Canada World Education

Course Outline

Course: Computer Science			
Grade: 12	**Type: U** C M O E	**Credit Value:** 1 **Credit hours:** 110	**Course code: ICS4U** **Dept:**
Teacher:		**Development date:**	
Course Reviser: J.F. Michaud **Date:**		**Prerequisites:** ICS3U	

Resources Required: electronic device with internet access
Textbook: none required
Supplementary resources: USB

Ministry Curriculum Documents:
- The Ontario Curriculum Grades 10 to 12 Computer Studies - Revised (2008)
- Growing Success – Assessment, Evaluation and Reporting in Ontario Schools-2010
- Learning for All – A Guide to Effective Assessment and Instruction for All Students, Kindergarten to Grade 12, 2013
- Environmental Education: Scope and Sequence of Expectations, 2017
- Course Descriptions and Prerequisites, Grades 9 to 12, 2018
- Equity and Inclusive Education in Ontario Schools: Guidelines for Policy Development and Implementation
- Financial Literacy: Scope and Sequence of Expectations, Grades 9-12, 2016
- First Nations, Métis, and Inuit Connections – Scope and Sequence of Expectations, 2016
- Health and Safety: Scope and Sequence of Expectations, Grades 9–12, 2017

Course Description

This course enables students to further develop knowledge and skills in computer science. Students will use modular design principles to create complex and fully docu- mented programs, according to industry standards. Student teams will manage a large software development project, from planning through to project review. Students will also analyse algorithms for effectiveness. They will investigate ethical issues in comput- ing and further explore environmental issues, emerging technologies, areas of research in computer science, and careers in the field.

Overall Expectations

By the end of this course, students will:

A1. demonstrate the ability to use different data types and expressions when creating computer programs;
A2. describe and use modular programming concepts and principles in the creation of computer programs;
A3. design and write algorithms and subprograms to solve a variety of problems;
A4. use proper code maintenance techniques when creating computer programs.

B1. demonstrate the ability to manage the software development process effectively, through all of its stages – planning, development, production, and closing;
B2. apply standard project management techniques in the context of a student-managed team project.

C1. demonstrate the ability to apply modular design concepts in computer programs;
C2. analyse algorithms for their effectiveness in solving a problem.

D1. assess strategies and initiatives that promote environmental stewardship with respect to the use of computers and related technologies;
D2. analyse ethical issues and propose strategies to encourage ethical practices related to the use of computers;
D3. analyse the impact of emerging computer technologies on society and the economy;
D4. research and report on different areas of research in computer science, and careers related to computer science.

Outline of course content :

Unit: 1 Programming in Java	Hours: 24
Unit: 2 Game Design using Object Oriented Programming	Hours: 25
Unit: 3 Arrays and Algorithm Analysis	Hours: 25
Unit: 4 Project Management	Hours: 24
Final Project 15%	Hours: 10
Exam 15%	Hours: 2

Mark reporting

Student marks will be posted online so that parents and students can see student progress and current marks through a secure reporting software.

Mark breakdown

Evaluations throughout the course: 70% of final grade

Final Evaluation: 30% of final grade

The term work and Exam will be broken down in the following skill Categories:

Knowledge and Understanding	30%
Thinking	20%
Communication	20%
Application	30%

The activities completed during the course will account for the following percentages:

Assignments	20% (2 Projects, 10% each)
Quizzes	18% (9 in-class Quizzes, 2% each)
Tests	32% (4 Tests, 8% each)
Final Project	15%
Exam	15%

Achievement levels

Level 1 50-59%	**Level 2 60-69%**	**Level 3 70-79%**	**Level 80-100%**

Teaching and Learning Strategies

Teachers use a variety of teaching strategies to maximize student learning. The following teaching strategies will be used in this course:

Teacher will utilize instruction that both responds to the characteristics of a diverse group of students and is precisely tailored to the unique strengths and needs of each student can be achieved using the principles and guidelines associated with three instructional approaches:

1) Universal Design for Learning (UDL),

2) differentiated instruction, and

3) the tiered approach to prevention and intervention. (Learning for All, Kindergarten to Grade 12: For more info please see http://www.edu.gov.on.ca/eng/general/elemsec/speced/LearningforAll2013.pdf)

What are UDL-aligned strategies? https://goalbookapp.com/toolkit/strategies

• UDL-aligned strategies are instructional methods and tools used by teachers to ensure that ALL students have an equal opportunity to learn. All of our strategies are aligned with Universal Design for Learning (UDL) guidelines. These guidelines help you to select strategies that remove barriers in instruction so that all students can achieve their learning goals.

• Differentiated Instruction is based on the idea that because students differ significantly in their interests, learning styles, and readiness to learn, it is necessary to adapt instruction to suit these differing characteristics. Teachers can differentiate one or a number of the following elements in any classroom learning situation (Tomlinson, 2004): the content of learning (what students are going to learn, and when); the process of learning (the types of tasks and activities); the products of learning (the ways in which students demonstrate learning); the affect/environment of learning (the context and environment in which students learn and demonstrate learning).
(http://edugains.ca/newsite/di/index.html)

Teaching and learning strategies adopted should be appropriate to the course type and should reflect an appropriate balance of theoretical components, practical applications for the course and appropriate to the range of student learning.

Helping students become self-directed.

In order to address the unique learning styles of students in this course, a variety of activities and learning experiences should be offered, including, but not restricted to: questioning, demonstrations, role-plays, simulations, co-operative group learning, brainstorming, discussion, peer coaching, interviewing, reflective writing, reflective thinking exercises, concept mapping, reading, tutoring, direct instruction, one-on-one teaching, and experiential learning.

Teachers will find ways throughout the course for students to make authentic learning connections with their other courses, the school, local community and the world at large.

Examples of teaching strategies:

- Brainstorming
- Be the teacher
- Case Studies
- Computer technology – reports, spreadsheets, flow charts , data bases, electronic presentation;
- Conferences
- Documentaries/Videos /Ted Talks/Video critique
- Flexible Grouping
- Focus Groups–Informal discussions based on focus questions
- Formal Debates/Informal debates
- Graphic Organizers
- Group critique
- Group Discussions
- Independent Study
- Informal Debates
- Internet Based Research/Investigation
- Interview
- Investigative and inquiry questions
- Media Presentation
- Peer feedback
- Planning and writing analytical pieces of work
- Provide specialized vocabulary
- Reading: read for meaning
- Reading: to develop the ability to use specialized vocabulary
- Research Project –individual
- Research Project-group
- Role-play
- Seminar
- Skype interviews
- Socratic Teaching
- Structured discussion
- Think-Pair Share
- UDL-Aligned Strategies (see https://goalbookapp.com/toolkit/strategies)
- Write or give a personal perspective in discussions

Assessment & Evaluation of Student Performance

Assessment & Evaluation

The primary purpose of assessment and evaluation is to improve student learning and to help students assume responsibility for their learning.

Mid-term and final marks are determined through evaluations or Assessments *of* Learning, which typically occur towards the end of a unit and end of the term. During the learning process, information about a student's learning is gathered and used by the teacher and student to inform decisions that affect goal setting and teaching in the classroom. The data gathered as Assessment *as* Learning and Assessment *for* Learning do not carry a mark weight, but do play a crucial role in student success as they help inform the teacher about each student's progress. All types of assessments allow teachers to provide descriptive feedback that is clear, specific, meaningful, and timely to support improved learning and achievement.

Learning Skills and Work Habits (responsibility, organization, independent work, collaboration, initiative, self-regulation) will be reported by a letter (E = Excellent, G = Good, S = Satisfactory, N = Needs Improvement). These

skills and habits support a high level of success in meeting the course expectations in addition to contributing to the development of positive life and work skills for the future.

Assessment as Learning	Assessment for Learning
Student Product ● Entrance tickets ● Graphic organizers-KWL ● Journal ● Peer assessment ● Peer editing checklist ● Pre-tests/Diagnostic tests ● Quizzes ● Reflections ● Rough drafts ● Self assessment ● Self-proofreading using a checklist ● Practical task	**Student Product** ● 3-Minute Pause ● Assignments ● Diagnostic Assessment ● Exit tickets ● Graphic organizers ● Homework ● Journals/Letters/Emails ● Know, WonderLearn (KWL) ● Learning Logs ● Presentation (PPT/Prezi..) ● Problem solving ● Quiz/problem solving ● Vocabulary notebook ● Project ● Practical task
Observation ● Checklist/Feedback for group discussion ● Peer rating on presentations ● Teacher anecdotal feedback ● Teacher feedback for a task ● Teacher rating for a task ● Whole class discussion	**Observation** ● Class discussions ● Demonstrations ● Informal debate ● Performance tasks ● Presentations ● Role Play
Conversation ● Student teacher conversations ● Questioning ● Moderated group discussions ● Peer-Oral feedback	**Conversation** ● Brainstorming ● Debate ● Focused Conversations ● Oral pre-tests ● Oral quizzes ● Interviews ● Pair work ● Group work ● Portfolio conferencing ● Student teacher conferences

Considerations for Program Planning

- Individual Education Plan: Accommodations to meet the needs of exceptional students as set out in their Individual Education Plan will be implemented within the classroom program. Additional assistance is available through tutoring.

- The Role of Technology in the Curriculum. Using information technology will assist students in the achievement of many of the expectations in the curriculum regarding research, written work, analysis of information, and visual presentations.

- English As a Second Language (ESL): Appropriate accommodations in teaching, learning, and evaluation strategies will be made to help ESL students gain proficiency in English.

- Programs will involve an open, collaborative, activity-based approach to teaching that accommodates students' interests, aspirations, and learning styles. Activities will be designed to include both individual and team approaches, with emphasis on equity and inclusive education, financial literacy, careers, and health and safety.

Technological Devices:

Any device with windows 8 or newer will work on the software used for all courses.

For Online courses Electronic devices are necessary to access the course content and lessons. However, it is strongly recommended that students use other means such as paper and pencil when comprehension skills are required.

CWEC supports the use of technology to enhance learning, but the use of such electronic technology in the classroom is at the discretion of the teacher. Working together we can ensure the appropriate use of technology by all members of our school community.