Ontario	**Ontario Ministry of Education** www.edu.gov.on.ca /eng/	Toronto District School Board	**Toronto District School Board** *www.tdsb.on.ca*		**R.H. KING ACADEMY** http://schools.tdsb.on.ca/ *rhking/*

COURSE OF STUDY OUTLINE			
Department	*Information Technology*	**Course Type**	*Open*
Teacher	*Pavel Muresan*	**Grade**	*10*
Course Title	*Computer Technology*	**Credit Value**	*One*
Course Code	*TEJ2O*	**Prerequisites**	*None*
Ministry Document	*The Ontario Curriculum. Grades 9 and 10. Technological Education (Revised), 2009 http://www.edu.gov.on.ca/eng/curriculum/secondary/teched910curr09.pdf*		
Learning Resources	*Course Electronic folder, Textbook, Student binder, Course Web site, Visual Studio. VB.Net Programming Environment*		

TEJ2O COURSE: COMPUTER TECHNOLOGY

COURSE OVERVIEW – COMPUTER TECHNOLOGY, GRADE 10, OPEN (TEJ2O)

MINISTRY OF EDUCATION CURRICULUM POLICY DOCUMENT: 1. The Ontario Curriculum. Grades 9 and 10. Technological Education (Revised), 2009, pp. 57- 63. ISBN 978-1-4249-8091-8 (PDF). © Queen's Printer for Ontario, 2009.

COURSE DEVELOPED: September 2016

RESOURCES:

1. **Curriculum Web site: http://www.edu.gov.on.ca/eng/curriculum/secondary/teched910curr09.pdf**
2. **Textbook:** Beth Brown, Bruce Presley. *An Introduction to Programming Using Microsoft Visual Basic.Net*, Lawrenceville Press, 2003. ISBN 1-58003-038-6.
3. **Computer Lab A22: Visual Studio. VB.Net Programming Environment**
4. **Student Binder** (15 dividers plus cover page) containing all handouts and assignments.
5. **Course Folder in the TDSB File Server.**

A. COURSE OUTLINE

This course examines computer hardware and the control of external components from an engineering perspective. The course introduces students to computer systems, networking, and interfacing, as well as electronics and robotics. Students will assemble, repair, and configure computers with various types of operating systems and application software. Students will build small electronic circuits and write computer programs to control simple peripheral devices or robots. Students will also develop an awareness of related environmental and societal issues, and will learn about secondary and postsecondary pathways and career opportunities in computer technology. This course is designated as open and can be taken by all students who wish to learn about Computer Technology. Students who wish to continue study in this area can take the Workplace or University/College courses in Grades 11 and 12 that lead to post-secondary courses or entry into the workplace. For this course also each student has to have a binder with dividers for each module. The binder has to contain all the lessons, notes, handouts, assignments, tests and quizzes, and it will be marked twice: midterm an at the end of the course. Some modules in this profile involve hands-on work with live electronic devices. Therefore, a focus on safe technical practices is required in this course. Safe operating procedures should be reviewed on a continuous basis.

Overall Expectations

By the end of this course, students will:

- identify and describe the functions of, as well as important advances related to, electronic and computer components;
- demonstrate a basic understanding of computer networks and their components;
- demonstrate a basic understanding of binary numbers and digital logic.
- install and configure the hardware and operating system of a workstation, and use file-management techniques effectively;
- construct and test simple interfaces and other electronic circuits;
- assemble and configure a simple computer network;
- install and use a variety of software;
- apply fundamental programming concepts to develop a variety of simple programs, including a program to control an external device.
- identify harmful effects of the widespread use of computers and associated technologies on the environment, as well as agencies that reduce these effects;
- identify effects of the widespread use of computers and associated technologies on society;
- follow appropriate health and safety procedures when assembling, using, and maintaining computer systems;
- demonstrate an understanding of ethical and security issues related to the use of computers;
- identify various careers related to computer technology, and describe the education and/or training required for them.

Topics to be covered

Ergonomics. Health and Safety. Ethics and Security
Data Representation and Digital Logic. Binary Numbers. Digital Logic circuits. Logic Gates and Truth Tables
PC Hardware and Interfaces
Operating Systems and Applications Software
Networking Concepts. Networking Set Up and Management
Computer Programming with VB.Net
Programming Concepts: Variable and Constants, Decision Structures, Repetition Structure
Electronics, Robotics and Computer Interfaces
Computer Technology, Environment and Society: Social Impact and Consequences
Computer Career Opportunities

Module Titles (Sequence and Time)

MODULE	UNITS/LESSONS DESCRIPTION	HOURS
ERGONOMICS. HEALTH AND SAFETY. ETHICS AND SECURITY	Students explore ergonomics, health and safety problems associated with computer use. Safe practices in the handling of computer hardware and electronic components. Use appropriate equipment, procedures, and techniques ***(e.g., use a wrist support, ensure power is off before opening the case of a computer, use proper lifting techniques when moving heavy equipment)*** to protect health and ensure safety when working with computers ***(e.g., to avoid musculoskeletal injuries, eye strain, repetitive strain injuries)***; identify issues related to Internet safety and personal identity security ***(e.g., protection of information stored on computers or transmitted over a network, identity theft, cyber stalking, cyber bullying, privacy policies);*** ethical use of computer ***(e.g., the social cost of hacking, lost and corrupt data, and plagiarism)***;	4 hours

COMPUTER TECHNOLOGY: SOCIAL AND ENVIRONMENTAL IMPACT AND CONSEQUENCES	Students will identify: 1. harmful effects of computer use on the environment ***(e.g., resources used and wastes created during production; disposal of old computers in landfill)***; 2. government agencies and community partners that provide resources and guidance for environmentally sound production, use, and recycling of computer equipment; 3. the social and ethical implications of computers; 4. the effects of the development of computer technology on society ***(e.g., cheaper and faster communication in a "global village"; almost instant access to information; changes in the nature of work; telecommuting; easily accessible means of recording and maintaining knowledge and traditions of minority cultures)***. 5. Students will describe how computers are used in various occupations ***(e.g., engineering calculations, architectural drawings, customer tracking and business data collection, navigation of airplanes and ships)***, and what work in these occupations would be like without computers.	6 hours
BINARY NUMBERS	The focus of this module is on how the internal workings of a computer represent data such as characters and numbers. Students learn standard codes for internal numbering and character representation ***(e.g., binary counting, binary codes, ASCII code, UNICODE)***. 1. How information is represented in computers; 2. Base Number Systems. Binary Number System. Binary place values; 3. Converting Binary to Base 10 and Base 16; 4.Converting Numbers from the Decimal System to Another Base Number System; 5. Adding Binary Numbers; 6. Adding Base Number Systems other than 10.	5 hours
LOGIC GATES AND TRUTH TABLES **DIGITAL LOGIC CIRCUITS**	In this module students learn to design and test fundamental logic gates (i.e., AND, OR, NOR, NAND, NOT, XOR, XNOR). They also learn about and construct simple electronic circuits, apply Boolean algebra, and devise truth tables to test and describe their functionality. Students develop an understanding of gates, semi-conductors (e.g., transistors, diodes, etc.), and integrated circuits by designing and building simple logic gates.1. Parallel and Series Circuits; 2. Truth Tables; 3. Fundamental Logic Gates: AND, NAND, OR, NOR, XOR, XNOR, and NOT; 4. Boolean Equations for Fundamental Logic Gates ***(e.g., for AND, the output is Y = A • B ; for OR, Y = A + B)***.; 5. Design Logic Gates and Integrated Circuits with E-Work Bench.	5 hours
PC HARDWARE AND INTERFACES. WORKSTATION SETUP	In this module, students will: 1. identify basic electronic components and describe their functions ***(e.g., resistors limit current; capacitors store charge, pass high frequencies, and block DC; diodes restrict current in one direction; LEDs indicate current flow; transistors act as amplifiers or switches)***; 2. use precise terminology to identify various types and features of computer hardware and interfaces ***(e.g., device name, capacity, speed, bandwidth, connector types)***; 3. identify the basic components and peripheral devices of a computer system ***(e.g., mainboard, CPU, power supply, hard drive, monitor, mouse, sound card, printer, scanner)***, and describe their functions; 4. describe important advances in electronic components ***(e.g., development of semiconductor technology)*** and computer components ***(e.g., clock rates, fabrication techniques, bus types)***. Emphasis is placed on safety as students handle a variety of tools, equipment, and internal and external components. 1. Computer Architecture. 2. PC Components. 3. Input Devices. 4. Output Devices. 5. Communication Devices. 6. Motherboard, Slots and PC Cards. 7. CPU. 8.Primary Storage. RAM and ROM. 9. Secondary Storage Devices. How Disk Storage Works. How a USB Drive and Hard Disk Drive Work. 10. Storage Devices and RAID. 11. Ports and Connectors. How Computer Ports Work. 12. POST (Power-On-Self-Test). 13. BIOS and CMOS. 14. Multimedia. How CD-ROM Works. 15. Bus Architecture. How a Bus Works. Also students will learn how to: connect	20 hours

	and configure the hardware for a personal computer system, and install an operating system; describe the hardware requirements of operating systems ***(e.g., processor speed and bus width, available storage space, memory size and speed)***; use file-management techniques to organize and back up files efficiently ***(e.g., move and rename files, store files on a network drive, use file-management and backup software)***.	
PC SOFTWARE. OPERATING SYSTEMS AND APPLICATIONS SOFTWARE	Students will: 1. describe the differences between operating systems and applications software; 2. install and configure software on a workstation ***(e.g., word-processing suite, driver for new hardware)***; 3. use software support systems to find technical information independently ***(e.g., help menu, online help, manuals)***; 4. use utility software to perform basic maintenance functions ***(e.g., defragment a disk drive, undelete a file, determine available space on a storage device, restore a file from a backup)***. Operating system components, interface and structure; how an Operating System controls hardware.	3 hours
NETWORKING CONCEPTS. NETWORK SETUP AND MANAGEMENT	Students will: 1. describe the basic components of a network ***(e.g., workstations, server, network interface cards, routers, switches, hubs)***; 2. compare various types of networks ***(e.g., local area network [LAN] versus wide area network [WAN], peer-to-peer versus client-server)***; 3. compare the various types of data transmission media for networks ***(e.g., fibre-optic cable, copper cable, wireless)***; 4. describe how individual workstations are identified on a network ***(e.g., logical and physical addressing, verification utilities)***. 5.install and configure a peer-to-peer (P2P) network, using appropriate software and connection devices; 6.enable network services ***(e.g., file sharing, print services)***. 7. Network Topologies: Mesh, Bus Star, Ring. 8. OSI Reference Model. 9. Networking Protocols. 10. IP Addresses and their Format. 9. TCP/IP Protocol.	6 hours
COMPUTER CAREERS (ISU)	Students research and identify computer technology related careers. Students identify employability skills and explore careers in the computer industry. 1. Computer and IT related jobs. 2. Job Description. Nature of the work. 3. Skills set. 4. Training path. Qualification requirements. 5. Main Industries of Employment. 6. Related occupations. 7. Transferable Skills. 8. Trends and Outlooks. 9. Annual Average Income. 10. Resources.	8 hours of work 10 hours for presentations
COMPUTER PROGRAMMING. PROGRAMMING CONCEPTS: VISUAL BASIC IDE	This module introduces Visual Basic Programming language and **Integrated Development Environment** (IDE) 1. Visual Basic Programming Language. 2. A Visual Basic Application. 3. The Visual Basic IDE. 4. Adding Objects to a Form. 5. Object Property Values. 6. Resizing and Moving an Object. 7. Saving a Project. 8. Running a Visual Basic Application. 9. Objects and their Event Procedures. 10. Using Assignment to Change Property Values. 11. The Form_Load Event Procedure. 12. Commenting Code. 13. Operators and Expressions. 14. Creating an Executable File.	6 hours
PROGRAMMING CONCEPTS: VARIABLES AND CONSTANTS	This module focuses on basic programming concepts: programming structures, variable declarations, assignment statements, input/output. 1. **Using Variable.** 2. Variable Assignment. 3. Using Name Constants. 4. Choosing Identifiers. 5. Built-In Data Types. 6. Variable Declarations. 7. Syntax Errors. 8. Debugging Techniques. 9. Obtaining a Value from the User. 10. Automatic Type Conversion. 11. Special Division Operators. 12. Option Buttons. 13. Visual Basic Programming Guidelines.	7 hours
PROGRAMMING CONCEPTS: DECISION STRUCTURES	This module introduces **If statements** as decision/selection structure. Each structure builds upon and is incorporated into subsequent structures. 1. The If... Then Statement. 2. Roundoff Error. 3. The If...Then...Else Statement. 4. Nested If...Then...Else Statements. 5. Generating Random Numbers. 6. Scope. 7. Logical Operators. 8. Algorithms. 9. Message Boxes. 10. Creating a Password Application. 11. Using Counters. 12. Check boxes. 13. Printing a form.	7 hours

PROGRAMMING CONCEPTS: LOOPS AND FUNCTIONS	This module focuses on repetition or iteration programming structure. **Do...Loop Statement.** The programming software that will be introduced in this module allows students to write simple programs which integrates with hardware to control external devices and peripherals. 2. Infinite Loops. 3. Input boxes. 4. Using Accumulators. 5. Character data Storage. 6. Comparing Strings.	7 hours
ELECTRONICS, ROBOTICS AND COMPUTER INTERFACES	Students will use appropriate test equipment to measure electrical quantities ***(e.g., voltage, resistance)***. They will design and test electronic circuits ***(e.g., LED circuit, flasher, timer)***, using both breadboard and soldering techniques to connect discrete components and/or integrated circuits. Describe and build an interface to connect a computer to a simple peripheral or robotic device ***(e.g., LED traffic light, DC motor, robotic arm)***. Trace the operation of a system consisting of a computer, a program, an interface, and external hardware to ensure that the interface circuit functions properly.	6 hours
EXAM REVIEW	Ten to 15 minutes per module.	4 hours plus Home work
FINAL EVALUATION/EXAM	Theoretical (online version available) and practical.	2 hours

Teaching/Learning Strategies

All units are activity-based. Socratic lessons, teacher demonstrations, and research activities provide students with the necessary terminology and methodology necessary to complete the various activities. Classroom discussions, brainstorming, and collaborative and/or co-operative learning is used to assist students in meeting course expectations. Problem-solving exercises are used. Students also research, write reports, and take notes in meeting expectations. Upon completion of this course, students demonstrate the ability to apply skills and knowledge to practical work tasks that involve planning and implementation processes, completion of work assignments, and various problem-solving activities.

B. OVERVIEW OF EVALUATION AND WEIGHTING

Students are provided with opportunities to demonstrate the highest level of their achievement of the expectations in the four achievement categories. Students will be evaluated based on the following four categories of knowledge and skills in technological education (70% of the final mark) and a final exam (30% of final mark). **Students will be graded based on the following categories:**

Knowledge/Understanding	**20%**
Thinking and Inquiry	**20%**
Application	**20%**
Communication	**10%**
Final Exam (20%) Major Project. Culminating activity (10%)	**10% + 20% = 30%**

COURSE EVALUATION PLAN

70% Course Work

(K/U = Knowledge/Understanding; TI = Thinking and Inquiry; A = Application; C= Communication)

CHAPTER/UNIT	EVALUATION TASK	ACHIEVEMENT CHART FOCUS	WEEK ENDING	DUE DATE

ERGONOMICS. HEALTH AND SAFETY. ETHICS AND SECURITY	Assignment: Design your Ergonomic Office. Quiz	K/U, TI, C, A	**WEEK 2**	
COMPUTER TECHNOLOGY: SOCIAL AND ENVIRONMENTAL IMPACT AND CONSEQUENCES	Assignment: Essay/Report. Social Impact of IT.	K/U, TI, C	**WEEK 3**	
BINARY NUMBERS	Test: Binary Numbers	K/U, TI, A	**WEEK 4**	
DIGITAL LOGIC CIRCUITS. LOGIC GATES AND TRUTH TABLES	Test: Logic Gates and Truth Tables	K/U, TI, A	**WEEK 5**	
PC HARDWARE AND SOFTWARE. WORKSTATION SETUP	Assignment: Design your Computer Dream. Major Assignment: Computer Components. Test PC Hardware and Software. Practical Assignment: Build your own computer.	K/U, TI, A, C	**WEEK 6, 7 and 8**	
PC SOFTWARE. OPERATING SYSTEMS AND APPLICATIONS SOFTWARE	Practical assignment.	K/U, A	**WEEK 9**	
NETWORKING CONCEPTS. NETWORK SETUP AND MANAGEMENT	Class Assignment: Network Topologies. Test: Networking	K/U, TI, A	**WEEK 9**	
COMPUTER CAREERS (ISU)	Major Assignment: Computer Careers.	K/U, C	**WEEK 10**	
FOUNDATION OF PROGRAMMING. PROGRAMMING CONCEPTS: VISUAL BASIC IDE	Chapter 3 Test. Chapter 3 Exercises and Reviews	K/U, TI, A	**WEEK 11**	
PROGRAMMING CONCEPTS: VARIABLES AND CONSTANTS	Chapter 4 Test. Chapter 4 Exercises and Reviews	K/U, TI, A	**WEEK 12**	
PROGRAMMING CONCEPTS: DECISION STRUCTURES	Chapter 5 Test. Chapter 5 Exercises and Reviews	K/U, TI, A	**WEEK 13**	
PROGRAMMING CONCEPTS: LOOPS AND FUNCTIONS	Chapter 6 Test. Chapter 6 Exercises and Reviews	K/U, TI, A	**WEEK 14 and 15**	
ELECTRONICS, ROBOTICS AND COMPUTER INTERFACES	Assignment: build and test a circuit	TI, A	**WEEK 16**	
BINDER EVALUATION	Learning Skills	K/U, TI, C, A	**WEEK 17**	
EXAM REVIEW		K/U, TI, C, A	**WEEK 18**	

EXAM	Final Exam	K/U, TI, A, C	**WEEK 19**	

30% Final Evaluations

Task	Achievement Chart Focus	Weighting
Examination	All categories: **K/U, TI, C, A**	30%

Learning Skills

Student Learning Skills will also be monitored and evaluated throughout the year. The report card provides a record of the learning skills demonstrated by the student in the following five categories: **Responsibility, Organization, Work Independent, Collaboration, Initiative and Self-regulation**. These learning skills are evaluated using the following four point scale: (E) Excellent, (G) Good, (S) Satisfactory, (N) Needs Improvement.

Learning Skills and Work Habits	Sample Behaviours
Responsibility	The student: • fulfils responsibilities and commitments within the learning environment; • completes and submits class work, homework, and assignments according to agreed-upon timelines; • takes responsibility for and manages own behaviour.
Organization	The student: • devises and follows a plan and process for completing work and tasks; • establishes priorities and manages time to complete tasks and achieve goals; • identifies, gathers, evaluates, and uses information, technology, and resources to complete tasks.
Independent Work	The student: • independently monitors, assesses, and revises plans to complete tasks and meet goals; • uses class time appropriately to complete tasks; • follows instructions with minimal supervision.
Collaboration	The student: • accepts various roles and an equitable share of work in a group; • responds positively to the ideas, opinions, values, and traditions of others; • builds healthy peer-to-peer relationships through personal and media-assisted interactions; • works with others to resolve conflicts and build consensus to achieve group goals; • shares information, resources, and expertise and promotes critical thinking to solve problems and make decisions.
Initiative	The student: • looks for and acts on new ideas and opportunities for learning; • demonstrates the capacity for innovation and a willingness to take risks; • demonstrates curiosity and interest in learning; • approaches new tasks with a positive attitude; • recognizes and advocates appropriately for the rights of self and others.
Self-regulation	The student: • sets own individual goals and monitors progress towards achieving them; • seeks clarification or assistance when needed; • assesses and reflects critically on own strengths, needs, and interests; • identifies learning opportunities, choices, and strategies to meet personal needs and achieve goals; • perseveres and makes an effort when responding to challenges.

Diagnostic evaluation - at the beginning of a term, a unit of study, or whenever information about prior learning is useful: unit pre-tests, skill inventory.

Formative evaluation - during learning, ongoing feedback to students of their strengths, weaknesses, and achievement of the expectations: course binder, course folder structure and updates, e-portfolio, self-assessment rubrics, checklists for programming problems, student/teacher conferencing, observation, peer assessment rubrics, check lists, anecdotal comments with suggestions for improvement, quizzes, self-assessment, journals, learning logs, reflection – important tools to encourage students to be more involved in their own learning process.

Summative evaluation - at the end of a learning process: classroom presentations, paper and pencil quizzes, tests, unit tests, final exam, assignments and projects evaluated using rubrics, culminating challenges, on line tests, quizzes and exam, rubrics, skills demonstration – hardware and networking skill demonstration, computer programs – focusing on both process and the final product, research projects. Student achievement is based on how well Ministry Expectations are met.

Tests/Quizzes

Tests will fall under the knowledge/understanding and thinking/inquiry achievement categories. Tests may be either theoretical or practical (performed on the computer) or a combination of both. Students will be informed well in advance of any test. Tests/Quizzes will be given on a regular basis. Students will be notified about quizzes at least one day in advance. At the end of each unit a test will be given. Students will be notified about unit tests a week in advance. Performance on tests and quizzes will be used to assess the achievement of knowledge and skills. If a test is missed due to illness a doctor's note must be presented. **Students who are going to miss a test because of a school trip or team activity must notify their teacher two days prior to the test date, so that an earlier test date may be assigned for those students.** These are the only valid reasons for a rewrite. **Failure to write a test will result in a NOT COMPLETE**. A student may only make up **one** test during the semester. Any other missed test will result in a **NOT COMPLETE.**

Missed Tests/Quizzes

If a student knows they will be absent on the day of a test, they must notify the teacher in advance. Arrangements will be made for the student to write the test at an alternate time if an acceptable reason is given.

Illness	A doctor's note must be produced
Excursion	Excursion form signed by student's teachers
Other	Appropriate documents

Assignments

Assignments will be given for each unit. Performance on assignments will be used to assess the achievement of knowledge and skills.

Late Assignments

Assignments are due at the beginning of the class on the due date, all assignments handed in past the ultimate due date (the last date the assignment will be accepted) will no longer be accepted. The students must give an acceptable reason to the teacher for handing in an assignment late prior to the due date. If an assignment is handed in later than course expectations deadline, the assignment will be marked as **Not Complete**.

If the teacher hands back an assignment to students, after being marked, late assignments will no longer be accepted after unit expectations deadline expired. In this case, the assignment will be marked as **Not Complete**.

Independent Study

There will be at least one independent study assigned. The independent study will be based on any of the units outlined for this course. Students are responsible for any material covered by independent study. Thus, tests may cover some of the material from the independent study.

All independent studies must be handed in on time otherwise a NOT COMPLETE will be given.

Remember: You always have CLINIC TIME to work on any computer assignments if you fall behind.

Midterm Mark
There will be no midterm examination. The midterm mark is based on the student's cumulative mark at the midterm mark date.

Binder Mark
Each student has to keep all lessons, notes, handouts, assignments, etc. well organized in a separate binder with dividers for units and modules. the binder will be marked at least twice: mid term mark and final mark. The mark will be based on how well organized is the binder, completeness of content and assignments.

Participation mark
At the end of semester each student will get a participation mark based on the number of absences and lates, class participation, course and class discipline, general attitude towards the course values, equipment and teaching and learning process.

The Final Summative Evaluation/Exam
The content of the final summative evaluation/exam will be based on the material covered throughout the full semester. For further information on final summative evaluation/exam protocol refer to the student agenda book.

Student Evaluation Sheet

Name:_____ **Student Number:**_____

N/M	Level 1			Level 2			Level 3			Level 4		
0-49	50-52	53-56	57-59	60-62	63-66	67-69	70-72	73-76	77-79	80-88	88-94	94-100
0	1-	1	1+	2-	2	2+	3-	3	3+	4-	4	4+

Assignment/Test/Quiz Description	Overall Mark %	Knowledge/ Understanding	Thinking/ Inquiry	Application	Communication	A) Not submitted B) Missed test/quiz C) Late assignment
1.						
2.						
3.						
4.						
5.						

C. WEEKLY AGENDA

TEJ2O COURSE: COMPUTER ENGINEERING TECHNOLOGY , GRADE 10, OPEN

WEEK	MODUL	UNITS/LESSONS	EXPECTATIONS: PERFORMANCE INDICATORS
WEEK 1	WEB DESIGN AND E-PORTFOLIO	1. Web Site Architecture and Design; 2. E-portfolio hierarchical/circular model.	*By the end of this module, students will be able to:* design a fully functional Web Site using different Web tools; apply hierarchical and circular model in web design and navigation.
WEEK 2	ERGONOMICS	1. Health and safety problems associated with computer use 2. Safe practices in the handling of	*By the end of this module, students will be able to:* use appropriate strategies to avoid potential health and safety problems associated with computer use, such as posture problems, eye strain, and musculoskeletal injuries; use safe practices in the handling of computer hardware and electronic components;

		computer hardware and electronic components	
WEEK 3	**COMPUTER TECHNOLOGY: SOCIAL IMPACT AND CONSEQUENCES**	1. The History of Computer Electronics and its Social Impact 2. The Social and Ethical Implications of Computers 3. Protecting Computer Software and Data. 4. The Ethical Responsibilities of the Programmer.	*By the end of this module, students will be able to:* describe the evolution of computer electronics; identify the social impact of computers and associated technologies; identify important scientific advances in computer electronic components; describe the development of computer engineering technology and its impact; describe how computer engineering has evolved and how it has affected people's security, safety, and privacy; demonstrate understanding of the importance of ethical computer use; demonstrate compliance with acceptable-use policies;
WEEK 4	**BINARY NUMBERS**	1. How information is represented in computers; 2. Base Number Systems. Binary Number System. Binary place values; 3. Converting Binary to Base 10 and Base 16; 4.Converting Numbers from the Decimal System to Another Base Number System; 5. Adding Binary Numbers; 6. Adding Base Number Systems other than 10.	*By the end of this module, students will be able to:* explain internal numbering and character representation systems; explain *place value* and *base number system* concepts; describe the relationship between the binary number system and computer logic; define a standard way of representing characters in binary code; convert positive integer numbers to binary form; convert binary numbers to base 10 numbers; convert binary numbers to hexa-decimal numbers and hexadecimal numbers to binary numbers;; convert numbers from decimal system to another base number system; add binary numbers.
WEEK 5	**LOGIC GATES AND TRUTH TABLES** **DIGITAL LOGIC CIRCUITS**	1. Parallel and Series Circuits; 2. Truth Tables; 3. Fundamental Logic Gates: AND, NAND, OR, NOR, XOR, XNOR, and NOT; 4. Boolean Equations for Fundamental Logic Gates; 5. Design Logic Gates and Integrated Circuits with E-WorkBench.	*By the end of this module, students will be able to:* use logic gates to construct simple circuits; describe and illustrate the functions of logic gates; derive the truth tables of the fundamental logic gates; write Boolean equations for the fundamental logic gates; describe the function of the fundamental logic gates, including the function of each pin: AND, NAND, OR, NOR, XOR, XNOR, and NOT.
WEEK 6 **WEEK 7**	**PC HARDWARE AND INTERFACES**	1. Computer Architecture. 2. PC Components. 3. Input Devices. 4. Output Devices. 5. Communication Devices. 6. Motherboard, Slots and PC Cards. 7. CPU. 8.Primary Storage. RAM and ROM. 9. Secondary Storage Devices. How Disk Storage Works. How Floppy Drive and Hard Drive Work. 10. Storage Devices and RAID. 11. Ports and Connectors. How Computer Ports Work. 12. POST (Power-On-Self-Test). 13. BIOS and CMOS. 14. Multimedia. How CD-ROM Works. 15. Bus Architecture. How a Bus Works.	*By the end of this module, students will be able to:* explain the historical development of a computer system as well as the relationship between computer internal hardware and software and external devices; describe a problem-solving model such as the input, processing, output model; identify the basic internal and external components of a computer; describe the primary function of each basic component; identify computer internals and peripheral devices and describe their relationship; connect and use correctly a variety of computer components and peripherals; use precise terminology in relation to all hardware, interfaces, and networking systems; set up a desktop computer system and install software; use safe practices in the handling of computer hardware and electronic components; demonstrate compliance with acceptable-use policies.
WEEK 8	**OPERATING SYSTEMS**	1. History of Operating Systems. 2. Operating System Components. 3. Operating System Interface. 4. Operating System Structure. 5. How an Operating System Controls Hardware.	*By the end of this module, students will be able to:* describe how the internal components of the computer enable the peripherals to function; demonstrate the use of an operating system, including a network; describe the primary function of each basic component; use Internetworking services correctly to access and navigate global information resources; use appropriate file management techniques.
WEEK 9	**NETWORKING SYSTEMS**	1. Network Components. 2. Network Topologies: Mesh, Bus Star, Ring. 3. Network Devices: Networking Card, Modem, Hub, Switch, Bridge, Router, Gateway. 4. OSI Reference Model. 5. LAN, MAN, WAN. 6. Networking	*By the end of this module, students will be able to:* describe network types, topology, architecture, and cabling standards; use precise terminology in relation to all hardware, interfaces, and networking systems; perform or observe a basic connectivity task involving two computers, a parallel or serial cable, and external devices (e.g., peripherals);

		Protocols. 7. Peer -to- Peer Networking and Client- Server Networking. 8. IP Addresses and their Format. 9. TCP/IP Protocol. I	
WEEK 10	**COMPUTER CAREERS (ISU)**	1. Computer and IT related jobs. 2. Job Description. Nature of the work. 3. Skills set. 4. Training path. Qualification requirements. 5. Main Industries of Employment. 6. Related occupations . 7. Transferable Skills . 8. Trends and Outlooks. 9. Annual Average Income. 10. Resources.	*By the end of this module, students will be able to:* identify and describe careers related to computer engineering; analyse the influences of computers on the engineering profession; identify computer skills that are important to employers.
WEEK 11	**PROBLEM SOLVING AND FLOW CHARTS**	1. Software Development Life Cycle (SDLC). 2. Problem Solving Models. 3. Flow Charts. 4. Algorithms. 5. Pseudo-code.	*By the end of this module, students will be able to:*describe a problem-solving model such as the input, processing, output model; explain software process design (SDLC, PDLC, IPO charts, HIPO charts); explain internal numbering and character representation systems; draw flow charts for solving abstract and real life problems using control structures (sequential, decision, iteration); write algorithms and pseudo-code.
WEEK 12	**PROGRAMMING CONCEPTS: VISUAL BASIC IDE**	1. Visual Basic Programming Language. 2. A Visual Basic Application. 3. The Visual Basic IDE. 4. Adding Objects to a Form. 5. Object Property Values. 6. Resizing and Moving an Object. 7. Saving a Project. 8. Running a Visual Basic Application. 9. Objects and their Event Procedures. 10. Using Assignment to Change Property Values. 11. The Form_Load Event Procedure. 12. Commenting Code. 13. Operators and Expressions. 14. Creating an Executable File.	*By the end of this module, students will be able to:* describe the fundamental programming constructs; apply fundamental programming constructs to develop programs that interact with external components; describe the relationship between the binary number system and computer logic; define a standard way of representing characters in a binary code; use Visual Basic IDE; understand objects and add objects to a form; create a VB application; understand event procedures; change property values at design time and run time; add comments to a program; understand operators and expressions; create an executable file; understand good programming style guidelines.
WEEK 13	**PROGRAMMING CONCEPTS: VARIABLES AND CONSTANTS**	1. Using Variable. 2. Variable Assignment. 3. Using Name Constants. 4. Choosing Identifiers. 5. Built-In Data Types. 6. Variable Declarations. 7. Syntax Errors. 8. Debugging Techniques. 9. Obtaining a Value from the User. 10. Automatic Type Conversion. 11. Special Division Operators. 12. Option Buttons. 13. Visual Basic Programming Guidelines. 14. Case Study.	*By the end of this module, students will be able to:*define constants, variables, expressions, and assignments statements, including the order in which the operations are performed; describe how computers store and work with different types of data, including numbers and characters; use input and output statements in a program; declare variables in program code; understand variable assignment statements; use named constants; use different data types; declare multiple variable in program code; understand syntax errors including run-time errors; use text box objects in application; use change event procedures; understand automatic type conversion; use special division operators.
WEEK 14	**PROGRAMMING CONCEPTS: DECISION STRUCTURES**	1. The If... Then Statement. 2. Roundoff Error. 3. The If...Then...Else Statement. 4. Nested If...Then...Else Statements. 5. Generating Random Numbers. 6. Scope. 7. Logical Operators. 8. Algorithms. 9. Message Boxes. 10. Creating a Password Application. 11. Using Counters. 12. Check boxes. 13. Printing a form. 14. Visual Basic Programming Guidelines.	*By the end of this module, students will be able to:* use a decision structure in a program; use If...Then, If ...Then... Else and If...Then...ElseIf statements; understand Nested If...Then...Else statements; generating random numbers; return integer portion of a number without rounding; understand the scope of a variable or constant; make global declarations; use And, Or, Not in Boolean expressions; understand algorithms and pseudocode; understand logic errors; use message boxes in applications; use counters in applications; use check box objects in applications; understand good programming style guidelines.
WEEK 15	**PROGRAMMING CONCEPTS: LOOPS AND FUNCTIONS**	1. Do...Loop Statement. 2. Infinite Loops. 3. Input boxes. 4. Using Accumulators. 5. String Conversion Functions. 6. Manipulating Strings. 7. The Len function. 8. the InStr function.	*By the end of this module, students will be able to:* use a repetition structure in a program; design, write, and test a computer program to control a simple peripherals; understand Do...Loop statement and infinite loops; use input boxes in applications; understand accumulators and sentinels; understand string functions; understand For... Next statements

		9. The for...Next Statement. 10. Generating Strings. 11. Character data Storage. 12. Comparing Strings. CASE STUDY.	and how to use Step; understand how the characters are stored in memory; understand the ASCII code and use the Asc and Chr functions in programs.
WEEK 16	**WORKING ON MAJOR PROJECT**	To apply programming and interfaces skills and knowledge.	*By the end of this module, students will be able to apply all basic programming and interfaces concepts and skills learned.*
WEEK 17	**MAJOR PROJECT PRESENTATIONS**	To prove communication skills and computer engineering competency and skills.	*By the end of this module, students will be able to present successfully the major project in front of the class proving communication skills and computer engineering competencies.*
WEEK 18	**EXAM REVIEW**		*By the end of this module, students will be able to to write successfully TEE2O Exam applying all concepts, skills and values learned in this course*
WEEK 19	**EXAM**	Available on line also.	Global and synthetic indicator - 30% of final mark.

Achievement Charts – ICS2O

Student Name _____ **Assignment** _____

Categories ☐ **Knowledge/Understanding** ☐ **Thinking/Inquiry** ☐ **Communication** ☐ **Application**

Category	**N/M**	**Level 1**			**Level 2**			**Level 3**			**Level 4**		
Knowledge/ Understanding	**0-49**	**50-52**	**53-56**	**57-59**	**60-62**	**63-66**	**67-69**	**70-72**	**73-76**	**77-79**	**80-88**	**88-94**	**94-100**
	0	**1-**	**1**	**1+**	**2-**	**2**	**2+**	**3-**	**3**	**3+**	**4-**	**4**	**4+**
• knowledge of facts, technical terminology, procedures, and standards		• demonstrates limited knowledge of facts, technical terminology, procedures, and standards			• demonstrates some knowledge of facts, technical terminology, procedures, and standards			• demonstrates considerable knowledge of facts, technical terminology, procedures, and standards			• demonstrates considerable knowledge of facts, technical terminology, procedures, and standards		
• understanding of concepts (e.g., uses of computer operating systems)		• demonstrates limited understanding of concepts			• demonstrates some understanding of concepts			• demonstrates considerable understanding of concepts			• demonstrates thorough and insightful understanding of concepts		
• understanding of relationships between concepts (e.g., energy conservation and		• demonstrates limited understanding of relationships between concepts			• demonstrates some understanding of relationships between concepts			• demonstrates considerable understanding of relationships between concepts			• demonstrates thorough and insightful understanding of relationships between concepts		

Category	**N/M**	**Level 1**			**Level 2**			**Level 3**			**Level 4**		
Communication	**0-49**	**50-52**	**53-56**	**57-59**	**60-62**	**63-66**	**67-69**	**70-72**	**73-76**	**77-79**	**80-88**	**88-94**	**94-100**
	0	**1-**	**1**	**1+**	**2-**	**2**	**2+**	**3-**	**3**	**3+**	**4-**	**4**	**4+**
• communication of information (e.g., computer & technical specifications)		• communicates information with limited clarity			• communicates information with moderate clarity			• communicates information with considerable clarity			• communicates information with a high degree of clarity, and with confidence		
• use of language, symbols, and visuals (e.g., computer programming and technical drawing)		• uses language, symbols, and visuals with limited accuracy and effectiveness			• uses language, symbols, and visuals with some accuracy and effectiveness			• uses language, symbols, and visuals with considerable accuracy and effectiveness			• uses language, symbols, and visuals with a high degree of accuracy and effectiveness		
• communication for different audiences and purposes (e.g., tourism, marketing)		• communicates with a limited sense of audience and purpose			• communicates with some sense of audience and purpose			• communicates with a clear sense of audience and purpose			• communicates with a strong sense of audience and purpose		

• use of various forms of communication (e.g., presentation software)		• demonstrates limited command of the various forms	• demonstrates moderate command of the various forms	• demonstrates considerable command of the various forms	• demonstrates extensive command of the various forms

Category	N/M	Level 1			Level 2			Level 3			Level 4		
Application	**0-49**	**50-52**	**53-56**	**57-59**	**60-62**	**63-66**	**67-69**	**70-72**	**73-76**	**77-79**	**80-88**	**88-94**	**94-100**
	0	**1-**	**1**	**1+**	**2-**	**2**	**2+**	**3-**	**3**	**3+**	**4-**	**4**	**4+**
• application of ideas and skills in familiar contexts (e.g., demonstrating good customer service practices)		• applies ideas and skills in familiar contexts with limited effectiveness			• applies ideas and skills in familiar contexts with moderate effectiveness			• applies ideas and skills in familiar contexts with considerable effectiveness			• uses thinking skills with a high degree of effectiveness		
• transfer of concepts, skills, and procedures to new contexts (e.g., applying scientific principles to health care and personal services)		• transfers concepts, skills, and procedures to new contexts with limited effectiveness			• transfers concepts, skills, and procedures to new contexts with moderate effectiveness			• transfers concepts, skills, and procedures to new contexts with considerable effectiveness			• transfers concepts, skills, and procedures to new contexts with a high degree of effectiveness		
• application of procedures, equipment and technology (e.g., use of design instruments, machine and hand tools)		• uses procedures, equipment, and technology safely and correctly only with supervision			• uses procedures, equipment, and technology safely and correctly with some supervision			• uses procedures, equipment, and technology safely and correctly			• demonstrates and promotes the safe and correct use of procedures, equipment, and technology		
• making connections (e.g., between personal experiences and the subject, between subjects, between subjects and the world outside the school)		• makes connections with limited effectiveness			• makes connections with moderate effectiveness			• makes connections with considerable effectiveness			• makes connections with a high degree of effectiveness		

Category	N/M	Level 1			Level 2			Level 3			Level 4		
Thinking/ Inquiry	**0-49**	**50-52**	**53-56**	**57-59**	**60-62**	**63-66**	**67-69**	**70-72**	**73-76**	**77-79**	**80-88**	**88-94**	**94-100**
	0	**1-**	**1**	**1+**	**2-**	**2**	**2+**	**3-**	**3**	**3+**	**4-**	**4**	**4+**
• thinking skills (e.g., evaluating professional practices and principles)		• uses thinking skills with limited effectiveness			• uses thinking skills with moderate effectiveness			• uses thinking skills with considerable effectiveness			• uses thinking skills with a high degree of effectiveness		
• inquiry/design skills (e.g., identifying the problem; formulating questions; planning; selecting strategies and resources; analysing and interpreting information; forming conclusions)		• applies few of the skills involved in an inquiry/design process			• applies some of the skills involved in an inquiry/design process			• applies most of the skills involved in an inquiry/design process			• applies all or almost all of the skills involved in an inquiry/design process		

D. ACCOMMODATIONS

The following teaching and learning strategies are used in the module and units: hardware devices (e.g., large screen monitors, larger fonts, special keyboards); appropriate environmental accommodations for students with physical disabilities; conferencing with Special Education staff and students to discuss modification and accommodation and to ensure physical aspects of the environment meet the needs of students and the program; word lists, glossaries, definition of terms, and visuals if available; grouping weaker students with stronger students to assist in instructional remediation and to provide further challenge; allowing more time to organize and complete assignments; providing a choice of assignment formats where possible; selecting problems that involve programming topics familiar to students to ensure better understanding of requirements; providing additional materials to reinforce or extend learning; providing opportunities for students requiring enhancement of program; using visual and audio-visual and web aids: digital projector, course web site; adjusting expectations for written work and number of assignments required.

Assessment Accommodations: providing additional review for students having difficulty integrating all the structures; allowing for non-timed evaluations; ensuring students understand; assessment/evaluation tools; providing the option for oral testing and demonstrations of skills.

Instructional Accommodations: peer tutoring, flexible timelines, small group learning, encouraging student-to-student discussion and teacher-to-student discussion to encourage confidence and motivation; written materials for students having difficulty processing auditory information, handouts to reinforce demonstrations, supplementary print and/or audiovisual aids to support activities.

E. R. H. KING ACADEMY STUDENT EXPECTATIONS

1. Students must adhere to the computer use policy as outlined in the Code of Conduct
2. Students must bring all class materials including any disks they need to every class.
3. When students work in pairs they must still maintain their own copy and back up of all assignments. Submitted assignments will have both student names. One may only work with a partner if approved by the course teacher. Under no other circumstances will assignments be identical.
4. Every student is responsible for missed work due to absence. It is suggested the student have the phone numbers of, at least, two fellow classmates.
5. Attendance is obligatory in order to fulfill course requirements.

F. RESOURCES

Smyth, Graham.Computer *Engineering: An Activity-Base Approach*. Holt software Associatres Inc. Toronto, 2000. ISBN 0-921598-36-X

Norton, Peter. *Essential Concepts*. McGraw-Hill Ryerson Limited, 1999. ISBN 0-02-804394-4

Rood, H.J. *Logic and Structured Design for Computer Programmers*, Second Edition. Boston: PWS-KENT Publishing Company, 1992. (Chpt. 1.2, 2) ISBN 0-534-92966-4

Tapscott, Don. *Growing up Digital*. McGraw Hill Ryerson Limited, 1998. ISBN 0-07-063361-4

White, Ron. *How Computers Work*. Quebec, Canada: 1997. ISBN 01-56-276546-9

http://openbookproject.net/electricCircuits/