view only the following authorized course material:

- Class notes, slides, and assignment descriptions and solutions posted by the instructor
- Course textbook
- Student's own course notes and assignment submissions
- Students may use an external tool such as a text editor or IDE to write answers to questions before entering them into the exam
- Students may contact the instructor to ask questions
- External resources (or any material not listed above) are NOT PERMITTED
- Communication with others (except the instructor) is NOT PERMITTED
- All work must be entirely the students' own. Collaboration or sharing of work is NOT PERMITTED
- You are expected to write the test/exam on its given day. Unless a medical certificate is provided, no accommodation is made for missed exams.

Students may choose not to attend classes or write examinations on holy days of their religion, but they must notify their instructors at least two weeks in advance. Instructors will then provide opportunity for students to make up work or examinations without penalty. A list of religious holidays can be found in the 2020-21 Undergraduate Academic Calendar.

Students with documented disabilities, temporary or chronic medical conditions, requiring academic accommodations for tests/exams or during lectures/laboratories are encouraged to contact Accessibility Services (AS) at 204.786.9771 or <https://www.uwinnipeg.ca/accessibility-services/> to discuss appropriate options. All information about a student's disability or medical condition remains confidential.

### **Final Letter Grade Assignment**

Historically, numerical percentages have been converted to letter grades using the following scale. However, instructors can deviate from these values based on pedagogical nuances of a particular class, and final grades are subject to approval by the Department Review Committee.

A+	90+ - 100%	B+	75 - 79%	C	60 - 64%
A	85 - 90%	B	70 - 74%	D	50 - 59%
A-	80 - 84%	C+	65 - 69%	F	below 50%

### **Prerequisite and Restriction Information\***

(This information can be found in the UW General calendar)

- A grade of at least C in both ACS-2906(3) and ACS-2947(3), or permission of the Department Chair.
- Restrictions: Students who have taken ACS-3921 will not be eligible to take ACS-4921.

\*Make sure that you have the necessary prerequisites to take this course. If you have not successfully completed the above listed course(s), it is in your interest to go to student registration office and officially drop the course.

## **Email Communication Requirements**

- Emails from accounts at uwinnipeg.ca are usually not filtered by the UofW email filter. Thereby, it is recommended that electronic communication used for the course utilize a UofW email account or the Nexus platform to minimize the risk of filtering.
- Use 'ACS-3921/4921' as subject in email communication related to the course.

## **Regulations, Policies, and Academic Integrity**

Academic dishonesty is a very serious offense and will be dealt in accordance with the University's policies.

*Avoiding Academic Misconduct:* Students are encouraged to familiarize themselves with the Academic Regulations and Policies found in the University Academic Calendar at:

<https://uwinnipeg.ca/academics/calendar/docs/regulationsandpolicies.pdf>

Particular attention should be given to subsections 8 (Student Discipline), 9 (Senate Appeals) and 10 (Grade Appeals). Please note, in particular, the subsection of Student Discipline pertaining to plagiarism and other forms of cheating.

Detailed information can be found at the following:

- Academic Misconduct Policy and Procedures: <https://www.uwinnipeg.ca/institutional-analysis/docs/policies/academic-misconduct-policy.pdf> and <https://www.uwinnipeg.ca/institutional-analysis/docs/policies/academic-misconduct-procedures.pdf>
- UW Library video tutorial "Avoiding Plagiarism"  
<https://www.youtube.com/watch?v=UvFdxRU9a8g>

Uploading essays and other assignments to essay vendor or trader sites (filesharing sites that are known providers of essays for use by others who submit them to instructors as their own work) involves "aiding and abetting" plagiarism. Students who do this can be charged with Academic Misconduct.

*Non-academic misconduct.* Students are expected to conduct themselves in a respectful manner on campus and in the learning environment irrespective of platform being used. Behaviour, communication, or acts that are inconsistent with a number of UW policies could be considered "non-academic" misconduct. More detailed information can be found here:

- Respectful Working and Learning Environment Policy  
<https://www.uwinnipeg.ca/respect/respect-policy.html>,
- Acceptable Use of Information Technology Policy  
<https://www.uwinnipeg.ca/institutional-analysis/docs/policies/acceptable-use-of-information-technology-policy.pdf>

- Non-Academic Misconduct Policy and Procedures: <https://www.uwinnipeg.ca/institutional-analysis/docs/student-non-academic-misconduct-policy.pdf> and <https://www.uwinnipeg.ca/institutional-analysis/docs/student-non-academic-misconduct-procedures.pdf>.

*Copyright and Intellectual Property.* Course materials are the property of the instructor who developed them. Examples of such materials are course outlines, assignment descriptions, lecture notes, test questions, and presentation slides—irrespective of format. Students who upload these materials to filesharing sites, or in any other way share these materials with others outside the class without prior permission of the instructor/presenter, are in violation of copyright law and University policy. Students must also seek prior permission of the instructor/presenter before, for example, photographing, recording, or taking screenshots of slides, presentations, lectures, and notes on the board. Students found to be in violation of an instructor’s intellectual property rights could face serious consequences pursuant to the Academic Misconduct or Non-Academic Misconduct Policy; such consequences could possibly involve legal sanction under the Copyright Policy

[https://copyright.uwinnipeg.ca/docs/copyright\\_policy\\_2017.pdf](https://copyright.uwinnipeg.ca/docs/copyright_policy_2017.pdf)

### Privacy

Students have rights in relation of the collecting of personal data the University of Winnipeg:

<https://www.uwinnipeg.ca/privacy/admissions-privacy-notice.html>.

More information:

- Zoom and Privacy: <https://www.uwinnipeg.ca/privacy/zoom-privacy-notice.html>
- Testing/Proctoring: <https://www.uwinnipeg.ca/privacy/zoom-test-and-exam-proctoring.html>.

### **Required Text Book(s)/Reading List**

Computer Security: Principles and Practice

William Stallings & Lawrie Brown

4th Edition, 2018

Pearson Education, Inc.

ISBN-13: 978-0-13-479410-5

ISBN-10: 0-13-479410-9

Class notes and notices will be posted on Nexus. Students are also responsible for material covered in class and announcements made in class.

### **Course Outline (Tentative)**

**Computer Security Technology and Principles**

Cryptographic Tools  
User Authentication  
Access Control  
Database and Data Centre Security  
Malicious Software  
Denial of Services Attacks  
Intrusion Detection  
Firewall and Intrusion Prevention System  
Wireless Network Security

### **Software and System Security**

Software Security  
Operating system Security  
Cloud and IoT Security

### **IT Security Management Issues**

IT Security Management and Risk Assessment  
IT Security Controls, Plans, and Procedures  
Security Auditing  
Legal and Ethical Aspects

Note that all topics listed may not be covered and may be offered in a slightly different time order.

### **Additional Course Related Information**

1. When it is necessary to cancel a class due to exceptional circumstances, instructors will make every effort to inform students via uwinnipeg email (and/or using the preferred form of communication, as designated in this outline), as well as the Departmental Assistant and Chair/Dean so that class cancellation forms can be posted outside classrooms .
2. Students are reminded that they have a responsibility to regularly check their uwinnipeg e-mail addresses (and/or using the preferred form of communication, as designated in this outline) to ensure timely receipt of correspondence from the university and/or their course instructors.
3. Students can find answers to frequently ask questions related to remote learning here:  
<https://www.uwinnipeg.ca/covid-19/remote-learning-faq.html>.
4. Please note that withdrawing before the VW date does not necessarily result in a fee refund (November 17 is VW date for classes that begin in September and end in December).
5. No classes:  
September 7<sup>th</sup>, 2020 Labour Day  
October 12<sup>th</sup>, 2020 Thanksgiving  
October 11<sup>th</sup>-17<sup>th</sup>, 2020 Mid-term reading week  
November 11<sup>th</sup>, 2020 Remembrance Day  
December 24<sup>th</sup>, 2020 - January 4<sup>th</sup>, 2021 University closed