



# Computer Science (COMP) 400

## Computer and Network Security (Revision 1)

**Status:**

Replaced with new revision, see the [course listing](#) for the current revision

**Delivery mode:**

Individualized study online with eText

**Credits:**

3

**Area of study:**

Science

**Prerequisites:**

COMP 347 and either MATH 270, MATH 209, MATH 309 or, course coordinator approval.\*\*

**Precluded:**

None

**Challenge:**

COMP 400 has a challenge for credit option.

**Faculty:**

Faculty of Science and Technology

**Notes:**

At this level of study, students are also expected to be able to program in one programming language, and have knowledge of databases and operating systems. Students who are concerned about

meeting the prerequisites for this course are encouraged to contact the **course coordinator** before registering.

## Overview

This course teaches some important concepts and technologies that address the risky computer and network environment IT professionals face. It details cryptographic tools and algorithms, authentication and access control schemes and protocols, systems that can be used to secure computers and networks, and the security of these systems. The course ends with management issues around computer and network security. Students will also learn to use a variety of tools and systems that can be used in security assessment, intrusion detection, information protection, and digital forensics, and system recovery.

## Outline

**Unit 1:** Introduction to Computer and Network Security Computers, computer networks and all sorts of software systems are a critical part of today's businesses and organizations. The security of computers, computer networks and computer systems hence becomes very important. In this first unit, students will learn some important concepts, terminologies and principles of computer and network security. Students will learn about the scope of the subject, the goals of computer and network security research and practice, the assets to be secured, the threats to the security of various assets, and the reality of the battle field. This unit has three (3) sections.

**Unit 2:** Cryptographic Protocols, Tools and Algorithms Cryptography is very important in computer and network security. It can be used to achieve various security goals including confidentiality, authentication, accountability and non-repudiation. In this unit students will learn about various cryptographic tools, algorithms and protocols, including how they work and where they can be used. This unit has three (3) sections.

**Unit 3:** Authentication and Access Control One important goal of computer

and network security is to make sensitive and valuable information and resources on computer and computer networks available only to the right person or people. To achieve this important goal, authentication and access control are needed. From this unit, students will learn about some important authentication techniques and protocols, as well as access control models and mechanisms. This unit has three (3) sections.

**Unit 4:** Security Systems and Models To secure information and other resources on computers and networks, various technologies and systems have been developed. In this unit students will learn about what systems are available, how they work and where they can be used. These systems include intrusion detection and prevention systems, firewalls, VPNs, as well as Internet security protocols and standards. From this unit students will also learn about various models for computer and network security, which can provide IT professionals with high-level views of the systems to be protected, or the work they are doing to secure the systems. This unit has four (4) sections.

**Unit 5:** Systems Security Today's businesses heavily depend on all kinds of computer and network based systems, and the security of each of these systems is a critical and important part of the entire security solution for the business. In this unit students will learn about security issues with some important systems and security technologies available for dealing with those issues. These systems include operating systems, application software systems, computer networks, the Web and e-mail. This unit has five (5) sections.

**Unit 6:** Management Issues with Computer and Network Security Studies have shown that many security problems or breaches are due to mismanagement. Investment in security technologies, devices and systems will yield nothing if they are not effectively used. Also, many security breaches can be attributed to people inside an organization or business, either because of negligence or because of bad intention. In this unit students will learn about various legal, ethical and management issues with computer and network security, including laws, regulations, policies and guidelines. This unit has six (6) sections.

## Learning outcomes

Upon successful completion of this course, you should be able to:


- Identify computer and information assets and the threats to their security.
- Explain how some cryptographic protocols, tools, and algorithms work, and where and how they can be used.
- Explain how authentication and access control can be done in various computer and information systems, and evaluate the strengths and weaknesses of those schemes and protocols.
- Use various security systems and tools to secure computer and information assets and to detect intrusions.
- Design new security protocols and tools for solving some network security problems.
- Collect evidence and take the steps to recover from an attack.
- Explain what security technology and techniques have been implemented in some popular computer and information systems.
- Discuss a variety of management issues related to computer and network security.
- Design and implement security policies and management-related measures for the security of computers and networks.

## Evaluation


To **receive credit** [🔗](#) for COMP 400, you must achieve a course composite grade of at least **D (50 percent)** [📄](#) including a grade of 50 percent on each assignment and at least 50 percent on the final examination. The weighting of these grades is as follows:

Activity	Weight
Assignment 1	20%
Assignment 2	20%
Assignment 3	20%



<b>Activity</b>	<b>Weight</b>
Assignment 4	20%
Final Exam	20%
<b>Total</b>	<b>100%</b>

To learn more about assignments and examinations, please refer to Athabasca University's [online Calendar](#) .

## Materials

Stallings, W., & Brown, L. (2015). *Computer security. Principles and practice* (3<sup>rd</sup> Ed.). Upper Saddle River, New Jersey: Pearson.  (eText)

### eText

Registration in this course includes an electronic textbook. For more information on [electronic textbooks](#) , please refer to our [eText Initiative site](#) .


### Other Materials

The remainder of the learning materials for *Computer Science 400* is available online. These include

- course notes for each unit
- assignments and instructions
- self-test quizzes
- links to other Web-based course resources
- a course evaluation form

### Special Course Features

COMP 400 can be completed online at the student's workplace or home. It is

an elective in all Computing and Information Systems programs, for example, [B.Sc. in Computing and Information Systems](#) .



## Challenge for credit

### Overview

The challenge for credit process allows you to demonstrate that you have acquired a command of the general subject matter, knowledge, intellectual and/or other skills that would normally be found in a university-level course.





Full information about [challenge for credit](#)  can be found in the Undergraduate Calendar.

### Evaluation

To **receive credit**  for the COMP 400 challenge registration, you must first complete a project assigned to you after your registration for the challenge, and achieve a grade of at least **D (50 percent)**  on the project, and then order and write a challenge exam and achieve a grade of at least D (50 percent) as well on the challenge exam. The project and the exam will weigh 50 percent each towards your final grade.

 **Challenge for credit course registration form**

## Important links

- › [Academic advising](#) 
- › [Program planning](#) 
- › [Request assistance](#) 
- › [Support services](#) 

without notice. Courses offered by other delivery methods may vary from their individualized study counterparts.

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*Updated June 5, 2024*

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