Course Outline

FACULTY:	**Faculty of Science and Technology**
PROGRAM(S):	**Computer Engineering Technology**
DEPARTMENT:	**Computer Engineering Technology**
COURSE TITLE:	**PROGRAMMING FUNDAMENTALS**
COURSE NUMBER:	**247-108-VA**
COURSE SECTION(S):	All
PONDERATION:	2h lecture, 3h lab work, 2h homework
NUMBER OF CREDITS:	2.33
PREREQUISITE(S):	None.
SEMESTER/YEAR:	FALL 2019
TEACHER (THEORY):	Subash Handa
Office:	K-309
Tel:	514-744-7500 Ex. 7756
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AVAILABILITY:	Office Hours: Monday 12:00 – 1 pm or by appointment
TEACHER (LAB):	Subash Handa
Office:	K-309
Tel:	514-744-7500 Ex. 7756
E-mail:	handas@vaniercollege.qc.ca
AVAILABILITY:	Office Hours: Monday 12:00 – 1 pm or by appointment

Introduction

In this course students will be introduced to the fundamentals of programming in an embedded system context. They will learn to identify and define fundamental programming concepts. They will also learn to use programming tools at a basic level. Students will learn to support the development of very basic embedded systems through documentation and programming libraries.

Statement of Competency

Competency 037S: To program computerized systems.

Element 1: Become familiar with the specifications.

Element 2: Define algorithms.

Element 3: Customize the Environment

Element 4: Code the program.

Element 5: Perform compilation exercises.

Element 6: Conduct tests.

Element 7: Optimize the code.

Element 8: Document the program.

Student Personal Resources Required

- The student must purchase textbook
- Project materials are purchased at the student's discretion

Bibliography

For this course, all students are required buy an online book.

Follow the procedures listed below:

1. **Sign in or create an account at learn.zybooks.com**
2. **Enter zybook code: Vanier247108VAHandaFall2019**
3. **Subscribe. --- Subscription is $58 (US) – Pay by credit card**

Note1: Dates and content may vary; labs may not perfectly synchronize with lecture dates.

Lecture	Theory	Lab
1	Course Overview; Introduction to Computers; Programming Fundamentals; Embedded Programming with Raspberry Pi	Algorithms/Flowcharting. Basic Hardware I/O
2	Fundamental Concepts; Introduction to Programming	Algorithms/Flowcharting. Basic Hardware I/O
3	Introduction to Python; The Python Interpreter; Writing Python Code: Text Editor; Working with an IDE: PyCharm	Introduction to Python
4	Variables, loops, branching Examples	Input/ Output, loops, branching
5	Procedures; Functions, Strings; Examples	Procedures; Functions, Strings; Libraries
6	Files; Applications	Basic I/O Operations
7	Libraries; Applications	Communicating with the Serial Port
8	**MIDTERM**	Complete System Design/Lab Test
9	Recursion	Recursion
10	Introduction Raspberry Pi	Raspberry Pi
11	Python Libraries; Examples of Library Creation; Matplotlib; NumPy & SciPy	Downloading and Using Packages
12	The Serial Communication Library; Basic Data Processing	Serial Communication
13	Demonstration of More Advanced Processing Algorithms; Moving Forward	Review
14	REVIEW	Project
15	**FINAL**	Project

Course Structure

THEORY:	2 hours/week:	
LABORATORY:	3 hours/week:	Students must be present and actively participating in the laboratory activity. They must demonstrate clearly that all tasks have been independently completed.
HOMEWORK:	2 hours/week:	Students are expected to devote at least 30 minutes in reviewing notes and 1.5h in practicing concepts learned in class, or doing assignments/projects.

ATTENDANCE

THEORY:	Consistent attendance is required to fully benefit from the course. In the event of absence, students are responsible for obtaining and assimilating all material covered.
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. To successfully be evaluated on the course competencies, lab attendance is required.
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:	25%	Midterm Test
		20%	Quizzes
		20%	Final Test
	35% lab work:	5%	English Proficiency /Professionalism
		25%	Labs/Homework
		5%	Online book
	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.); and
    - Having all assigned work completed.

  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.
- Cell phones or 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 two weeks after they are assigned unless the instructor provides a specific due date.
- Any assignment or project carries the standard late penalty of 15% per day late to a maximum of 45%.
- 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

Important Assessment Dates

The following dates are tentative and will be confirmed at least 1 week in advance

- **Midterm Test : Week 8**
- **Project report due: Week 15**
- **Final Exam: Week 15**

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 don't have the answer they can direct you to the right place to find it.

The Learning Center - TLC (B205): Student-orientated centre dedicated to promoting and aiding students' development and success in academics and in society.

Admissions and placement tests	Learning Disabilities (advantages to registering)
English Exit Exam	English conversation and pronunciation clubs
English Peer Tutoring	Scholarship information
Vanier Native Program	Diversity support

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

Math and Science Center (F540): The Mathematics & Science Centre aims to promote student success in mathematics and science.

Drop-in help	Teacher s and Peer Tutoring
Private Tutoring	Various Clubs

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.