NORTHWESTERN POLYTECHNIC

DEPARTMENT Of Science

COURSE OUTLINE – Fall 2025

CS4130 (A2): Networks and Information Systems Security – 3 (3-0-3)

Northwestern Polytechnic acknowledges that our campuses are located on Treaty 8 territory, the ancestral and present-day home to many diverse First Nations, Metis, and Inuit people. We are grateful to work, live and learn on the traditional territory of Duncan's First Nation, Horse Lake First Nation and Sturgeon Lake Cree Nation, who are the original caretakers of this land.

We acknowledge the history of this land, and we are thankful for the opportunity to walk together in friendship, where we will encourage and promote positive change for present and future generations.

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OFFICE HOURS:

CALENDAR DESCRIPTION:

Security stands out as a critical requirement in the design and deployment of information systems in general, and computer networks in particular. This course provides a comprehensive coverage of the theory, concept, design principles and technologies for information security. This course deals with the design of secure information systems with emphasis on secure networking and secure transfer of information.

PREREQUISITE(S)/COREQUISITE:

Successful completion of Year 2

REQUIRED TEXT/RESOURCE MATERIALS:

- Computer Security Principles and Practice, William Stallings and Lawrie Brown, 4th Ed., 2018.
- Network Security Essentials, William Stallings, 6th Edition, 2017.
- Computer & Internet Security: A Hands-on Approach, Wenliang Du, 3rd Edition, ISBN: 978-17330039-4-0.

- Other resources will also be available on BrightSpace.

DELIVERY MODE(S): In-Person, On-Campus

This course includes 3-hours of lecture per week and a 3-hour lab per week.

Lectures:	MW	8:30 – 9:50
Lab: L1	W	2:30 – 5:20

LEARNING OUTCOMES:

Throughout the course, the students will:

1. Learn about the vulnerabilities of computer systems.
2. Learn about common tools used by the attackers.
3. Apply network security principles to protect information security.
4. Apply theoretical and practical knowledge in secure data transfer and authentication.
5. Describe future trends in the field of network security.

TRANSFERABILITY:

Please consult the Alberta Transfer Guide for more information. You may check to ensure the transferability of this course at the Alberta Transfer Guide main page http://www.transferalberta.alberta.ca.

** Grade of D or D+ may not be acceptable for transfer to other post-secondary institutions. **Students are cautioned that it is their responsibility to contact the receiving institutions to ensure transferability.**

EVALUATIONS:

Your final grade will be determined in the following manner:

Lab Assignments	25%
Quizzes	75%
Final Exam	No Final Exam

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Please note that most universities will not accept your course for transfer credit IF your grade is less than C-. Grading Chart:

Alpha Grade	4-point Equivalent	Percentage Guidelines	Alpha Grade	4-point Equivalent	Percentage Guidelines
A+	4.0	95-100	C+	2.3	67-69
A	4.0	85-94	C	2.0	63-66
A-	3.7	80-84	C-	1.7	60-62
B+	3.3	77-79	D+	1.3	55-59
B	3.0	73-76	D	1.0	50-54
B-	2.7	70-72	F	0.0	00-49

COURSE SCHEDULE/TENTATIVE TIMELINE:

1. **Introduction to Network Security –** The basics of a security, Classification of threats.
2. **Types of Attacks –** Understanding denial of service attacks and other attacks, Understanding various malware classes.
3. **Encryption Fundamentals –** The history of encryption, learning about modern encryption methods, identifying good encryption, Understanding digital signatures and certificates, Understanding and using decryption, Cracking passwords, Steganography, Steganalysis.
4. **Fundamentals of Firewalls –** What is a firewall, types of firewalls, selecting and using firewalls, using proxy servers.
5. **Intrusion Detection Systems (IDS) –** Understanding and implementing IDS and honey pots.
6. **Transport Level Security –** Understanding the Internet TLS protocol components and services.
7. **Electronic Mail Security –** Understanding MIME and S/MIME email security protocol and services.
8. **IP Security –** Understanding IPSec protocol to secure Internet traffic at packet level.
9. **Internet Authentication Protocols –** The structure of Kerberos authentication system.
10. **Defending Against Malware –** Definition and classification of malware, understanding virus attacks, virus scanners, antivirus policies and procedures, defending against Trojan horses, spyware and adware.
11. **Wireless Network Security –** Understanding the wireless network security challenges and mechanisms.
12. **Database Security –** Understanding the special requirements of database security.
13. **Digital Forensics.**
14. **Techniques Used by Attackers –** Preparing to Hack, The attack phase.

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STUDENT RESPONSIBILITIES:

- Students should arrive on time for classes and labs (no later than 10 min).
- If students are consistently late, they may be barred from attending future classes.
- Students' attendance will be recorded.
- Students are responsible for all lecture materials, labs and readings.
- It is the student's responsibility to adhere to ALL course requirements.
- The students are expected to finish the assignments during the lab sessions.
- The students should not leave the lab without demonstrating their work to the instructor and signing up in the attendance sheet.
- Assignments must be submitted on their due date by the end of the labs.
- Late assignments will NOT be accepted and will receive a grade of 0 (unless a permission is granted).
- The use of AI is not allowed and considered an academic misconduct.
- No use of cellphones during classes and labs.
- Cellphones are banned during quizzes and exams.
- In case of illness, a doctor's note should be provided.
- If the final is missed due to illness it will be deferred.

STATEMENT ON ACADEMIC MISCONDUCT:

Academic Misconduct will not be tolerated. For a more precise definition of academic misconduct and its consequences, refer to the Student Rights and Responsibilities policy available at https://www.nwpolytech.ca/about/administration/policies/index.html.

**Note: all Academic and Administrative policies are available on the same page.

Additional Information:

- The quizzes could be written or practical tasks and will be during the lab or class time.
- The students should be prepared at anytime for flash quizzes (quizzes without prior notification).
- The evaluation of this course is divided into two parts: lab/programming part (assignments, practical quizzes, practical exams, etc.) and theoretical part.
- For passing this course, the students **MUST** pass in the lab/programming part (%50 at least) and **MUST** also pass the theoretical part as well (%50 at least).