VANIER
CÉGEP/COLLEGE
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Computer Engineering
Technology Department

Course Outline

FACULTY:	**Faculty of Science and Technology**	
PROGRAM(S):	**243.A0 Computer Engineering Technology**	
DEPARTMENT:	**247 Computer Engineering Technology**	
COURSE TITLE:	**NETWORKED EMBEDDED SYSTEMS**	
COURSE NUMBER:	**247-609-VA**	
COURSE SECTION(S):	0001	
PONDERATION:	2-3-2	lecture - labwork - homework
NUMBER OF CREDITS:	2.33	credits
PREREQUISITE(S):	247-305-VA	Embedded Linux Computer
	247-509-VA	Network Systems Design
	247-511-VA	Microcontroller Applications
SEMESTER:	Semester 6	
SEMESTER/YEAR:	Winter 2022	
TEACHER:	Day Yann Fong	Office K-311
		Tel. 514-744-7500x8335
		E-mail MS Teams Chat, Mio
AVAILABILITY:	Thu & Fri 9:30am -12:30 pm, or by appointment	

Description

In this course, student will learn concepts of embedded system networking and IoT.

They will learn how to install, optimize and write procedures on different types of networks and buses: such as Local Area Network, CAN bus and LIN bus, LoRaWAN.

They will also learn how to integrate the IoT to an embedded network system. They will learn how to program and integrate databases and webpages to an embedded network system.

Statement of Competencies

037R To write computerized system procedures.

1. Focus on the desired results
2. Determine work strategies
3. Check the effectiveness of the strategies selected
4. Produce the final version

037U To perform activities related to optimizing a computerized system

1. Analyze the existing system's performance and characteristics.
2. Identify the hardware and software modifications to be made.
3. Modify the system.
4. Check the system's operation
5. Document the optimization.

Tentative course content and schedule

Week duration	Theory Topics (Thu 2:30pm – 5pm)	Tentative Lab Activities (Mon 2pm – 6pm)
1	Presentation on LoRa	Presentation of course outline. Overview of IoT, LoRaWAN
2	IoT project using PT	Introduction to IoT on PT
3	IoT and BBB platform	IoT project using PT
4	Introduction to HTML	BeagleBone as web server
5	PhP	BBB HTTP
6		BBB PHP
7	*** Mid-term Test ***	
8	Controller Area Network (CAN) - I	**Learning Integrated Assessment (LIA) - I**
9	***** Mid-Term Break *****	
10	Controller Area Network (CAN) - II	Introduction to CAN on BBB
11	Local Interconnect Network (LIN)	CAN mask and filter
12	Review	
13	**Learning Integrated Assessment (LIA) - II**	Remote frame operation

Course Material Required

- Hand-outs will be provided as required and reading maybe be assigned
- Lab:
    - BeagleBone Black kits

Bibliography

- *Exploring BeagleBone. Derek Molloy.*

Course Structure

THEORY:	2 hour / week	Due to course compression to 12 weeks (3-week stage), this is scheduled as **2.5 hours/week**. Lectures and demonstrations, discussions and problem solving with student participation.
LABORATORY:	3 hours / week	Due to course compression to 12 weeks (3-week stage), this is scheduled as **3.75 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 hour / week	The student will be expected to devote approximately 2 hour per week to homework.

ATTENDANCE

THEORY:	Consistent attendance is strongly recommended. **Students are responsible for obtaining all material covered during any absence.**
LABORATORY:	Laboratory sessions are part of assessment activities. Failure to complete 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). During the lab periods you are expected to work on your assignments. It is not permitted to use the internet during lab periods outside the scope of the lab.
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. College policies on just cause will apply.

EVALUATION

The final mark will be weighted:	35% theory	20%	Homework/Assignment/Quizzes
		15%	Midterm test
	35% lab	25%	Lab demo & report
		10%	Lab project
	30% Theory & lab work	30%	Learning Integrated Assessment (LIA)
	Total		**100%**

LEARNING INTEGRATED ASSESSMENT (LIA)

Each course includes a Learning Integrated Assessment (LIA) that attests to students' achievement of the course- level learning outcome that is the main knowledge, skills, and attitudes to be developed. The LIA for this course is the following:

Students will be evaluated for knowledge in the theory class and for course skills in the lab class.

EVALUATION CRITERIA FOR THE LEARNING INTEGRATED ASSESSMENT

- LIA – I : 12%
- LIA – II : 15%
- SPLI : 3%

Weight of Grade (%)
30%

STUDENT PROFICIENCY IN THE LANGUAGE OF INSTRUCTION (SPLI)

Student proficiency in the language of instruction is the ability to write, read, speak, and listen in order to communicate effectively at the college level. SPLI may also require discipline-specific vocabulary, documentation, and communication skills; assessment of language skills must account for a minimum of 10% of any take-home written assignment or oral presentation in which English is the language of expression.

In this course, you will be assessed for SPLI in the following assessments:

Assess the quality of the language in all the reflections, as well as the written documentation

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 o**r** 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.
- Quizzes may be given without prior notice – there are no make-ups for quizzes (mark of 0 for missed quizzes).
- **Students are expected to conduct themselves in a professional manner at all times.** This includes but is not limited to:
  - Arriving to 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.
- Reports must be typed and computer generated according to the guidelines.
- 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.
- **ALL** assigned work (assignment, lab report etc) must be submitted **ON TIME**. **NO LATE SUBMISSION WILL BE ACCEPTED**, unless for valid reasons that was communicated to the instructor at least 2 days prior to the deadline.
- In-class assignments will only be accepted in the class in which they are assigned.
- Students who are consistently late for class may be refused entry.
- 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

- Mid-term test : Week 7 (3rd Mar 2022)
- LIA - I : Week 8 (7th Mar 2022)
- LIA - II : Week 13 (14th Apr 2022)

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.

General College Academic Policies:

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