

# **RYERSON UNIVERSITY**

## **Ted Rogers School of Information Technology Management and G. Raymond Chang School of Continuing Education**

### **COURSE OF STUDY 2017-2018**

### **(C)ITM 301 – IT Infrastructure**

#### **1.0 PREREQUISITE**

The prerequisite for this course is (ITM 100 or ITM 102) or in the two-year Business Tech. Ontario College Diploma. Students who do not have the prerequisites will be dropped from the course.

#### **2.0 INSTRUCTOR INFORMATION**

- Name:
- Office Phone Number:
- E-mail address:
- Faculty/course web site(s): <https://my.ryerson.ca>
- Office Location & Consultation hours:
  - Your instructor is available for personal consultation during scheduled consultation hours which are posted on their office door or on the course shell in D2L Brightspace. However, you are advised to make an appointment by e-mail or by telephone before coming to ensure that the professor is not unavoidably absent.
- E-mail Usage & Limits:

Students are expected to monitor and retrieve messages and information issued to them by the University via Ryerson online systems on a frequent and consistent basis. ***Ryerson requires that any official or formal electronic communications from students be sent from their official Ryerson E-mail account.*** As such emails from other addresses may not be responded to.

#### **3.0 CALENDAR COURSE DESCRIPTION**

This course provides an introduction to computer hardware/software and communication networks. It gives the students the knowledge and skills that they need for communicating effectively with professionals whose special focus is on hardware and systems software technology and for designing organizational processes and software solutions that require in-depth understanding of the IT infrastructure capabilities and limitations. It also prepares the students for organizational roles that require interaction with external vendors of IT infrastructure components and solutions.

#### 4.0 COURSE OVERVIEW

Students in this course will build on previous knowledge of Business Information Systems. ITM301 concentrates on the components of a secure corporate IT infrastructure. The objectives for this course are:

1. to develop a comprehensive knowledge of the functionality of networking hardware;
2. to acquire the skills to solve business problems that require IT solutions; and
3. to develop the competency to investigate inter-organization and intra-organization communications problems and propose a viable technology solution.

#### 5.0 COURSE OBJECTIVES

Upon completion of this course, students will be able to:

1. Analyze a business problem and propose an IT enabled solution.
2. Explain the principles underlying layered systems architecture and their application to both computers and networks.
3. Distinguish the core elements of an IT infrastructure solution, such as clients, servers, other network devices, wired and wireless network links, systems software, and specialized security devices.
4. Discuss how IT infrastructure components are organized into infrastructure solutions in different organizational environments.
5. Examine the principles underlying operating systems and virtual networks and propose a network operating system given a business scenario.
6. Use practical examples to demonstrate how protocols are used to enable communication between computing devices connected to each other.
7. Configure an IT infrastructure solution for a small organization, including a network based on standard technology components, servers, security devices, and several different types of computing clients.
8. Apply the core concepts underlying IP networks to solve simple network design problems, including IP subnetting.
9. Illustrate the role of the emergent cloud computing technology in business today.
10. Write about the opportunities that virtual computing service provision models, such as Virtual Machines and Virtual Networks, create for organizations

#### 6.0 EVALUATION

The grade for this course is composed of the mark received for each of the following components:

<b>Evaluation Component</b>	<b>Percentage of the Final Grade</b>
Assignments	10%
Labs	10%
Group Project	10%
Midterm Examination	30%
Final Examination	40%
<b>Total</b>	<b>100%</b>

**NOTE:** Students must achieve a course grade of at least 50% to pass this course.

#### Citation Format for Essays and Term Papers

All essay assignments, term paper and other written works must adhere with APA citation format.

Technical errors (spelling, punctuation, proofing, grammar, format, and citations) and/or inappropriate levels of language or composition will result in marks being deducted. You are encouraged to obtain assistance from the Writing Centre ([www.ryerson.ca/writingcentre](http://www.ryerson.ca/writingcentre)) for help with your written communications as needed.

You can find APA guidelines and academic referencing from the following online resources:

a) Ryerson Writing Support Web site:

<http://www.ryerson.ca/content/dam/studentlearningsupport/resources/citation-conventions/APA%20Basic%20Style%20Guide.pdf>

b) Ryerson Library for APA style guide: <https://library.ryerson.ca/guides/style/>

## 7.0 POSTING OF GRADES

- ❖ All grades, on assignments or tests must be posted or made available to students through the return of their work. Grades on final exams must be posted. However, as there may be other consideration in the determination of final grades, students will receive their official final grade in the course only from the Registrar. Final official course grades may not be posted or disclosed anywhere by an instructor.
- ❖ Posting of grades on the Course Management System (D2L Brightspace) is preferred. If grades are posted in hard copy they must be posted numerically sorted by student identification number after at least the **first four digits** have been removed. Instructors must inform students in all course management documentation of the method to be used in the posting of grades. Students who wish not to have their grades posted must inform the instructor in writing.
- ❖ Some graded work will be returned to students prior to the last date to drop a course without academic penalty.

## 8.0 TOPICS – SEQUENCE & SCHEDULE

Session	Topic	Learning Outcomes	Readings	Activities & Due Dates
1	Lecture: Introduction to IT infrastructure Computer networks and its various business applications.	<ul style="list-style-type: none"> <li>● Identify types of applications and protocols used on a network</li> <li>● Distinguish between the client-server and P2P networks</li> </ul>	Ch.1: Material Lecture notes	<ul style="list-style-type: none"> <li>• Logging in D2L</li> <li>• Navigating Turnitin.com</li> </ul>
2	Lecture: Networking Essentials	<ul style="list-style-type: none"> <li>● Describe how computers and other devices are addressed on a network</li> <li>● Describe the purpose of the OSI model and each of its layers</li> </ul>	Ch. 2: Material	Lab exercise: <b>Lab1</b>
3	Lecture: TCP/IP Protocols	<ul style="list-style-type: none"> <li>● Identify and explain the functions of the core TCP/IP protocols</li> <li>● Explain the purposes and properties of routing and</li> </ul>	Ch. 3: Material	Lab exercise: <b>Lab2</b>

		describe common IPv4 and IPv6 routing protocols		
4	Lecture: Transmission Basics and Networking Media	<ul style="list-style-type: none"> <li>• Explain analog and digital transmission</li> <li>• Explain types of multiplexing technologies</li> <li>• Describe the physical characteristics of coaxial cable, STP, UTP, and fiber-optic media</li> <li>• Compare the benefits and limitations of different networking media</li> </ul>	Ch.4 & Ch 5: Material Lecture notes	Lab exercise: <b>Lab3</b>
5	Lecture: Wireless Networking	<ul style="list-style-type: none"> <li>• Describe WLAN architecture</li> <li>• Describe major characteristics of 802.11 standards</li> <li>• Describe WPA/WPA2 encryptions</li> <li>• Explain Wireless PAN</li> <li>• Explain WiMAX technology</li> </ul>	Ch.6: Material Lecture notes	Lab exercise: <b>Lab4</b>
6	Lecture: Cloud Computing & Virtualization Switches VLANs and bridging protocols	<ul style="list-style-type: none"> <li>• Explain Cloud Computing.</li> <li>• Explain virtualization and characteristics of virtual network components.</li> <li>• Describe the techniques for incorporating virtual components in VLANs.</li> <li>• Explain methods for connecting Virtual Machines</li> </ul>	Ch. 7 & Ch. 10: Material  Prepare for Midterm	Lab exercise: <b>Lab5</b>  Intro. Group Project Case study
7	<b>Midterm Examination</b>  Lecture: Remote Access	<ul style="list-style-type: none"> <li>• Explain methods for remotely connecting to a network</li> <li>• Discuss VPNs and the protocols they rely on</li> <li>• Understand methods of encryption, such as IPsec, SSL/TLS, and SSH</li> </ul>	Ch.7: Material Lecture notes	Assignment: Assignment 1
8	Lecture: Network Risk Management	<ul style="list-style-type: none"> <li>• Describe security risks associated with people, hardware, software, and Internet access</li> <li>• Assess a network's security needs and vulnerabilities</li> <li>• Prevent and respond to malware infections</li> </ul>	Ch.8: Material Lecture notes	Assignment: Assignment 2
9	Lecture: TCP/IP structure & network segmentation	<ul style="list-style-type: none"> <li>• Describe methods of network design unique to TCP/IP networks, including subnetting &amp; CIDR</li> <li>• Describe IPv6 network addressing</li> </ul>	Ch. 10 : Material	Assignment: Assignment 3

10	Lecture: Network Operating Systems & Applications	<ul style="list-style-type: none"> <li>● Explain the function of a server operating system in a network</li> <li>● Explain the role of NOS in managing a network security</li> <li>● Describe the role of a directory service</li> <li>● Describe the role of LDAP protocol</li> <li>● Explain Active Directory infrastructure</li> </ul>	Lecture notes	Assignment: Assignment 4
11	Lecture: Wide Area Network	<ul style="list-style-type: none"> <li>● Explain different WAN topologies</li> <li>● Compare features of various WAN technologies</li> <li>● Describe several WAN transmission and connection methods, including PSTN, ISDN, T-carriers, DSL, broadband cable, ATM, SONET, MPLS and Satellite</li> </ul>		Assignment: Assignment 5
12	<b>Group Project</b> Course wrap-up			

## 9.0 TEACHING METHODS

The pedagogical approach for this course is Outcomes Based Action Learning (OBAL). The course will incorporate the following teaching/learning methods: Lectures, readings, case study analysis, labs exercises, lab assignments and discussions are the primary teaching methods in this course. Students are expected to have studied the assigned readings and completed any online or written pre-class assignments or quizzes prior to attending the lectures. Some of the assigned weekly labs/assignments may be combined into a single case study with a higher weight. The lectures will review and expand the textual material and provide students with the professor's commentary, examples, and illustration. The case studies will be used to link theoretical IT Infrastructure concepts to practice in a business context. The in-class activities and problem sets will be used to allow the students to use their understanding of the material to develop IT solutions. The group assignment and regular status update meetings with the Professor will enable students to develop their "soft skills". Each student is expected to contribute to the active learning environment through in-class and/or online discussions and will be grade accordingly.

## 10.0 TEXTS & OTHER READING MATERIALS

**Title:** Network+ Guide to Networks, 7th Edition

**Author:** Jill West, Tamara Dean, Jean Andrews

**Publisher:** Cengage Learning

**ISBN:** 978-1305090941

### Suggested/Recommended Textbook

**Title:** Cloud Computing, Automating the Virtualized Data Center

**Author:** Venkata Josyula, Malcom Orr & Greg Page

**Publisher:** Cisco Press

**ISBN-13:** 978-1587204340

## **11.0 VARIATIONS WITHIN A COURSE**

All sections of a course (Day and CE sections) will follow the same course outline and will use the same course delivery methods, methods of evaluation, and grading schemes. Any deviations will be posted on D2L Brightspace once approved by the course coordinator.

## **12.0 OTHER COURSE, DEPARTMENTAL, AND UNIVERSITY POLICIES**

- For more information regarding course management and departmental policies, please consult the ‘**Appendix of the Course of Study**’ which is posted on the Ted Rogers School of Information Technology Management website, <http://www.ryerson.ca/content/dam/itm/documents/cos/Appendix.pdf>. This appendix covers the following topics:

- 12..1** Attendance & Class Participation
- 12..2** Email Usage
- 12..3** Request for Academic Consideration
  - 12..3.1** Ryerson Health Certificate
  - 12..3.2** Academic Accommodation for Students with Disabilities
  - 12..3.3** Religious, Aboriginal or Spiritual Observance
  - 12..3.4** Re-grading and Recalculation
- 12..4** Examinations & Tests
  - 12..4.1** Period of Prohibition from Testing
  - 12..4.2** Make-Up of Mid-Term Tests, Assignments and Other Assessments
    - During the Semester
  - 12..4.3** Make –Up of Final Exams
  - 12..4.4** Missing a Make-Up
- 12..5** Late Assignments
- 12..6** Standard of Written Work
- 12..7** Academic Grading Policy
- 12..8** Academic Integrity
  - 12..8.1** Turnitin.com
- 12..9** Student Rights