

RYERSON UNIVERSITY

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

COURSE OF STUDY 2017-2018

(C)ITM 207 – Computer-Enabled Problem Solving

1.0 PREREQUISITE

There are no prerequisites for this 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

The course covers the basic data representation and processing constructs necessary to problem solving using computers. This includes the development of algorithmic solutions to data processing problem through the use of workflow concepts such as sequence, selection, and iteration. In addition, the course addresses select fundamental problem solving strategies such as the decomposition of data processing problems into multiple tasks whose functions are coordinated within a specified workflow. Computer simulation and/or implementation tools will be used to provide hands on application of covered concepts using business problem solving examples.

4.0 COURSE OVERVIEW

The course covers the basic data representation and processing constructs necessary to problem solving using computers. This includes the development of algorithmic solutions to data processing problem through the use of workflow concepts such as sequence, selection, and iteration. In addition, the course addresses select fundamental problem solving strategies such as the decomposition of data processing problems into multiple tasks whose functions are coordinated within a specified workflow. The flowchart-based programming Raptor tool will be used to provide hands on application of covered concepts using business problem solving examples.

5.0 COURSE OBJECTIVES

1. Develop an understanding of the fundamental concepts and elements underlying computing
2. Develop the analytical skills necessary for the design, testing and debugging of algorithmic solutions
3. Develop an understanding of algorithms commonly used in computer solutions of real world problems

6.0 EVALUATION

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

Evaluation Component	Percentage of the Final Grade
Labs/Homework	10%
Midterm Exam	30%
Final Exam	60%
Total	100%

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) 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	Readings	Assignments
1	Number Systems Learning Outcomes: <ul style="list-style-type: none"> ○ Describe the different types of numbers ○ Apply conversions between number bases 	Ch2 – Binary Values and Number Systems	Lab/Homework #1
2	Computer Representation of Data Learning Outcomes: <ul style="list-style-type: none"> ○ Explain how different types of data are represented in a computer ○ Perform binary arithmetic operations 	Ch3 – Data Representation	Lab/Homework #2
3	Boolean Logic Learning Outcomes: <ul style="list-style-type: none"> ○ Explain what are Boolean expressions, truth tables, gates and circuits ○ Use Boolean expressions, logic diagrams and truth tables to describe the behavior of gates and circuits 	Ch4 – Gates and Circuits	Lab/Homework #3
4	Algorithmic Problem Solving Topics: <ul style="list-style-type: none"> ○ Problem Solving ○ Algorithms ○ Flowcharts Learning Outcomes: <ul style="list-style-type: none"> ○ Describe the essential activities of problem solving ○ Develop algorithms for simple problems ○ Specify algorithm using flowcharts and pseudo-code 	<ul style="list-style-type: none"> • Ch7 - Section 7.1 • Raptor Tutorial –Building a flowchart 	Lab/Homework #4
5	Algorithm Design Topics: <ul style="list-style-type: none"> ○ Arithmetic Operations ○ Workflow Control Structures Learning Outcomes: <ul style="list-style-type: none"> ○ Develop algorithms with single variables ○ Develop algorithms using control structures 	<ul style="list-style-type: none"> • Ch7 - Section 7.2 • Introduction to Programming with Raptor - Wayne Brown 	Lab/Homework #5
6	Midterm exam		
7	Arrays, Strings & File I/O Topics: <ul style="list-style-type: none"> ○ Strings ○ Arrays ○ File I/O 	Introduction to Array Variables – William L. Bahn Introduction to RAPTOR – Data Files – Elizabeth Drake	Lab/Homework #6

	Learning Outcomes: <ul style="list-style-type: none"> ○ Develop algorithms that use String and Array variables ○ Develop algorithms that make use of file I/O operations 		
8	Advanced Algorithmic Problem Solving Topics: <ul style="list-style-type: none"> ○ Sub-flowcharts ○ More on Strings, Arrays and flow control structure Learning Outcomes: <ul style="list-style-type: none"> ○ Develop structured algorithms using sub-flowcharts 	<ul style="list-style-type: none"> • Ch7, Section 7.3 	Lab/Homework #7
9	Sorting Topics: <ul style="list-style-type: none"> ○ Selection Sort ○ Bubble Sort ○ Insertion Sort Learning Outcomes: <ul style="list-style-type: none"> ○ Develop algorithmic solution that make use of selection, bubble and insertion sort algorithms 	Ch7 – Section 7.5	Lab/Homework #8
10	Searching Topics: <ul style="list-style-type: none"> ○ Sequential Search ○ Binary Search Learning Outcomes: <ul style="list-style-type: none"> ○ Develop algorithmic solution that make use of sequential and binary search algorithms 	Ch7 - Section 7.4	Lab/Homework #9
11	Computer Programming Languages Topics: <ul style="list-style-type: none"> ○ Imperative & Declarative Programming ○ Essential Concepts of Object Orientation Learning Outcomes: <ul style="list-style-type: none"> ○ Explain what are source code, compilers and executable computer programs ○ Explain the different computer programming paradigms ○ Explain what are the elements and concepts of object orientation ○ Identify objects and classes from business requirements 	Ch9 – Sections 9.1, 9.2, 9.3, 9.4 & 9.5	Lab/Homework #10
12	Modeling and Simulation Learning Outcomes: <ul style="list-style-type: none"> ○ Explain what are computer simulation models ○ Explain the utility of computer simulation models ○ Describe the basic elements and applications of computer graphics 	Ch14	

9.0 TEACHING METHODS

The course will incorporate lecture and laboratory/tutorial sessions designated at the instructor's discretion. The laboratory/tutorial sessions will be dedicated to practice and problem solving exercises

designed to reinforce the learning of the concepts being taught and develop the associated analysis and design skills.

10.0 TEXTS & OTHER READING MATERIALS

Title: Computer Science Illuminated (6th Edition)

Author: Nell Dale and John Lewis

Publisher: Jones & Bartlett Learning

ISBN: 978-1284055917

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