Bloor Collegiate Institute
Computer Science, ICS4U

Grade 12, University/TOPS

Teacher: Mr. Mario Portoraro, OCT, QTS (UK), B Ed, B Sc, B Mus
Mario.Portoraro@tdsb.on.ca

Location: Room 307

Materials: Class Notes and Exercises. All material posted at:

- York University Abel Moodle web site

  http://abelmoodle.abel.yorku.ca/moodle/login/

  The self-enrolment key is `APG1718`

- Bloor Collegiate Institute Pick Up folder at

  1296-PickUp/Mr. Mario/<course code>

Extra help: Days 2 and 4 after school 3:15-4:00 pm

Co-Curricular:

CCC: Canadian Computing Contest of Waterloo University
Contest on-line at Bloor CI, Wednesday February 21, 2018
Listen for daily announcements to meet at 12:00 in 307

ECOO: Educational Computing Organization of Ontario
Listen for daily announcements to meet at 12:00 in 307

York University Field Trips
Four lectures on research topics of Computer Science
Dates TBD

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 documented 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 computing and further explore environmental issues, emerging technologies, areas of research in computer science, and careers in the field. (Computer Studies: The Ontario Curriculum Grades 10 to 12. Revised 2008)

Overall expectations

By the end of this course, students will demonstrate the ability to:

- *Use different data types and expressions when creating computer programs;*
- *Use modular programming concepts and principles in the creation of computer programs; design and write algorithms and subprograms to solve a variety of problems;*
- *Use proper code maintenance techniques when creating computer programs.*
- *Manage the software development process effectively, through all of its stages - planning, development, production, and closing;*
- *Apply standard project management techniques in the context of a student-managed team project; apply modular design concepts in computer programs;*
- *Analyse algorithms for their effectiveness in solving a problem.*
- *Assess strategies and initiatives that promote environmental stewardship with respect to the use of computers and related technologies;*
- *Analyse ethical issues and propose strategies to encourage ethical practices related to the use of computers;*
- *Analyse the impact of emerging computer technologies on society and the economy*
- *Research and report on different areas of research in computer science, and careers related to computer science.*

This course is designed to prepare students to enter comfortably into the required first year level computer science course for the Computer Science programs of Ontario Universities. The following is a description of the University of Toronto's CSC148 course:[1]

> "CSC148H1 Introduction to Computer Science[36L/24P]
>
> Abstract data types and data structures for implementing them. Linked data structures. Encapsulation and information-hiding. Object oriented programming. Specifications. Analyzing the efficiency of programs. Recursion..."

[1] http://calendar.artsci.utoronto.ca/crs_csc.htm#CSC148H1

Units of Study*

Topic	Hours (+/- 2)
Preliminary. Review of Grade 11 Concepts, e-client	10
Unit 1. Searching, Sorting Algorithms	10
Unit 2. File I/O and Data storage in linear files, e-server	8
Unit 3. Data Structures I: Singly and doubly Linked Lists, e-server	10
Unit 4. Recursion	10
Unit 5. Data Structures II: Binary Trees, AVL Trees, e-server	15
Unit 6. Data Files and Index Files, e-server	5
Unit 7. Computer Science History, Environmental/Social Issues	8
Unit 8. Networking, encrypted data transfer, concurrency, e-server	8
Unit 9. Hierarchies, inheritance, polymorphism	8
Unit 10. The C Programming Language	10
Independent Study Unit, e-server/e-client	8
Total hours of study	**110**

*Source: *Computer Studies: The Ontario Curriculum Grades 10 to 12. Revised 2008*

Unit	Overall Expectations	Specific Expectations
1	*A. Programming Concepts and Skills* *C. Computer Environment and Systems*	*A1. Data Types and Expressions* *C3. Software Development*
2	*A. Programming Concepts and Skills*	*A2. Control Structures*
3	*A. Programming Concepts and Skills*	*A2. Control Structures*
4	*A. Programming Concepts and Skills*	*A1. Data Types and Expressions*
5	*A. Programming Concepts and Skills*	*A3. Subprograms*
6	*D. Topics in Computer Science*	*D1. Environmental Stewardship and Sustainability* *D3. Post-Secondary Opportunities*
7	*C. Computer Environment and Systems*	*C1. Computer Components* *C2. File Maintenance*
8	*A. Programming Concepts and Skills* *B. Software Development*	*A4. Code Maintenance* *B1. Problem-solving Strategies* *B2. Designing Software Solutions* *B3. Designing Algorithms* *B4. Software Development Life Cycle*
9	*A. Programming Concepts and Skills*	*A3. Subprograms*
10	*D. Topics in Computer Science*	*D2. Exploring Computer Science*
11	*D. Topics in Computer Science*	*D2. Exploring Computer Science*
12	*D. Topics in Computer Science*	*D2. Exploring Computer Science*

Assessment and Evaluation

The following strategies will be used to effectively assess and evaluate the student:

- Teacher observation
- Class participation, questions and answers, cooperation with peers
- Quizzes, tests, examinations, independent units of study
- Computer lab work: Because this course is lab work intensive, work in class will be marked regularly. Lab work consists of a large project that spans throughout most of the year. Missed classes and work will have an effect on the grade. Students are allowed 5 *justified* absences without consequence to the grade. Absences beyond 5 must be made up with after school sessions. If a student chooses to make up a justified absence it must be done by the next after school session.
- Oral presentations, media works
- Self-assessment, peer assessment
- Optional Challenge questions: A series of challenge questions will be posted throughout the year with the following guidelines:
  (a) A student needs to have at least a 90% current mark in order to attempt and submit solutions to any of the challenge questions.
  (b) Solutions may be submitted at any time outside of moratorium
  (c) Solutions must be fully correct and need to be explained to Mr. Portoraro by way of an appointment.
  (d) Upon successful approval of a solution to a challenge question, the student will receive a 1% raise towards his/her current mark, to be applied at the next reporting period.
  (e) A maximum of 3 challenge questions can be completed for each reporting period.

Mark Calculation

Final course mark is distributed as follows[2]:

Term	ISU and Exam
70%	30%

All term work is subject to the Achievement Categories distributed as follows:

Knowledge and Understanding	Thinking	Application	Communication
20%	20%	40%	20%

[2] The Ontario Curriculum, Grades 9 to 12: Program Planning and Assessment, p.15

Knowledge/Understanding evaluates the material studied in a unit such as algorithms, number systems or particulars of a programming language.

Thinking/Inquiry evaluates the student's ability to integrate material learned elsewhere with the newly learned concepts, such as the use of trigonometry in computer graphics.

Application evaluates the capacity of the student to develop a working computer program from a given problem and/or algorithm.

Communication evaluates the effectivenes in writing clear and concise software. For example, using descriptive variable names, proper code indentation, commenting and documentation.

Evaluations becomes progressively more significant over time so that *"...special consideration should be given to more recent evidence of achievement."*[3] Average weights for each type of evaluation is (+/- 2%):

Lab Work/Quizzes	Assignments/Quests	Unit Tests	ISU	Exam
25%	25%	20%	15%	15%

Evaluation distribution

Evaluation	Percentage wrt final grade (+/- 0.5%)
Preliminary Quest	2.50%
Unit 1 Test	4.80%
Unit 2 Quest	2.70%
Unit 3 Test	5.20%
Unit 4 Quest	2.90%
Unit 5 Test	5.60%
Unit 7 Presentation/Assignment	6.00%
Unit 8 Quest	3.10%
Unit 9 Test	6.00%
Unit 10 Presentation/Assignment	6.40%
Lab Work/Quizzes Terms 1-4	24.90%
ISU	15.00%
Final Exam	15.00%
Totals	100.00%

Expectations from Students

[3] Ibid.

Attendance
Students are expected to attend all classes. Absences must be explained by way of a note from a parent/guardian or a doctor. Missing classes will be followed up by the teacher according to school board regulations. Students with recurring attendance and/or lateness may be required to complete after school make up time.

Because this works is lab work intensive, work in class will be marked regularly. Missed classes and missed work will have an effect on the grade. Students are allowed 5 justified absences without consequence to the grade. Absences beyond this amount must be made up with after school sessions. Unjustified absences cannot be made up.

Punctuality
Period 1 students are to be in class by the start of the National Anthem. Students of other periods are to arrive in class by the time the second bell is rung. It is in the interest of students to arrive on time because:

1. Quizzes based on homework may be given at the start of the period.
2. Clarification questions will be taken up before the daily lesson

Homework
Students are expected to complete all homework as assigned.

Class Notes
Students must come to class ready to take notes. Students are responsible for all the material that is presented and discussed in the classroom.

Submitted Work
All submitted work must be the work of each student. Students need to be ready to explain their work at any time. In the case of teamwork, students may submit work as a group, yet each individual must be ready to explain their contribution fully.

Plagiarism results in significant to serious consequences and is dealt according to the Code of Conduct of Bloor Collegiate Institute and the Toronto District School Board. Plagiarism may be recorded in the OSR.

Lab Maintenance
Room 307 is being maintained by your teacher, Mr. Portoraro, and updated constantly with newer and costly equipment. Students are required to use all equipment respectfully, maintain their work area clean and leave it ready for the

next person that will be using it. Food and/or drink **are not allowed** in the lab room.

Electronic Devices
For the purposes of working more productively, students may use their cell phones to listen to music during computer lab work. Cell phones or any other devices are not allowed during teaching time. Students texting or using their devices counter-productively will have their privileges revoked.

BCI School Agenda
All students are responsible for the guidelines of the Bloor Collegiate Institute Agenda as well as the Code of Conduct outlined by the Toronto District School Board.