# CN8822: Network Operating Systems

## Calendar Description

This course will help students to build and maintain a UNIX-based network systems and servers. It covers installation and fine tuning of Linux system as well as securing a host first then a network. Course will cover security topics such as intrusion detection, packet crafting, packet reading and tcpdump filters. Network services such as DNS, DHCP, Web server will be covered.

## Course Details

- Linux workstation installation
- System Maintenance
- System Performance and Monitoring
- Scripts, netcat, awk, and sed
- HTTP + Installation
- DNS + Installation
- DHCP, SMTP + Installation
- Socket Programming
  - Connection-oriented sockets
  - Connectionless-sockets
  - Examine Java network support
- Linux security
  - Secure UNIX/Linux workstation
  - Limiting resources
  - Kernel turnable parameters
  - Firewalls
  - Auditing tools
- Linux network security
- OpenSSH
- Packet Reading
- TCPDUMP
- IDS Snort
- Packet Crafting

## Course Schedule and Evaluations

## Week 1 (TBA)

### Learning Objectives

To grasp the fundamental concepts of host and network security.

### Topics Covered

Secure UNIX/Linux workstation

Limiting Resources

Kernel tune-able parameters

Firewalls

Auditing tools

### Activities

Lab # 1 (given)

## Week 2 (TBA)

### Learning Objectives

To grasp the fundamental concepts of host installation, configuration and optimization

### Topics Covered

Linux workstation installation

System maintenance

System performance and monitoring

Linux network security

OpenSSH

### Activities

Assignment # 1 (given)

Lab #1 (Due)

## Week 3 (TBA)

### Learning Objectives

To grasp the fundamental concepts of shell scripting and services installation

### Topics Covered

Scripts, netcat, awk and sed

HTTP and service installation

DNS and service installation

**Activities**

Assignment # 2 (given)

Lab #2 (given)

## Week 4 (TBA)

**Easter Sunday, No Class**

**Activities**

Lab #2 (Due)

## Week 5 (TBA)

**Learning Objectives**

To grasp the fundamental concepts of socket programming

**Topics Covered**

DHCP, SMTP and service installation

Socket programming

Connection-oriented sockets

Connectionless-sockets

Examine Java network support

**Activities**

Lab # 3 (given)

## Week 6 (TBA)

**Learning Objectives**

To grasp the fundamental concepts of packet analysis using industry standard tools

**Topics Covered**

Packet reading

TCPDUMP

IDS Snort

Packet crafting (time permitting)

**Activities**

Lab # 4 (given)

Lab #3 (Due)

**Week 7 (TBA)**

**Activities**

Lab #4 (Due)

Demo Assignment # 1

Demo Assignment # 2

## Missed Classes and/or Evaluations

Students are required to inform their instructors of any situation which arises during the semester which may have an adverse effect upon their academic performance, and must request any considerations and accommodations according to the relevant policies and well in advance. Failure to do so will jeopardize any academic appeals.

- *Medical certificates* – If a student misses the deadline for submitting an assignment, or the date of an exam or other evaluation component because of illness, he or she must submit a Ryerson Student Medical Certificate AND an Academic Consideration form within 3 working days of the missed date. Both documents are available at www.ryerson.ca/senate/forms/medical.pdf. If you are a full-time or part-time degree student, then you submit your forms to your own program department or school. If you are a certificate or non-certificate student, then you submit your forms to the staff at the front desk of the Chang School.
- *Religious observance* – If a student needs accommodation because of religious observance, he or she must submit a Request for Accommodation of Student Religious, Aboriginal and Spiritual Observance AND an Academic Consideration form within the first 2 weeks of the class or, for a final examination, within 2 weeks of the posting of the examination schedule. If the required absence occurs within the first 2 weeks of classes, or the dates are not known well in advance as they are linked to other conditions, these forms should be submitted with as much lead time as possible in advance of the required absence. Both documents are available at http://www.ryerson.ca/senate/forms/relobservforminstr.pdf. If you are a full-time or part-time degree student, then you submit the forms to your own program department or school. If you are a certificate or non-certificate student, then you submit the forms to the staff at the front desk of the Chang School.
- *Students with disabilities* – In order to facilitate the academic success and access of students with disabilities, they should register with the Access Centre http://www.ryerson.ca/studentservices/accesscentre/index.html. Before the first graded work is due, students should also inform their instructor through an "Accommodation Form for Professors" that they are registered with the Access Centre and what accommodations are required.

## Academic Integrity and Plagiarism

Ryerson's Policy 60 (the *Student Code of Academic Conduct)* applies to all students at the University.  The policy and its procedures are triggered in the event that the there is a suspicion that a student has engaged in a form of academic misconduct.

Forms of academic misconduct include plagiarism, cheating, supplying false information to the University, and other acts.  The most common form of academic misconduct is plagiarism. Plagiarism is a serious academic offence and penalties can be severe.  In any academic exercise, plagiarism occurs when one offers as one's own work the words, data, ideas, arguments, calculations, designs or productions of another without appropriate attribution or when one allows one's work to be copied.

All academic work must be submitted using the citation style approved by the instructor.  The most common citation style is APA.  Students may refer to the Ryerson Library for APA style guide references: http://library.ryerson.ca/guides/toolbox/style/

It is assumed that all examinations and work submitted for evaluation and course credit will be the product of individual effort, except in the case of group projects arranged for and approved by the course instructor.  Submitting the same work to more than one course, without instructor approval, is also considered a form of plagiarism.

Students are advised that suspicions of academic misconduct may be referred to the Academic Integrity Office (AIO).  Students who are charged with academic misconduct will have a Disciplinary Notation (DN) placed on their academic record (not on their transcript) and will be assigned one or more of the following penalties:

- A grade reduction for the plagiarized work
- A zero for the plagiarized work
- An F in the course
- More serious penalties up to and including expulsion from the University

For more detailed information on these issues, please refer to the full online text for the *Student Code of Academic Conduct* at http://www.ryerson.ca/senate/policies/pol60-F2014.pdf and the Academic Integrity Website at www.ryerson.ca/ai.

Students who do not want their work submitted to this plagiarism detection service must, by the end of the second week of class, consult with the instructor to make alternate arrangements. Turnitin.com is a plagiarism prevention and detection service to which Ryerson subscribes. It is a tool to assist faculty members in determining the similarity between student work and the work of other students who have submitted papers to the site (at any university), internet sources, and a wide range of journals and other publications. While it does not contain all possible sources, it gives faculty some assurance that students' work is their own. No decisions are made by the service; it simply generates an "originality report". Faculty must evaluate that report to determine if something is plagiarized.

## Important Resources Available at Ryerson

Use the services of the University when you are having problems writing, editing or researching papers, or when you need help with course material:
- **The Library** (LIB 2<sup>nd</sup> floor) provides research workshops and individual assistance. Inquire at the Reference Desk or at www.ryerson.ca/library/info/workshops.html
- **The Writing Centre** (LIB 272- B) offers one-on-one tutorial help with writing and workshops www.ryerson.ca/writingcentre/workshops.htm
- **Learning Success** (VIC B-15) offers individual sessions and workshops covering various aspects of researching, writing, and studying. You must book these directly through their website http://www.ryerson.ca/studentservices/learningsuccess/
- **English Language Support** (VIC B-17) offers workshops to improve overall communication skills www.ryerson.ca/studentservices/els/

**There is one general site where you may see and register for all of the workshops offered by all of these areas:** http://www.ryerson.ca/academicintegrity/workshops.html