

# Cybersecurity (CSEC)

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## Cybersecurity (CSEC) Courses

### CSEC 2108 [0.5 credit]

#### Cryptographic Algorithms and Protocols

Block ciphers and modes of operation; public-key encryption; cryptographic hash functions; digital signatures; password-based cryptography; randomness and guesswork; authentication and authenticated key establishment protocols; challenge-response protocols; elliptic curve cryptography; post-quantum algorithms.

Includes: Experiential Learning Activity

Precludes additional credit for COMP 2108, COMP 3109 (no longer offered), COMP 4109 (no longer offered).

Prerequisite(s): (COMP 1006 or COMP 1406 with a minimum grade of C-, (COMP 2804 or STAT 2507), and MATH 1104.

Lectures three hours a week, tutorials one and a half hours a week.

### CSEC 3108 [0.5 credit]

#### Systems Security

Securing networked computer systems. Threat modelling. Operating system security and design principles. Access control. Software-based exploits, memory safety, non-functional testing in software development. Social engineering. Browser-server and transport-layer security. Middleperson attacks, end-to-end security. Public-key certificates. Case study: Bluetooth or Wi-Fi security.

Includes: Experiential Learning Activity

Precludes additional credit for COMP 4108 and SYSC 4810.

Prerequisite(s): CSEC 2108, (COMP 3000 or SYSC 4001), and (COMP 3203 or SYSC 4602).

Lectures three hours a week, tutorials one and a half hours a week.

### CSEC 3999 [0.0 credit]

#### Co-operative Work Term

Includes: Experiential Learning Activity

### CSEC 4000 [0.5 credit]

#### Operating Systems Security

The course examines past, present, and emerging approaches for securing operating systems. The focus is to provide a foundation for understanding requirements to secure hosts at the operating system level and survey the landscape of available tools and techniques for implementing operating system security controls.

Includes: Experiential Learning Activity

Prerequisite(s): (COMP 3000 or SYSC 4001) and CSEC 3108.

Lectures three hours a week.

### CSEC 4100 [0.5 credit]

#### Human Factors in Security

Designing security mechanisms with human factors in mind. Evaluating software-based systems with focus on how interaction design affects security/privacy.

Current approaches to usable security; user studies; methodologies for empirical analysis; design principles for usable security/privacy; case studies including authentication, anonymity systems.

Includes: Experiential Learning Activity

Prerequisite(s): COMP 3008 and CSEC 3108.

Lectures three hours a week.

### CSEC 4200 [0.5 credit]

#### Network Security

Security throughout network stack layers. Internet core security. VPNs and tunnelling protocols. Firewalls and Intrusion Detection Systems. Internet measurements. IoT security. Botnets. Securing network protocols, including email and web. Network monitoring. Traffic sniffers and vulnerability scanners.

Includes: Experiential Learning Activity

Prerequisite(s): (COMP 3000 or SYSC 4001), (COMP 3203 or SYSC 4602), and CSEC 3108.

Lectures three hours a week.

### CSEC 4300 [0.5 credit]

#### Software Security

Resilience of everyday software to vulnerabilities. Security engineering and the security development lifecycle. Static analysis and vulnerability analysis. Model checkers. Security testing, non-functional testing, fuzz-testing. Programming languages and security. Cryptographic APIs and use of security toolkits.

Includes: Experiential Learning Activity

Prerequisite(s): (COMP 3000 or SYSC 4001), COMP 3004 and CSEC 3108.

Lectures three hours a week.

### CSEC 4900 [0.5 credit]

#### Selected Topics in Security I

An in-depth study of selected topics, with an emphasis on areas of strong current interest in research or practice.

Includes: Experiential Learning Activity

Prerequisite(s): CSEC 3108, and permission of the School of Computer Science.

Lectures three hours a week.

### CSEC 4901 [0.5 credit]

#### Selected Topics in Security II

An in-depth study of selected topics, with an emphasis on areas of strong current interest in research or practice.

Includes: Experiential Learning Activity

Prerequisite(s): CSEC 3108, and permission of the School of Computer Science.

Lectures three hours a week.