



BUR OAK SECONDARY SCHOOL
Digital Technology and Innovations in the Changing World

COURSE CODE: ICD20

MINISTRY CURRICULUM DOCUMENT: Ministry Website - Computer Studies, 2023

MINISTRY PREREQUISITE: None

DEPARTMENT: Computer Studies

CREDIT VALUE: 1.0

DEPARTMENT HEAD: Mr. Fernandes

COURSE DESCRIPTION

This course helps students develop cutting-edge digital technology and computer programming skills that will support them in contributing to and leading the global economic, scientific and societal innovations of tomorrow. Students will learn and apply coding concepts and skills to build hands-on projects and investigate artificial intelligence, cybersecurity, and other emerging digital technologies that connect to a wide range of fields and careers. Using critical thinking skills with a focus on digital citizenship, students will investigate the appropriate use and development of the digital technologies that they encounter every day, as well as the benefits and limitations of these technologies.

MINISTRY LEARNING EXPECTATIONS

A. Computational Thinking and Making Connections

- A1. Apply computational thinking concepts and practices, and use various tools and processes to plan and develop computational artifacts for a wide variety of contexts, users, and purposes
- A2. Demonstrate an understanding of important social, cultural, economic, environmental, and ethical issues, as well as contributions and innovations involving diverse local and global communities, related to digital technology
- A3. Demonstrate an understanding of real-world applications of digital technology and programming, including within various industries and careers

B. Hardware, Software, and Innovations

- B1. Demonstrate an understanding of the functions and features of the hardware and software they encounter in their everyday life
- B2. Demonstrate an understanding of various ways to use hardware, software, and file management, and of research practices to support their own use of digital technology
- B3. Demonstrate an understanding of safe and effective practices related to data and cybersecurity in various contexts
- B4. Investigate current and emerging innovations in digital technology, including automation and artificial intelligence, and assess their benefits and limitations

C. Programming

- C1. Explain fundamental programming concepts and algorithms
- C2. Use fundamental programming concepts to write simple programs
- C3. Demonstrate an understanding of program components and modules

COURSE UNITS

Unit 1: Introduction to Programming

This unit introduces students to the fundamentals of computer programming. Students will learn how to plan, write and test basic programs that involve input, process and output. Students will also learn basic programming syntax and how to format and document their code. Students will also learn to use planning tools such as pseudocode, algorithms and structure charts to organize their logic.

Unit 2: Understanding Computers

This unit introduces students to the relationship between computer hardware and software. Students will gain an understanding of how parts of the computer interact with the code that they write. Also, the interaction between the Internet and computer software is covered.

Unit 3: Advanced Programming

This unit introduces students to the fundamental building blocks of more complex programs - control structures. Students will learn how to use control structures and modularization to create more diverse and complex programs. This unit includes a variety of skills including hands-on projects.

Unit 4: Software Development

This unit introduces students to the basics of software development following in creating a larger project that uses the knowledge of the prior units. This product(s) is often formed in various settings from games to applications, both individually and in group settings.

Unit 5: Computers and Society

This unit covers a variety of topics that deal with the relationship between computers and their impact on society. This includes coverage of the social and environmental impacts and how society is changing with emerging technologies such as automation, artificial intelligence and cybersecurity, and their ethical implications. Also, students will explore emerging industries and related career opportunities. The content of this unit is often spread out throughout the entire term.

Unit 6: Final Summative Project

This task(s) provides students with an opportunity to demonstrate their overall understanding in the form of a final software project. This project often takes the form of a game and/or application where students will utilize all the program skills acquired throughout the course.

TEACHING/LEARNING STRATEGIES

A variety of teaching and learning strategies are used, including:

- Brainstorming – group generation of initial ideas to encourage participation and inclusion
- Collaborative/Cooperative Learning – small group learning providing high levels of student engagement, interdependence and inclusion
- Conferencing – student to student conversation and student to teacher conversation
- Kinesthetic activities - to engage other types of body learning
- Pair Programming - used to both learn and create with partners encouraging communication and sharing
- Problem-Based approach – using a series of steps to solve a problem
- Project-Based approach - students work on comprehensive projects that involve design, planning and testing
- Scaffolding - to build upon concepts in a strategic manner
- Role playing - used to better understand concepts by placing the student in various viewpoints
- Independent Study – students explore and research a topic of interest
- Inquiry – active learning and discovery through posing questions and researching answers
- Report/Presentation – oral and written presentation of researched topic to class
- Teacher modelling/student practice - provide opportunities to students to develop individual confidence
- Whole Group Instruction - used for shared understanding often as an introduction or summary of concepts

ASSESSMENT AND EVALUATION

The primary purpose of assessment and evaluation is to improve student learning. **The Achievement Chart for Computer Studies** will guide all assessment and evaluation.

The **final grade** will be determined as follows:

- **70% based on Assessment of Learning** conducted throughout the course
- **30% based on a Final Summative Project and/or a Final Exam** administered towards the end of the course

| <u>Category</u> | <u>Percent</u> |
|------------------------------------|----------------|
| Knowledge and Understanding | 25% |
| Thinking and Inquiry | 25% |
| Communication | 25% |
| Application | 25% |
| ----- | |
| Total | 100% |

Assessment and evaluation is divided into two important parts: a) the grade the student receives on a midterm or final report indicates achievement/ proficiency in Curriculum Expectations, and b) a level of competency that will be assessed and reported in the following areas of Learning Skills and Work Habits: Independent Work, Collaboration, Responsibility, Initiative, Self-Regulation, and Organization. **See the Bur Oak Secondary School Assessment, Evaluation and Communication Policy on Google Classroom

Assessment for/as Learning

- Checklists – for formative teacher/peer/self-assessment
- Computer Programs – focusing on both process, communication, understanding and a final product
- Concept Maps - to make connections of various ideas and create a framework of understanding
- Conversations - discussion between students and/or teacher to share understanding and thought processes
- Demonstrations – show how students are learning and working
- Descriptive Feedback - anecdotal comments with suggestions for improvement
- Observations – seeing how students deal with problems and work in groups to solve problems
- Oral Question and Answer sessions - feedback for both students and teacher regarding understanding
- Performance Tasks - on-computer skill demonstrations
- Quizzes – feedback for both the student and the teacher about a few chosen expectations
- Reflection – tool to encourage students to be more involved in their own learning process
- Rubrics – provide clear expectations of performance at the start of an activity
- Self/Peer Assessment - students take ownership of their learning

Assessment of Learning

- Presentations - involving both oral and/or visual components
- Performance Tasks - on-computer skill demonstrations
- Research Projects - presented in various forms
- Software Projects – focussing on both process and the final product
- Triangulation - using conversations, observations and products together
- Unit Tests – paper and pencil tests used for assessing a variety of skills

Assessment & Evaluation of Student Learning Skills

- Teacher evaluations based on observations
- Student self-assessment
- Student-teacher conferences
- Self-reflection exercises

ACCOMMODATIONS

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

The following are general accommodation/adaptation strategies used in this course:

- References and inclusion of recommendations from student IEPs and other records
- Provide adaptive hardware devices and/or software tools (e.g. large screen monitors, personal laptops, specialized software for various needs including electronic texts for easier translation and adoption)
- Provide appropriate environmental accommodations for students with various challenges
- Conferencing with Special Education Staff and students to discuss accommodations to ensure that various aspects of the classroom environment meet the needs of the students to fully participate in the program
- Conferencing with MLL Staff and students to discuss accommodations including providing translations of course content, lists of terms, and other resources as needed
- Strategic grouping of students to encourage peer interaction, support and development
- Flexible scheduling to organize and complete assigned tasks
- Provide examples and templates to give students a more clear framework as needed
- Assist students in dividing larger tasks into smaller more manageable tasks (chunking)
- Provide oral explanations and individual/small group conferencing to ensure understanding of concepts
- Provide alternative selection of problems (for example, adjusting context to a more familiar topic)
- Use of visual aids/manipulatives to assist students as needed
- Provide various enrichment opportunities to enhance learning

CONSIDERATION FOR BOARD INITIATIVES

Throughout the course, consideration will be given to incorporating the following board-wide initiatives into the content, processes and environment:

- Dismantling Anti-Black Racism Strategy
- Indigenous Education and Equity
- Mathematics
- Mental Health
- Modern Learning

RESOURCE MATERIALS

Students will have access to the following resources:

- Computer lab
- Python Programming Language
- IDLE IDE
- Electronic text, presentations and notes
- Google Classroom and Apps
- Other hardware/software tools as needed

**See the YRDSB Information Technology Acceptable Use Agreement on Google Classroom