TEJ 3M

Computer Engineering Technology, Grade 11

Teacher	Mr. Roller gordon.roller@ocdsb.ca Room 266, Computer/Engineering Lab
Required Materials	Binder, lined paper, pen / pencil
Course Enhancement Fee	**Total $35.69** (This covers the purchase of an electronics kit that will be used extensively throughout the course and into grade 12. If the kit was already purchased in grade 10 TEJ2O, there is no need to purchase another one)

Course Profile

This course examines computer systems and control of external devices. Students will learn to design computer hardware using Boolean logic and simplification techniques. Students will develop knowledge and skills in electronics, robotics, programming, and networks, and will build systems that use computer programs and interfaces to control and/or respond to external devices. Students will learn to use electronic instrumentation. Students will develop an awareness of related environmental and societal issues, and will learn about college and university programs leading to careers in computer technology.

Prerequisite: None.

Course Outline

Number Systems - a look at the binary, decimal and hexadecimal number systems. Number conversion. One's and two's complement representation for binary subtraction.

Boolean Logic - Boolean logic gates, Boolean identities, consensus theorem, DeMorgan's theorem, sum of products, binary addition and subtraction, design of a full adder, Karnaugh maps

Electronics -Ohm's law, integrated logic gates, led displays, the 555 timer, schematic capture, instrumentation including the multimeter and the oscilloscope

Coding/Hardware Interfacing - using the Arduino programming language (based on the C language) and it's associated libraries to interact with buttons, motors, LEDs, LED displays, LCDs, and buzzers. Arduino language data types, conditional structures, control structures, arrays, functions and pointers. A close look at common communications interfaces including UART, SPI and IIC. Creating more I/O using shift registers. Advanced techniques for scheduling events, use of hardware interrupts, and efficient use of program memory.

Networks - creating an arduino based web server, ethernet shield, local peer-peer networks

Course Evaluation

Course evaluation is divided into 70% term work and 30% final summative task. Details of how the 70% term mark is derived are included below. For explanations of the Ministry expectations, please follow this link:

http://www.edu.gov.on.ca/eng/curriculum/secondary/2009teched1112curr.pdf

Tasks	Ministry Expectations														
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	D1	D2	D3
History of the Internet Quiz											✔	✔			
Health and Safety/ Security/Career Presentation													✔	✔	✔
Number Systems Unit Test					✔										
Computer Design Project (Desktop Renewal Project)	✔	✔				✔									
Boolean Logic Unit Test					✔										
Electronics Labs (1-9)								✔							
555 Timer Assignment								✔							

Car Blinker System Culminating Task			✔			✔			✔							
Arduino Mini Assignments						✔					✔					
Karaoke Culminating Task								✔			✔					
Network Mini Assignments					✔					✔						
Network Unit Test					✔											

When assigning new work, the evaluation rubric is provided at that time. Google Classroom is used extensively to assign and track various assignments.