

---

## Web Security Basics

---

### ICT-Applications & Programming

<b>Course Number:</b> CST8265	<b>Co-Requisites:</b> N/A	<b>Pre-Requisites:</b> CST8257
<b>Applicable Program(s):</b> 3002X01FWO - Internet Applications & Web Development	<b>AAL:</b> 4	<b>Core/Elective:</b> Core
3002X03FWO - Internet Applications & Web Development	4	Core
<b>Prepared by:</b>	Mohammad Nazrul Ishlam Patoary, PhD, Professor	
<b>Approved by:</b>	Sandra Brancatelli, Chair, ICT - Applications & Programming	
<b>Approval Date:</b>	Monday, December 17, 2018	
<b>Approved for Academic Year:</b>	2018-2019	
<b>Normative Hours:</b>	75.00	

### Course Description

---

Students explore how to secure website and web applications. Tools and techniques for understanding basic web environment security and web application security are also explored. Common web application vulnerabilities and the mechanisms/tools to detect and prevent them are investigated. This may include such things as encryption, secure socket layers (SSL), authentication and authorization.

### Relationship to Vocational Learning Outcomes

---

This course contributes to your program by helping you achieve the following Vocational Learning Outcomes:

#### 3002X01FWO - Internet Applications & Web Development

- |       |   |
|-------|---|
| VLO 2 | Configure and maintain internet services, internet application servers, database servers, and network services. (T,)  |
| VLO 3 | Construct, modify, implement, query, and maintain effective databases, and interface with applications. (T,)          |
| VLO 4 | Develop internet services and web application security by applying appropriate techniques and strategies. (T, A, CP,) |
| VLO 5 | Program and debug internet applications using a variety of client-side and serverside development languages. (T,)     |

- VLO 9 Adhere to relevant laws and industry standards. (T, A, CP,)
- VLO 11 Develop strategies for ongoing personal and professional development that will lead to enhanced work performance and career opportunities, and keep pace with industry changes. (T,)

### 3002X03FWO - Internet Applications & Web Development

- VLO 2 Configure and maintain internet services, internet application servers, database servers, and network services. (T,)
- VLO 3 Construct, modify, implement, query, and maintain effective databases, and interface with applications. (T,)
- VLO 4 Develop internet services and web application security by applying appropriate techniques and strategies. (T, A, CP,)
- VLO 5 Program and debug internet applications using a variety of client-side and serverside development languages. (T,)
- VLO 9 Adhere to relevant laws and industry standards. (T, A, CP,)
- VLO 11 Develop strategies for ongoing personal and professional development that will lead to enhanced work performance and career opportunities, and keep pace with industry changes. (T,)

## Relationship to Essential Employability Skills

---

This course contributes to your program by helping you achieve the following Essential Employability Skills:

- EES 2 Respond to written, spoken or visual messages in a manner that ensures effective communication. (T, A,)
- EES 3 Execute mathematical operations accurately. (T, A,)
- EES 4 Apply a systematic approach to solve problems. (T, A, CP,)
- EES 5 Use a variety of thinking skills to anticipate and solve problems. (T, A, CP,)
- EES 6 Locate, select, organize and document information using appropriate technology and information systems. (T, A,)
- EES 7 Analyze, evaluate and apply relevant information from a variety of sources. (T, A,)
- EES 9 Interact with others in groups or teams in ways that contribute to effective working relationships and the achievement of goals. (T,)
- EES 10 Manage the use of time and other resources to complete projects. (T,)

## Course Learning Requirements/Embedded Knowledge and Skills

---

When you have earned credit for this course, you will have demonstrated the ability to:

### 1.) Identify the threats and vulnerabilities associated with a network.

Knowledge of the goals of security

Identify and explain the various threats to a network

Describe secure safeguards to counter threats or reduce vulnerabilities (firewalls, vpn's etc.)

**2.) Install and use security tools and software.**

Knowledge of various network and security tools and/or products (Nmap, Nessus, Wireshark etc) and how they are installed and used.

**3.) Implement countermeasures to achieve computer security.**

Knowledge of the various countermeasures used in computer security including but not limited to: cryptography, redundancy, access control, intrusion detection

List and explain the basic types of encryption

Basic knowledge of how cryptography can be used to support and improve security as it relates to e-commerce systems

**4.) Understand the tools and techniques used to identify and mitigate web application vulnerabilities.**

Knowledge of the security features provided by Web Servers.

Knowledge of database security features for web applications.

**5.) Understand how to implement web server security measures to prevent web attacks.**

Understand techniques for breaking web applications

Implement tools and techniques for testing web applications and their vulnerabilities.

Describe the tools and techniques used to protect web applications from various threats and vulnerabilities.

**7.) Understand various security standards.**

Knowledge of Canadian and International IT Security standards.

**8.) Understand the benefits of a security policy document.**

Knowledge of a security policy and its importance to Web applications and E-commerce systems.

## **Learning Resources**

---

Required Textbooks:

None

#### Reference Textbooks:

1) Network Security Fundamentals, by Gert De Laet and Gert Schauwers, Cisco Press

ISBN 1-58705-167-2

2) Preventing Web Attacks with Apache, by Ruan C. Barnett, Addison Wesley,

ISBN 0-321-32128-6

3) How to Break Web Software, by Mike Andrews, James A. Whittaker, Addison Wesley,

ISBN 0-321-36944-0

4) Computer Ethics 3RD Ed, by Deborah G. Johnson, Prentice Hall,

ISBN 0-13-093699

## Learning Activities

---

Samples of learning activities include:

- classroom lectures
- laboratory work
- practical and reading assignments
- research of course-related material

## Evaluation/Earning Credit

---

The following list provides evidence of this course's learning achievements and the outcomes they validate:

Lab Activity(ies) (25%)

Validates Outcomes: CLR 1, CLR 2, CLR 3, CLR 4, CLR 5, EES 2, EES 4, EES 5, EES 6, EES 7, EES 9, EES 10

Assignment(s) (20%)

Validates Outcomes: CLR 7, CLR 8, EES 2, EES 3, EES 4, EES 5, EES 6, EES 7, EES 9, EES 10

Midterm Exam(s) (10%)

Validates Outcomes: CLR 1, CLR 4, CLR 5, CLR 7, CLR 8, EES 2, EES 3, EES 4, EES 5

Midterm Exam(s) (10%)

Validates Outcomes: CLR 1, CLR 4, CLR 5, CLR 7, CLR 8, EES 2, EES 3, EES 4, EES 5

Quiz(zes)/Test(s) (10%)

Validates Outcomes: CLR 1, CLR 4, CLR 5, CLR 7, CLR 8, EES 2, EES 3, EES 4, EES 5

Final Exam (25%)

Validates Outcomes: CLR 1, CLR 4, CLR 5, CLR 7, CLR 8, EES 2, EES 3, EES 4, EES 5

Students are expected to meet evaluation and completion deadlines as stated in course outline and course section information documents. In circumstances where evaluation and/or completion deadlines are missed or student performance has been affected by a temporary or permanent disability (including mental health), interim or retroactive accommodations may be considered. In such instances, please consult your course faculty member. For other situations where deferral of evaluations may be warranted, please refer to college policy AA21.

## Prior Learning Assessment and Recognition

---

Students who wish to apply for prior learning assessment and recognition (PLAR) need to demonstrate competency at a post-secondary level in all of the course learning requirements outlined above. Evidence of learning achievement for PLAR candidates includes:

- Challenge Exam
- Project/Assignment

## Grade Scheme

---

Final Grade	Mark Equivalent	Numeric Value	Final Grade	Mark Equivalent	Numeric Value
A+	90% - 100%	4.0	A	85% - 89%	3.8
A-	80% - 84%	3.6	B+	77% - 79%	3.3
B	73% - 76%	3.0	B-	70% - 72%	2.7
C+	67% - 69%	2.3	C	63% - 66%	2.0
C-	60% - 62%	1.7	D+	57% - 59%	1.4
D	53% - 56%	1.2	D-	50% - 52%	1.0
F	0% - 49%	0	FSP	0	0

## Other Information

---

Students are required to respect the confidentiality of employer, client and/or patient information, interactions, and practices that occur either on Algonquin College premises, or at an affiliated clinical/field/co-op placement site. Concerns regarding clients, patients, and/or employer practices are to be brought to the attention of the program coordinator, or designated field/clinical/co-op placement supervisor so that they may be resolved collaboratively. Such concerns are not to be raised publically either verbally, in writing, or in electronic forums. These matters are to be addressed through established program communication pathways.

## Course Related Information

---

### Course Content

Through an overview of a broad range of topics, the course is designed to give the student an appreciation for the various security policies, procedures and implementations used to make Web applications and E-commerce systems a safe and secure environment.

## Department Related Information

---

### STUDENT ACADEMIC RESPONSIBILITIES

Each student is responsible for:

- Knowing the due dates for marked out-of-class assignments.
- Attending all classes and knowing the dates of in-class marked assignments and exercises.
- Maintaining a folder of all work done in the course during the semester for validation claims in cases of disagreement with faculty.
- Keeping both paper and electronic copies of all assignments, marked and unmarked, in case papers are lost or go missing.
- Regularly checking both Blackboard announcements as well as one's Algonquin e-mail account for important messages from both professors and college administration.
- Participating in on-line and classroom exercises and activities as required.
- Retaining course outlines for possible future use to support applications for transfer of credit to other educational institutions.

**Harassment/Discrimination/Violence will not be tolerated.** Any form of harassment (sexual, racial, gender or disability-related), discrimination (direct or indirect), or violence, whether involving a professor and a student or amongst students, will not be tolerated on the college premises. Action taken will start with a formal warning and proceed to the full disciplinary actions as outlined in Algonquin College Policies - HR22 and SA07.

Harassment means one or a series of vexatious comment(s) (whether done verbally or through electronic means), or conduct related to one or more of the prohibited grounds that is known or ought reasonably to be known to be unwelcome/unwanted, offensive, intimidating, derogatory or hostile. This may include, but is not limited to: gestures, remarks, jokes, taunting, innuendo, display of offensive materials, offensive graffiti, threats, verbal or physical assault, stalking, slurs, shunning or exclusion related to the prohibited grounds.

For further information, a copy of the official policy statement can be obtained from the Student Association.

### Violation of the Copyright Act

**General – The Copyright Act** makes it an offence to reproduce or distribute, in whatever format, any part of a publication without the prior written permission of the publisher. For complete details, see the Government of Canada website at <http://laws.justice.gc.ca/en/C-42> . Make sure you give it due consideration, before deciding not to

purchase a textbook or material required for your course.

**Software Piracy - The Copyright Act** has been updated to include software products. Be sure to carefully read the licensing agreement of any product you purchase or download, and understand the terms and conditions covering its use, installation and distribution (where applicable). Any infringement of licensing agreement makes you liable under the law.

**Disruptive Behaviour** is any conduct, or threatened conduct, that is disruptive to the learning process or that interferes with the well being of other members of the College community. It will not be tolerated. Members of the College community, both students and staff, have the right to learn and work in a secure and productive environment. The College will make every effort to protect that right. Incidents of disruptive behaviour must be reported in writing to the departmental Chair as quickly as possible. The Chair will hold a hearing to review available information and determine any sanctions that will be imposed. Disciplinary hearings can result in penalties ranging from a written warning to expulsion.

For further details, consult the Algonquin College Policies AA32, SA07 and IT01 in your Instaguide.

## College Related Information

---

### Email

Algonquin College provides all full-time students with an e-mail account. This is the address that will be used when the College, your professors, or your fellow students communicate important information about your program or course events. It is your responsibility to ensure that you know how to send and receive e-mail using your Algonquin account and to check it regularly.

### Students with Disabilities

If you are a student with a disability, you are strongly encouraged to make an appointment at the Centre for Accessible Learning to identify your needs. Ideally, this should be done within the first month of your program, so that a Letter of Accommodation (LOA) can be provided to your professors. If you are a returning student, please ensure that professors are given a copy of your LOA each semester.

### Retroactive Accommodations

Students are expected to meet evaluation and completion deadlines as stated in course outline and course section information documents. In circumstances where evaluation and/or completion deadlines are missed or student performance has been affected by a temporary or permanent disability (including mental health), interim or retroactive accommodations may be considered. In such instances, please consult your course faculty member. For other situations where deferral of evaluations may be warranted, please refer to college policy AA21.

### Academic Integrity & Plagiarism

Adherence to acceptable standards of academic honesty is an important aspect of the learning process at Algonquin College. Academic work submitted by a student is evaluated on the assumption that the work presented by the

student is his or her own, unless designated otherwise. For further details consult Algonquin College Policies AA18: Academic Dishonesty and Discipline and AA20: Plagiarism

### **Student Course Feedback**

It is Algonquin College's policy to give students the opportunity to share their course experience by completing a student course feedback survey for each course they take. For further details consult Algonquin College Policy AA25: Student Course Feedback

### **Use of Electronic Devices in Class**

With the proliferation of small, personal electronic devices used for communications and data storage, Algonquin College believes there is a need to address their use during classes and examinations. During classes, the use of such devices is disruptive and disrespectful to others. During examinations, the use of such devices may facilitate cheating. For further details consult Algonquin College Policy AA32: Use of Electronic Devices in Class

### **Transfer of Credit**

It is the student's responsibility to retain course outlines for possible future use to support applications for transfer of credit to other educational institutions.

**Note:** *It is the student's responsibility to refer to the Algonquin College Policies website for the most current information at <http://www.algonquincollege.com/policies/>*

## **Legend**

---

### **Terms**

- ALO: Aboriginal Learning Outcome
- Apprenticeship LO: Apprenticeship Learning Outcome
- CLR: Course Learning Requirement
- DPLO: Degree Program Learning Outcome
- EES: Essential Employability Skill
- EOP: Element of Performance
- GELO: General Education Learning Outcome
- LO: Learning Outcome
- PC: Program Competency
- PLA: Prior Learning Assessment
- PLAR: Prior Learning Assessment and Recognition
- VLO: Vocational Learning Outcome

### **Assessment Levels**

- T: Taught
- A: Assessed
- CP: Culminating Performance