

RYERSON UNIVERSITY

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

(C)ITM 301 – IT Infrastructure

COURSE OUTLINE FOR 2020-2021

1.0 PREREQUISITE(S)

(C)ITM 207 or in the 2-Year Business Technology Management Ontario College Diploma Graduate Program

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 sent through D2L and Ryerson email on a frequent and consistent basis. In accordance with the policy on Ryerson student email accounts ([Policy 157](#)), Ryerson requires that any electronic communication by students to Ryerson faculty or staff be sent from their official Ryerson email account. Messages from other accounts may be disregarded.

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 OBJECTIVES AND LEARNING OUTCOMES

Learning outcomes describe what students are expected to have learned or achieved; as a result, they usually describe what students will be capable of doing, or what evidence will be provided to substantiate learning.

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.

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 & IoT technologies in business today.
10. Write about the opportunities that virtual computing service provision models, such as Virtual Machines and Virtual Networks, create for organizations

5.0 TEXTS & OTHER READING MATERIALS

Title: Network+ Guide to Networks, 8th Edition

Author: Jill West, Tamara Dean, Jean Andrews

Publisher: Cengage Learning

ISBN: 978-1337569330

Suggested/Recommended Textbook

Title: A+ Guide to Managing and Maintaining Your PC, Comprehensive, 6th Edition

Author: Jean Andrews

Publisher: Cengage Learning

ISBN: 9780619217587

6.0 TEACHING METHODS

In Fall 2020 this course will be taught will be taught remotely in virtual classrooms. Instruction will take place at scheduled hours, following the approach outlined in D2L Brightspace. You will not be required to attend the Ryerson University campus to complete this course.

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.

7.0 EVALUATION, ASSESSMENT AND FEEDBACK

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

| Evaluation Component | Percentage of the Final Grade |
|-----------------------------|--------------------------------------|
| Assignments | 10% |
| Labs | 10% |
| Group Project | 10% |
| Midterm Examination | 30% |
| Final Examination | 40% |
| Total | 100% |

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

- ❖ At least **20%** of student's grade based on individual work will be returned to students prior to the last date to drop a course in [good academic standing](#).

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) for help with your written communications as needed.

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

[Student Learning Support > Online Resources > Writing Support Resources](#)

- [APA Basic Style Guide](#)

[Ryerson Library Citations and Style Guides](#)

- [APA Style](#)

8.0 PLAGIARISM DETECTION

Turnitin (if used in this course)

Turnitin.com is a plagiarism prevention and detection service to which Ryerson subscribes. It is a tool to assist instructors in determining the similarity between students' work and the work of other students who have submitted papers to the site (at any university), internet sources, and a wide range of books, journals and other publications. While it does not contain all possible sources, it gives instructors some assurance that students' work is their own. No decisions are made by the service; it generates an "originality report," which instructors must evaluate to judge if something is plagiarized.

Students agree by taking this course that their written work will be subject to submission for textual similarity review to Turnitin.com. Instructors can opt to have student's papers included in the Turnitin.com database or not. Use of the Turnitin.com service is subject to the terms-of-use agreement posted on the Turnitin.com website. 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 their instructor to make alternate arrangements.

Even when an instructor has not indicated that a plagiarism detection service will be used, or when a student has opted out of the plagiarism detection service, if the instructor has reason to suspect that an individual piece of work has been plagiarized, the instructor is permitted to submit that work in a non-identifying way to any plagiarism detection service.

Virtual Proctoring (if used in this course)

Online exam(s) within this course use a virtual proctoring system. Please note that your completion of the exam will be recorded via the virtual platform and subsequently reviewed by your instructor. The virtual proctoring system provides the instructor with a recording that only includes video where possible indications of suspicious behaviour are identified. Recordings will be held for a limited period of time in order to ensure academic integrity is maintained.

Access to a computer that can support remote recording is your responsibility as a student. The computer should have the latest operating system, at a minimum Windows (10, 8, 7) or Mac (OS X 10.10 or higher) and web browser Google Chrome or Mozilla Firefox. You will need to ensure that you can complete the exam using a reliable computer with a webcam and microphone available, as well as a high-speed internet connection. Please note that you will be required to show your Ryerson OneCard prior to beginning to write the exam. In cases where you do not have a Ryerson OneCard, government issued ID is permitted.

Information will be provided prior to the exam date by your instructor who may provide an opportunity to test your set-up or provide additional information about online proctoring. Since videos of you and your environment will be recorded while writing the exam, please consider preparing the background (room / walls) so that personal details are not visible, or move to a room that you are comfortable showing on camera.

9.0 TOPICS – SEQUENCE & SCHEDULE

| Session | Topic | Learning Outcomes | Reading(s) | Activities & Due Dates |
|----------------|--|--|---------------------------------|---|
| 1 | Lecture: Essentials of a Computer System Introduction to IT infrastructure Computer networks and its various business applications. | <ul style="list-style-type: none"> ● Describe how computers work ● Identify types of applications and protocols used on a network ● Distinguish between the client-server and P2P networks | Ch.1: Material Lecture notes | <ul style="list-style-type: none"> ● Logging in D2L ● Navigating Turnitin.com |
| 2 | Lecture: Networking Essentials | <ul style="list-style-type: none"> ● Describe how computers and other devices are addressed on a network ● Describe the purpose of the OSI model and each of its layers ● Describe major network topologies & standards ● Describe network | Ch. 1 & Ch. 2: Material | Lab exercise: Lab1 |

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| | | infrastructure diagrams | | |
| 3 | Lecture: TCP/IP Protocols | <ul style="list-style-type: none"> ● Identify and explain the functions of the core TCP/IP protocols ● Explain the purposes and properties of routing and describe common IPv4 and IPv6 routing protocols ● Explain major Routing protocols | Ch. 3 & Ch. 4: Material Lecture notes | Lab exercise: Lab2 |
| 4 | Lecture: Transmission Basics and Networking Media | <ul style="list-style-type: none"> ● Explain analog and digital transmission ● Explain types of multiplexing technologies ● Describe the physical characteristics of coaxial cable, STP, UTP, and fiber-optic media ● Compare the benefits and limitations of different networking media | Ch.5: Material Lecture notes | Lab exercise: Lab3 |
| 5 | Lecture: Wireless Networking | <ul style="list-style-type: none"> ● Describe WLAN architecture ● Describe major characteristics of 802.11 standards ● Explain IoT devices & networks ● Explain WiMAX technology | Ch.6: Material Lecture notes | Lab exercise: Lab4 |

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| | | <ul style="list-style-type: none"> ● Describe Wi-Fi security | | |
| 6 | Lecture: Cloud Computing & Virtualization Remote Access | <ul style="list-style-type: none"> ● Explain Cloud Computing. ● Explain virtualization and characteristics of virtual network components. ● Describe Cloud deployment model ● Discuss VPNs and the protocols they rely on ● Understand methods of encryption, such as IPsec, SSL/TLS, and SSH | Ch. 7: Material Lecture notes Prepare for Midterm | Lab exercise: Lab5 Intro. Group Project Case study |
| 7 | Midterm Examination | | | Assignment: Assignment 1 |
| 8 | Lecture: IP networking and VLANs | <ul style="list-style-type: none"> ● Describe methods of network design unique to TCP/IP networks, ● Explain how subnet marks work ● Explain IP subnetting & implementation ● Describe VLANs and their components. | Ch.8: Material Lecture notes | Assignment: Assignment 2 |
| 8 | Lecture: Network Risk Management & Security | <ul style="list-style-type: none"> ● Describe security risks associated with people, hardware, software, and Internet access | Ch.9 & Ch. 10: Material Lecture notes | Assignment: Assignment 3 |

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

10.0 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.

11.0 OTHER COURSE, DEPARTMENTAL, AND UNIVERSITY POLICIES

For more information regarding course management and departmental policies, please consult the [Course Outline Appendix](#) which is posted on the [Ted Rogers School of Information Technology Management website](#)

NOTE: Students must adhere to all relevant university policies found in their online course shell in D2L and /or on the following URL: [senate-course-outline-policies](#).

The appendix covers the following topics:

- Attendance & Class Participation
- Email Account
- Request for Academic Consideration
- Examinations & Tests
- Late Assignments
- Standard of Written Work
- Academic Grading Policy
- Academic Integrity
- Student Rights

Important Resources Available at Ryerson

- [Academic Accommodation Support](#): Ryerson University acknowledges that students have diverse learning styles and a variety of academic needs. If you have a diagnosed disability that impacts your academic experience, connect with Academic Accommodation Support (AAS). Visit the [AAS website](#) or contact aasadmin@ryerson.ca for more information. Note: All communication with AAS is voluntary and confidential, and will not appear on your transcript.
- [The Library](#) provides research workshops and individual assistance. If the University is open, there is a Research Help desk on the second floor of the library, or go to [Workshops](#).

- [Student Learning Support](#) offers group-based and individual help with writing, math, study skills, and transition support, as well as [resources and checklists to support students as online learners](#).
- You can submit an [Academic Consideration Request](#) when an extenuating circumstance has occurred that has significantly impacted your ability to fulfill an academic requirement.
- [Ryerson COVID-19 Information and Updates for Students](#) summarizes the variety of resources available to students during the pandemic.
- Familiarize yourself with the tools you will need to use for remote learning. The [Continuity of Learning Guide](#) for students includes guides to completing quizzes or exams in D2L or Respondus, using D2L Brightspace, joining online meetings or lectures, and collaborating with the Google Suite.