Course Outline

FACULTY:	**Faculty of Science and Technology**
PROGRAM(S):	**243.A0**
DEPARTMENT:	**Computer Engineering Technology**
COURSE TITLE:	**COMPUTER CIRCUIT FUNDAMENTALS**
COURSE NUMBER:	**247-107-VA**
COURSE SECTION(S):	0001,0002,0003
PONDERATION:	2-3-2 lecture - lab work - homework
NUMBER OF CREDITS:	2.33 credits
PREREQUISITE(S):	None
SEMESTER/YEAR:	A2019
TEACHER:	Subash Handa Office: K309 Tel: 514-744-7500 Ex. 7756 E-mail: handas@vaniercollege.qc.ca
AVAILABILITY:	Office Hours: Monday 12 – 1pm or by appointment.
TEACHER: (LAB):	Mina Yazdanpanah
OFFICE:	K 323
TEL:	514-744-7500 ext. 7498
EMAIL:	yazdanpm@vaniercollege.qc.ca
AVAILABILITY:	Office Hours: Wednesday 10:30 – 11:30 am or by appointment

Course Description:

In this course, students will be introduced to fundamentals of computer circuits. They will identify component datasheets. Students will design simple digital systems and their related schematics.

They will interpret circuit diagrams, examine circuits, perform circuit simulations, and troubleshoot problems using appropriate techniques and test equipment.

Students will learn to read component datasheets and schematics using appropriate software. They will also learn to interpret and process data. Moreover, they will develop the ability to write diagnostic reports based on test results.

Statement of Competency

037C – To process technical information.

Element 1: Gather technical information	1.1 Accurate determination of the information sought 1.2 Appropriate use of the computer, software and search tools 1.3 Reliability and variety of information sources 1.4 Clarity of communications when consulting resource people 1.5 Relevance and completeness of information gathered
Element 2: Organize the information.	2.1 Accurate interpretation of the information gathered 2.2 Proper sorting of information 2.3 Accurate comparison of data 2.4 Careful and coherent organization of data
Element 3: Record the information.	3.1 Correct observance of spelling and grammar rules 3.2 Correct observance of writing standards 3.3 Appropriate use of software programs

Statement of Competency	
037F – To diagnose a digital electronics problem	
Element 1: Become familiar with the problem and specifications.	1.1 Accurate interpretation of the problem to be diagnosed 1.2 Accurate interpretation of: – the circuits and their schematic diagrams – standards – Verification methods
Element 2: Identify anomalies.	2.1 Systematic check of components' conformity with schematic diagrams 2.2 Visual inspection of all components
Element 3: Take measurements.	3.1 Appropriate selection and use of measuring instruments 3.2 Observance of procedure
Element 4: Analyze the results.	4.1 Accurate interpretation of the test results 4.2 Accurate determination of calculations to be made in accordance with: • applicable laws, concepts and theorems • the circuits involved 4.3 Accuracy of calculations 4.4 Logical processing of results
Element 5: Determine the cause or causes of the problem.	5.1 Accurate interpretation of deviations observed
Element 6: Write a report**.**	6.1 Clarity and accuracy of information 6.2 Use of appropriate terminology

Student Personal Resources Required

BOOK REQUIRED – APPROXIMATE COST $200.00 AVAILABLE IN THE VANIER BOOKSTORE

DIGITAL FUNDAMENTALS ED: 11
Author: Floyd, Thomas L.
Item#: 9780132737968
Publisher: Pearson Education
Section: Textbooks

References:

DIGITAL SYSTEMS PRINCIPLES AND APPLICATIONS
Ronald J. Tocci Neal Widmer, Gregory Moss ISBN: 013510382-7

DIGITAL LOGIC DESIGN: Tutorial and Laboratory Exercises John F. Passfiume Michael Douglas ISBN: 0471603457

Note1: Dates and content may vary

Course Content and Tentative Dates (see *Note1)		
Week	**Theory**	**Lab**
1	Course Outline. Number systems and codes.	Practice and discussions on Number systems
2	The Binary number system.	Practice and examples on Binary numbers.
3	The Hexadecimal number system.	Practice and examples on Hexadecimal numbers.
4	Introduction to Logic Concepts Logic Gates: OR, AND, NOT, NOR, NAND.	Exploring the construction of Digital Circuits.
5	Introduction to Logic Concepts Logic Gates: XOR, XNOR, Half adder, Full adder	Implement Boolean function using logic
6	Boolean Algebra Laws and Rules.	Construction of Digital Circuits, Half Adder, Full Adder.
7	***Midterm Exam***	Lab. Test 1
8	Minimization of Digital Circuits by the use of Boolean Algebra.	Solving problems using K-Maps
9	Standard Logic Devices	Comparator
10	Minimization of Digital Circuit by using Karnaugh Map	Data Sheet verification
11	Decoders / Demultiplexers	Decoders
12	Encoders / Multiplexers	Multiplexers
13	Applications: Seven Segment Decoder	Computer Simulation of Digital Circuits
14	Review	Completion of Labs and Project
15	***Final Exam***	Lab. Test 2

Course Structure

THEORY:	2 hours/week:	Lectures and demonstrations, discussions and problem solving with student participation.
LABORATORY:	3 hours/week:	Demonstrations, lab activities and work performed by students, and results presented. Detailed report written by the students demonstrating an understanding of the competencies addressed.
HOMEWORK:	2 hours/week:	The student are expected to devote approximately 2 hours per week to homework.

ATTENDANCE

THEORY:	Consistent attendance is strongly recommended. **Students are responsible for obtaining all material covered during any absence.**
LABORATORY:	Failure to complete all lab activities assigned in the designated lab class without just cause may result in a failure of the lab session and any results and/or Lab Report derived from the session. In order to meet and be evaluated on the course competencies, lab attendance is required. Note that there is both a separate and an integrated **professionalism** mark associated with the course (see below).
TESTS:	Absence will result in failure of the missed test (mark of 0). Students with a just cause for absence are encouraged to seek alternative arrangements with the instructor – beforehand if possible.

EVALUATION

The final mark will be weighted:	65% theory:	20%	Homework and Quizzes
		25%	Midterm Test
		20%	Final Test
	35% lab work:	5%	Lab test
		25%	Labs
		5%	English Proficiency/ Professionalism
	Total:	**100%**	

The following general rules apply:

- **A minimum mark of 60% is required to pass the course AND at least 50% in the Theory portion AND at least 50% in the Lab portion. If the mark is less than 50% for either the Theory or Lab portion, the total mark will not exceed 55%.**
- At least one week's notice will be given for test dates or changes in test dates.
- Tests questions will not be re-graded after 24 hours of returning and any altered material will not be re--graded
- Quizzes may be given without prior notice – there are no make-ups for quizzes.
- Students are expected to attend all their schedule classes.
  - Absence from any lab class where specific skills are being assessed will result in a failure of that skill.
- **Students are expected to conduct themselves in a professional manner at all times.** This includes but is not limited to:
  - Arriving to class (theory and laboratory) on time and prepared to do the required work;
  - Conducting themselves in an appropriate manner at all times (including being respectful to the teacher, classmates, and any guests);
  - Using professional language (no cursing and/or swearing and using appropriate vocabulary);
  - Arriving to class/lab with all necessary supplies (logbook, notebook, textbook, manual, paper, writing implements, calculator, etc.);
  - Turning off all personal communication/music/video electronics (removing headphones, earphones, ear buds etc.);
  - Having all assigned work completed; and
  - **No cell phones or recording devices are to be used.**

  Remember that developing professional behaviours and habits now is an important aspect of preparation for entering a professional work environment in the future.
- **Students are expected to take their own notes during classes.**
- **Calculators with memory for equations (for example graphing calculators) will not be allowed when writing tests.**
- **Reports must be typed and computer generated according to the guidelines provided by the teacher. When requested, Lab preparations and Lab Results/logbooks are to be handed in during the lab session. Late Lab Preparations/Lab Results may not be accepted, and a zero mark will be recorded**.

  Reports are due one week after they are assigned unless the instructor provides a specific due date.
- Any assigned work submitted beyond 1 week late may not be accepted, and a zero mark may be recorded. Assigned work up to and including one week late may be reduced by up to 25% of the maximum mark.
- In-class assignments will only be accepted in the class in which they are assigned.
- Students who are consistently late for class (lab and/or theory) may be refused entry.
- All grades are reported on a numeric scale from 0% to 100%. The following categories briefly describe the relative value of these grades.

range	mean	Description
90 - 100	**95**	Excellent, mastery of the objectives
80 - 89	**85**	Very Good mastery of the objectives
65 - 79	**72**	Good, mastery of objectives
60 - 64	**62**	Fair mastery of objectives
0 - 59	n/a	Poor mastery of objectives

Academic and other Resources

If at any point in the semester, you are concerned about the course or you realise that you are having academic difficulties; your first resource should be to talk to me, your teacher. Academic difficulties include problems with the understanding of the theory, to the development of the practical skills required by the course. The earlier you look for help, the greater your chances of succeeding in the course. If I don't feel I can provide you with the help you need then I may recommend one of the College resources below.

For other problems or difficulties, you may encounter while at Vanier there are a number of Services available to help you within the college. They are there for you to use. These include:

Student Services (C203): Some areas where they provide services and/or information are:

Services for students with disabilities	Counselling (personal and other problems)
Student Advocate	Financial Aid (including aid and scholarships)
Health Services (Nurse on staff)	Student Employment
Academic and Behaviour Policies	Lockers
Housing	Volunteering

Student Services is a great resource for questions about college life and any problems you encounter while at Vanier. If they do not have the answer, they can direct you to the right place to find it.

Tutoring and Academic Success Center - TASC (F-300): Student-orientated centre dedicated to promoting and aiding students' development and success in academics and in society.

Admissions and placement tests	S.T.A.R. Program
English Exit Exam	English conversation and pronunciation clubs
English Peer Tutoring	Scholarship information
Vanier Native Program	Diversity support

TASC is the main college resource for students with learning difficulties and for students with weak English language skills.

Science, Technology, Engineering and Mathematics - STEM (D-301): This Centre aims to promote student success in mathematics and science. The large interactive study space includes a hackerspace for hands-on applied projects such as robotics, and a study hub for collaborative group work. Teacher help, computers, and a large collection of math and science textbooks are equally available. We offer a number of activities, services and resources including:

Free drop-in peer tutoring	Drop-in help from teachers
Free private tutoring	Teacher-led review sessions
Computer access	Laptop borrowing

Mediation and Grades Review

There are two committees available to the student for resolution of academic complaints.

1. The *Grades Review Committee* to review complaints concerning the grading of students' work.
2. The *Faculty Mediation Committee* to review academic complaints other than those dealing with student grades – see *Student Academic Complaints* below.

Information on College Policies

It is the student's responsibility to be familiar with and adhere to Vanier College Academic Policies. A summary of the course-level academic policies that apply in this and all other Vanier courses can be found in Omnivox under Important Vanier Links, or by following this link http://www.vaniercollege.qc.ca/psi/course-level-policies/.

Complete policies can also be found on the Vanier College website, under Policies.