1.0 PREREQUISITE(S)

None

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

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 address 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 OBJECTIVES AND LEARNING OUTCOMES

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.

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

5.0 TEXTS & OTHER READING MATERIALS

Title: Computer Science Illuminated (6th Edition)
Author: Nell Dale and John Lewis
Publisher: Jones & Bartlett Learning
ISBN: 978-1284055917

6.0 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.

7.0 EVALUATION, ASSESSMENT AND FEEDBACK

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

<table>
<thead>
<tr>
<th>Evaluation Component</th>
<th>Percentage of the Final Grade</th>
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</thead>
<tbody>
<tr>
<td>Labs/Homework</td>
<td>20%</td>
</tr>
<tr>
<td>Midterm Test</td>
<td>30%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>50%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
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**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.

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.

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

<table>
<thead>
<tr>
<th>Session</th>
<th>Topic &amp; Learning outcomes</th>
<th>Readings</th>
<th>Assignments</th>
</tr>
</thead>
</table>
| 1       | Number Systems Learning Outcomes:  
- 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:  
- Explain how different types of data are represented in a computer | Ch3 – Data Representation | Lab/Homework #2 |
| 3 | **Boolean Logic**  
**Learning Outcomes:**  
- 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:**  
- Problem Solving  
- Algorithms  
- Flowcharts  

**Learning Outcomes:**  
- Describe the essential activities of problem solving  
- Develop algorithms for simple problems  
- Specify algorithm using flowcharts and pseudo-code | - Ch7 - Section 7.1  
- Raptor Tutorial – Building a flowchart | Lab/Homework #4 |
| 5 | **Algorithm Design**  
**Topics:**  
- Arithmetic Operations  
- Workflow Control Structures  

**Learning Outcomes:**  
- Develop algorithms with single variables  
- Develop algorithms using control structures | - Ch7 - Section 7.2  
- *Introduction to Programming with Raptor* – Wayne Brown | Lab/Homework #5 |
| 6 | **Midterm exam** | | Lab/Homework #6 |
| 7 | **Advanced Algorithmic Problem Solving**  
**Topics:**  
- Strings & Arrays  
- File I/O  
- Sub-flowcharts  

**Learning Outcomes:**  
- Develop algorithms that use String and Array variables  
- Develop algorithms that make use of file I/O operations  
- Develop structured algorithms using sub-flowcharts | - Ch7, Section 7.3  
- *Introduction to Array Variables* – William L. Bahn  
- *Introduction to RAPTOR – Data Files* – Elizabeth Drake | Lab/Homework #7 |
<table>
<thead>
<tr>
<th></th>
<th><strong>Searching &amp; Sorting</strong></th>
<th><strong>Computer Programming</strong></th>
<th><strong>Simulation, Graphics &amp; Gaming</strong></th>
<th><strong>Artificial Intelligence</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Topics:</strong></td>
<td>Sequential Search</td>
<td>Imperative &amp; Declarative Programming</td>
<td>Simulation models</td>
<td>Knowledge Representation</td>
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<td></td>
<td>Selection Sort</td>
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<td>Gaming</td>
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<td></td>
<td>Bubble Sort</td>
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<tr>
<td></td>
<td>Insertion Sort</td>
<td></td>
<td></td>
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<tr>
<td><strong>Learning Outcomes:</strong></td>
<td>Develop algorithmic solutions that make use of sequential and binary search algorithms</td>
<td>Explain what are source code, compilers and executable computer programs</td>
<td>Explain what is a simulation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Develop algorithmic solutions that make use of selection, bubble and insertion sort algorithms</td>
<td>Explain the different computer programming paradigms</td>
<td>Describe the different computer simulation models</td>
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<tr>
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<td>Explain what are the elements and concepts of object orientation</td>
<td>Describe key issues of computer graphics generation</td>
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<td></td>
<td>Ch7 - Section 7.4 ad 7.5</td>
<td>Ch9 – Sections 9.1-9.5</td>
<td>Ch14</td>
<td>Ch13</td>
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<td></td>
<td>Lab/Homework #8</td>
<td>Lab/Homework #9</td>
<td>Lab/Homework #10</td>
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</table>
Learning Outcomes:
- Explain the processing of expert systems and neural networks
- Discuss key aspects of natural language processing

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