RYERSON UNIVERSITY

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

(C)ITM 600 – Data Communications Network Design

COURSE OUTLINE FOR 2019-2020

1.0 PREREQUISITE

The prerequisite for this course is ITM 301 or Direct Entry. Students who do not have the prerequisite 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:

In accordance with the policy on Ryerson Student E-mail accounts (Policy 157), *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. 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.

3.0 CALENDAR COURSE DESCRIPTION

This course will provide students with an understanding of how telecommunications networks are designed and deployed to support e-commerce, multimedia and web-centric business applications. Network planning concepts, network analysis, network design tools and techniques are introduced. The objective of this course is to understand the design and analysis of data communications networks through the introduction of case studies and practical network design methodologies. Also

an understanding of the application, deployment and benefits of industry standard architectures including: TCP/IP, VoIP, SONET, Gigabit Ethernet, 3G and other emerging standards will be provided.

4.0 COURSE OBJECTIVES AND LEARNING OUTCOMES

This course provides the student a foundation in the telecommunications network analysis and design process. The process includes: requirements analysis, application flow analysis and technology selection and deployment phases. Other topics include addressing design, reliability assessment, network monitoring and optimization. Course content is re-enforced through frequent case study review and discussions.

The course introduces data network planning concepts, and presents practical deployment and management strategies including the assessment and determination of appropriate technologies for implementing specific business communications systems.

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

1. Analyze business and technical goals within the given constraints of an existing network and the characteristics of its traffic.

2. Recommend a logical network design that includes network topology, addressing and numbering schemes, switching and routing protocols, network security and management strategies.

3. Participate in and contribute to the development of a physical network design that includes selecting technologies and devices.

4. Participate in simulations that will allow them to test and develop documentation of the network design.

Content	Teacher/Student Activities	(LO) Learning Outcomes	Assessment of Learning Outcomes
Needs Assessment	Lecture/Discussion Case Study Lab assignment	1) To assess and describe the current network needs of a business.	Written assignment Case Analysis
Technical goals and tradeoffs	Lecture/Discussion Case Study Lab assignment	2) To identify the technical capabilities of the proposed network and consider realistic tradeoffs	Written assignment Case Analysis
Current network status	Lecture/Discussion Case Study	3) To investigate and document the As Is	Written assignment Case Analysis

	Lab assignment	status of the network.	
Fundamentals of logical network design	Lecture/Discussion Case Study Lab assignment	4) To determine what types of traffic and access to resources that the network need to support	Written assignment Case Analysis
Fundamentals of physical network design	Lecture/Discussion Case Study Lab assignment	5) To establish the hardware and software requirements of the core, distribution and access layers of the network	Written assignment Case Analysis
Testing the network design	Lecture/Discussion Case Study Lab assignment	6) To develop test plans and procedures	Written assignment Case Analysis
Documenting the network design	Lecture/Discussion Case Study Lab assignment	7) To write a comprehensive documentation of the network	Written assignment Case Analysis

5.0 TEXTS & OTHER READING MATERIALS

Title: Top-Down Network Design (3rd Edition)
Author: Priscilla Oppenheimer
Publisher: Cisco Press
ISBN: 978-1587202834

6.0 TEACHING METHODS

- Regular lectures, prescribed weekly readings, problem based assignments, and topic and case study discussions are the main teaching activities that occur in this course.

- Since a major component of this course is problem-based learning, the five individual assignments provide practice and progressive skill-building that ensure that each student can master the course content.

- Teamwork activities allow the students to apply the analytical techniques that were introduced in class and practiced in the problem sets. In addition, by working in small teams the students develop interaction and individual and group presentation skills.

- The instructor will establish an active learning environment by engaging the students in a Socratic exchange of relevant questions and ideas. Students should expect a frequent and substantive interaction between the instructor and students and among students in every class.

Those students that actively participate in the learning process will gradually assume ownership of the knowledge contained in the course materials. In addition to ownership of the course content, the students will master a set of skills that they can use to develop communications networks.

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
Mid Term Test: • 1 hour duration scheduled for Week 6 or Week 7 • Multiple choice questions and short answer questions.	20%
Problem Sets and Labs: • Five individual assignments will be provided over the course of the term. • They will consist of any combination of written answers, multiple choice questions, descriptive and analytical analysis including calculations and spreadsheet analysis.	30%
Total Term weighting:	50%
Final Examination: • 2.5 hours duration • Combination of multiple choice questions and written answers to short questions.	50%
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 TOPICS – SEQUENCE & SCHEDULE

Session	Topic	Learning Outcomes	Reading(s)	Activities & Due Dates
1	Course Introduction Analyzing Business Goals and Constraints	1	3-24	In-class discussions
	Analyzing Technical Goals and Tradeoffs	1 & 2	25-58	
2	Characterizing the Existing Internetwork		59-86	In-class discussions. Install Software
3	Characterizing Network Traffic	3 & 4	87-118	Assignment 1 Given
4	Designing a Network Topology	1 & 3	119-166	Assignment 1 Due
5	Emerging Topics	4		Assignment 2 Given
6	Designing Models for Addressing and Naming	3 & 4	167-198	Assignment 2 Due
7	Mid Term Exam (Week 6 for some classes) Selecting Switching and Routing Protocols	1, 2, 3, 4 & 5	199-232	Midterm Test Assignment 3 Given

8	Selecting Switching and Routing Protocols (Continued)	2, 3 & 5	199-232	Review Midterm. In-class discussions Assignment 3 Due
9	Developing Network Security Strategies (Web site)	2 & 5	233-262	In-class discussions. Assignment 4 Given.
10	Developing Network Management Strategies	2 & 6	263-282	Assignment 4 Due.
11	Selecting Technologies and Devices for Enterprise Networks	5, 6 & 7	319-352	Assignment 5 Given.
12	Optimizing Your Network Design	6 & 7	367-392	Assignment 5 Due.

9.0 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.

10.0   OTHER COURSE, DEPARTMENTAL, AND UNIVERSITY POLICIES
For more information regarding course management and departmental policies, please consult the '**Appendix of the Course Outline**' 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:

1.   Attendance & Class Participation

2.   Email Account

3.   Request for Academic Consideration

4.   Examinations & Tests

5.   Late Assignments

6. Standard of Written Work

7. Academic Grading Policy

8. Academic Integrity

9. Student Rights