

RICHMOND HILL HIGH SCHOOL DEPARTMENT OF COMPUTER SCIENCE
ICS4UE - GRADE 12 AP COMPUTER SCIENCE

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Course Description

The AP Computer Science course introduces students to computer science with fundamental topics that include problem solving, design strategies and methodologies, organization of data (data structures), approaches to processing data (algorithms), analysis of potential solutions, and the ethical and social implications of computing. The course emphasizes Software Engineering principles through a project based approach to both object-oriented and imperative problem solving and design. The collaborative nature of this course allows students to develop real-life solutions that scale up from original problem definition to full-fledged software solutions.

Prerequisite: ICS3U6

Overall Expectations: By the end of the 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.
- (Ontario Curriculum, Computer Studies, 2008)

Course Topics

Fundamental Programming Concepts

Problem Solving, Conventions
I/O, Arithmetic, Selection, Repetition
Methods, pre-post conditions
Multi-Dimensional Arrays
Sorting, Boolean Algebra

Object Oriented Design

Classes, Objects, Polymorphism
Inheritance, Encapsulation
Interfaces, Abstraction, Error Handling

Data Structures and Algorithms

Lists, Stacks, Queues, Trees
Searching Algorithms
Complexity, Recursion, File I/O

Programming Theory

graphs, optimization, dynamic programming
multitasking, networking
cryptography, AI, GUI

Software Engineering

Tools, Planning, Documenting
assertions, conditions
Project Management, code tracing

Computers and Society

Ethics and Technology
Careers

*This course uses a hands-on project based approach to learning as opposed to traditional discrete unit design.

Assessment and Evaluation

The final grade in the course will be calculated with the following breakdown:

Term Work (70%)		Final Evaluation (30%)	
Knowledge/Understanding	20%	Final Project	10%
Application	25%	Final Exam	20%
Thinking/Inquiry	15%		
Communication	10%		

Students will be assessed on the five learning skills listed below. Throughout the course, students will have a variety of opportunities to develop and demonstrate their learning skills. The learning skills will be tracked and recorded for report card purposes. The report card will indicate these skills at a level of Excellent, Good, Satisfactory or Needs Improvement.

Learning Skill	Criteria
Works Independently	-begins learning activities without prompting -stays on task without disrupting others
Teamwork	-courteous and respectful for others person and property -works to achieve the goals of the group of the class
Organization	-follows attendance and punctuality guidelines -maintains an organized binder -brings all required materials to class each day.
Work Habits	-completes homework on a daily basis -completes assignments by the due date -effectively uses class time -puts forth best effort
Initiative	-actively participates by asking/answering questions -willing to help others -demonstrates a curiosity about ideas discussed in class

Course Requirements

Students will be required to access the course LMS as it contains lessons, examples, assignments, due dates, Java resources, and links to useful sites. Students will also be required to submit work digitally through an online submission. Students should make use of their YRDSB Google Apps account to transfer work between school and home. Finally, students should bring a USB flash drive (4Gb+) to class regularly to support with daily class activities and to use as a secondary backup location for their work.

This year students will have the unique opportunity to use an LMS called [Coursesites](#). This learning management software is popular amongst many universities including the University of Toronto. Please take time to review the [privacy policy](#) for this service. Any questions or concerns can be directed to me via email.

Even though most course content will be kept in digital format it is expected that every student will keep small notebook/binder for their course notes, handouts, assignments, quizzes and tests. Students will be required to keep BOTH their digital files and notebook in order. Students are permitted to bring their own laptops to class. This has the added advantage of permitting students to make use of programming tools and resources that are not installed on the school network.

Additional Resources

[Oracle Java Tutorial and API reference \(http://docs.oracle.com/javase/tutorial/reallybigindex.html\)](http://docs.oracle.com/javase/tutorial/reallybigindex.html)
[Introduction to Programming Using Java](#), D. Eck, August 2014 (PDF on Course site)
[Programming with Java](#), G. Ridout, August 2015. (PDF on Course site)

Attendance and Punctuality

Since computer lab time is dedicated for skill development, students are expected to make effective use of lab time by attending all classes punctually, and following the attendance and punctuality policy of the school.

- 1) If a student is going to miss a summative because of a scheduled appointment (e.g. dentist), or a school activity (e.g. sports, field trip), the student should see his/her teacher as soon as possible before the test date to make other arrangements. Students should attempt schedule absences around school assignments as many assessments cannot be rescheduled (group presentations, lab activities, exams, etc).
- 2) If a student misses a summative because of illness, a medical certificate is required and/or a separate note from a parent/guardian indicating that they are aware that you missed a summative because of your illness. In this case the student is responsible for making arrangements with his/her teacher to complete his/her summative as soon as possible after returning to school.
- 3) If a student misses a due date as a result of truancy, a mark of zero will be assigned. However, the student is still expected to complete the missed work the following day, or within a timeframe determined in consultation with the teacher. At the end of the course, the department may consider the submitted work in calculating the final grade in accordance with Board and Ministry policies

Not submitting assigned work on time is a serious decision which may jeopardize success in the course.

Academic honesty

Respect for self and others is important and learning is enhanced when students respect themselves and their ability to think independently and honestly. Students will be expected to demonstrate respect for the intellectual property rights of others and adhere to a code of honour in all evaluated activities. It is in the best interests of each student to build habits that contribute to genuine academic, personal and social growth.

- 1) All independent work should consist of a student's own work. This means that material should not be copied from another student or an external resource (internet, book, etc.).
- 2) Group work requires that each member contribute equally and work should not have been copied from another group or an external resource (internet, book, etc.). Individual group members will be penalized if they do not participate and/or contribute their fair amount to the group work.

Plagiarism does not help students learn the concepts. Copied assignments will be given a mark of zero for the copy and may result in a mark of zero for the original. To avoid any confusion of the authenticity of work, students should be able to clearly explain any line or section of code in any of their programs at any time. Students should also keep any initial plans or rough notes until the assignment has been marked.

Respect for the learning environment:

The computer hardware and networking capabilities are provided for student learning, as such it is the responsibility of all students to take proper care and maintenance of all hardware and use them for learning purposes only. Students are expected to adhere to the Computer Acceptable Use Policy of the school. Technological devices such as: cell phones, game consoles, recording devices, cameras, video, etc., are not to be used in the classroom without the permission of the teacher, since such devices are disruptive to the smooth operation of the school and for student learning. These devices may be confiscated if used inappropriately. Students may not have headphones/earbuds on or in their ears during instruction time. Please refer to the student agenda book for more detailed information regarding policies and procedures regarding technology.

Program Considerations

Assessment, instructional and environmental accommodations are provided to individual students as per their IEP. Similarly, adaptations for English Language Learners are provided based upon the student's level of language development, strengths and needs.

Daily Work and Extra Help

Since the content of this course is always building on previously presented material, it is very important that students do not fall behind in their studies. If a student is having trouble with any of the material presented in this course, it is important that they seek extra help as soon as possible.

Contact information

Please refer to my email address below for contact information.

This is the best way for parents to get in touch with me and will result in the quickest response.

Teacher: **Mr. Mangat**

email/contact: **harpal.mangat@yrdsb.ca**

Department Website: <http://goo.gl/7MyYWC>

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**ICS4UE – Grade 12 Computer Science Advanced Placement
Mangat.**

2018/2019

Agreement

Student Name (Print): _____ Signature: _____ Date: _____

Parent Name (Print): _____ Signature: _____ Date: _____