

Springfield Technical Community College
School of Engineering Technology
Department of Electrical Engineering Technology
Syllabus

Course: EET-260/260L Microprocessor Applications
Instructor: Rick Jagodowski

Date: Spring 2017
Lecture Credits: 2
Lab Credits: 1

1. Catalog Description: Microprocessor Applications

This course is directed to the application and use of microprocessors in industry, with emphasis on understanding basic operation, interfacing, and programming. Study includes basic architecture, developmental languages, bus structures, interfacing with peripheral devices, memory, input/output devices, and diagnostics. **Two lecture hours (hybrid: one hour classroom, one hour online) & Three lab hours.**

PREREQUISITE: MAT-125, EET-111, EET-200, EET-210

CO-REQUISITE: EET-260L

2. Course Content

This course will give the students the skills necessary to understand, program, interface and evaluate common micro-controller and embedded controller devices. The majority of the course will revolve around the discussion of the BASIC STAMP offered by Parallax. The BASIC Stamp programs use a simple language called PBASIC. The lecture will investigate the architecture, interfacing, the programming, and the editors available while the lab portion will give hands-on experience interfacing to micro-controllers and embedded devices.

3. Student Learning Outcomes (SLO's)

Upon successful completion of this course, students will be able to:

- apply analog and digital signal processing concepts.
- comprehend digital logic, analog & ADC/DAC concepts.
- analyze devices utilizing embedded controller devices.
- effectively read and write the command set of the BS2 series of processors.
- read and create flowcharts.
- analyze & diagnose systems with basic and advanced sensor I/O, including smart sensors.
- create basic embedded controller interface circuits.
- read and create schematic diagrams.
- apply a systems-level view of complex systems for trouble-shooting purposes.

4. Grading & Performance Policy

* **Attendance:** Attendance is mandatory. This course is delivered in a hybrid-format, meaning there is one hour of scheduled lecture with one hour of on-line assigned work. It is expected that students will do the required preparation assignment before each lecture class. Students absent from more than 3 classes may be removed from the class at the professor's discretion. It is the student's responsibility to make arrangements to make up any missed work. Missed work may only be made up if the professor allows. The schedule for any make up work will be at the instructor's discretion. If the student knows in advance he or she may not be in lecture it is the student's responsibility to notify the professor in advance. Attendance will be taken at each lecture & lab session.

* **Professional behavior:** Students are expected to act in a professional and mature manner at all times. Improper behavior will result in a reduced grade and if not corrected may result in removal from the course. The grade may be reduced due to being late to the class, "fooling around", improper language, being a disruption to the educational process, having conversations during lecture, or similar violations of the course rules.

* **Policy on course disruptions:** Students are expected to act in a respectful and mature manner. Course disruptions, loud or disruptive behavior, intimidation, violation of the policies and procedures set down in the STCC Student Handbook, or similar problems will result in the student being removed from the lab or lecture.

Be sure to turn off all cell phones or other electronic devices before entering the lecture or lab. In many cases the professors allow cell phones during lab but not while lectures are in process. Talking or causing disruptions while lecture is in process is also considered disruptive. At the professor's discretion he or she may attempt to correct the student's behavior or remove the student from the class.

The following is the STCC Code of Conduct from www.stcc.edu:

"Springfield Technical Community College recognizes that all students, as members of the college community, enjoy the freedom of speech and assembly, freedom of association, freedom of the press, right of petition and the right of due process. These rights do not come without responsibilities and respect for others in the College community. Attendance at the College is a privilege and not a right, and enrollment carries with it obligations in regard to conduct, both in and out of class. Students are responsible for knowing and understanding the contents of this Code. Students are responsible for abiding by the laws governing the College and are expected to observe standards of conduct set by the College."

*** Due Dates:** Late work may be depreciated by 25% every week or part of a week it is late. Solutions to the homework and labs may be distributed. Once the solution is distributed no further homework will be accepted. It is the student's responsibility to be aware of all work assigned and the due dates.

***Quizzes & Exams:** Quizzes will be given frequently, approximately one per week. They will be based upon class, reading, homework and lab work assignments. There are no make-ups allowed for missed quizzes, however the 2 lowest quiz grades will be dropped at the end of the semester. There will be 2 exams given. One around the mid-semester break and the comprehensive Final Exam. During exams and quizzes we do not allow the use of cell phones or any device with wireless, infrared or similar communications capability.

*** Quality:** Submission of poor quality work will not be accepted. Submissions which do not meet minimum documentation standards set forth in class, are incoherent, or are illegible will be returned [not graded] to the student. These cases are treated as if no work was submitted.

*** Academic Honesty:** All students are assumed to do their own work. Using other's work is permitted, under some circumstances, with proper credit to the original author(s). Academic dishonesty of any manner is not tolerated. In the event it is discovered by the professor ALL PARTIES INVOLVED receive a grade of "F" [0.0]. No distinction is made between those "cheating" and those being "cheated from". If a student believes his/her work is being borrowed without consent it is her/his responsibility to report the incident. This is the only means to escape the consequences. All incidents are examined on a case-by-case basis by the professor whose decision is final.

*** Labs:** Students are required to take EET-260L with this course. Students should keep all lab work in a notebook. Progress reports will have to be posted weekly on the Forums at cset.stcc.edu/forums in the EET-260L area. You will need an account to post on the Forums, see your instructor for directions on creating an account.

Grade Evaluation:

Lecture:		Lab:	
Attendance & Professionalism	20%	Attendance & Professionalism	25%
Homework	5%	Progress Reports/Forum Posts	25%
Quizzes	25%	Lab Reports & Research	50%
Exams (2)	50%		

Your final grade for the course will be determined using the formula:

$$\text{(Lecture Grade) X 0.7} + \text{(Lab Grade) X 0.3} = \text{Final Grade}$$

You will receive a common grade for the lecture & lab portions calculated based upon the weights given above.

5. Class Organization

The course is a lecture format with the lectures often aimed at procedures that will be verified in the Co-Requisite lab course, EET-260L. The instructor will use a variety of techniques to help present and demonstrate the concepts and theories discussed in the lecture. The lab exercises will give students the opportunity to develop hands-on experience in the topics under discussion.

6. Text and Equipment requirements:

The lecture and lab will use resources provided by Parallax, Inc. for their Board of Education (BoE) development board. You should have the BoE from your BoEBot kit used in the EET-101 (old ELEC-140) course. This board is also contained in the *BASIC Stamp Discovery Kit*, the *BoEBot Kit* or the *Basic Stamp Activity Kit* which are available from Parallax, Inc. (www.parallax.com). These kits contain texts, documentation and components. Students are able to purchase these kits directly from Parallax if they wish. The STCC Bookstore may have the BoEBot kit available. See your instructor or the CSET Forums for more information about purchasing options. ***NOTE: If you purchase your own kit, these kits are your responsibility. They do contain sensitive electronic components which could be damaged if you do not follow proper procedures. If you have any questions you are expected to ask your instructor for assistance. The faculty and staff of STCC do not assume any liability from misuse of your kit.***

Parallax makes most of their manuals & texts available for download in pdf form for download. Sections of certain manuals not included with the above kits will be used for supplemental information throughout this course. Those sections will be posted on the Electronics Group Forums at cset.stcc.edu/forums (see below).

Internet Access: It is expected that each student have internet access to do supplemental research outside of the classroom. Links to these sites will be posted on the *STCC Electronics Group Forums*. If you have access at home then you may do such research at home. Otherwise it is expected that you do the research where ever necessary. The Student Success Center also has computers available for student use.

Forums: The Electronics Group of STCC maintains Forums at cset.stcc.edu/forums. Every student in the class will be required to create an account to access and post on these forums. These accounts will be created within the first couple of weeks of classes.

Supplemental Text:

The instructor will supply web links and pdf files for supplemental information via the Forums at cset.stcc.edu/forums. Students should have a USB “thumb drive” to save the files for the electronic documentation and to keep their work backed up.

7. Office Hours

Office hours are posted on my office door. Other times may be available by appointment. (Due to the diverse academic schedules of both students and faculty, plus commitments outside of school, students are encouraged to post questions about relevant course material on the EET-260/260L Forums. This will serve as an extension of the class beyond normal class meetings. Please take advantage of this opportunity.)

8. STCC Course Schedule*

Week	Topic
1	Syllabus, Policies & Introduction to course, Review of Digital Concepts.
2	Ch. 1 WAM (What's A Microcontroller text), DEBUG, Variables
3	Ch. 2 & 3 WAM - HIGH, PAUSE, LOW, Loops, Counting,
4	Ch. 4 WAM - PULSOUT, FREQOUT and PWM discussion.
5	Nested Loops, input, servo motor operation.
6	Ch. 5 WAM – Measuring Rotation, potentiometers, scaling, time.
7	Ch. 6 WAM – Displays, 7-segment, LCD
	**** Exam #1 ****
8	Ch. 7 & 8 WAM – memory maps, WRITE, subroutines, nesting, READ
9	***** SPRING BREAK *****
10	Advanced Sensor Applications 1
11	Advanced Sensor Applications 2.
12	Advanced Sensor Applications 3.
13	Advanced Sensor Applications 4.
14	Advanced Sensor Applications 5.
15	Trends in micro-controllers: Propeller, Raspberry Pi
16	Raspberry Pi
17	**** Final Exam (Date & Time TBA) ****

***NOTE:** The above outline may be modified to best serve the educational needs of the student.

Lab exercises will be assigned each week to help supplement the material presented in lecture. The “Advanced Sensor Applications” experiments will make use of a variety of “smart sensors” available from Parallax. These sensors are in limited supply, so students will alternate through the various experiments each week.

Course Methodology and Philosophy

S.T.C.C. invests a considerable amount of resources into equipment for student and faculty use. As a member of the faculty, I will make use of all available teaching methods and tools. For lectures, most instruction will be a combination of Power Point and blackboard/whiteboard. Students are encouraged to actively participate by way of relevant questions and comments about the subject matter under discussion. It is my responsibility to make sure that the subject matter is presented in as clear a manner as possible. Your feedback is invaluable to my ability to accomplish this goal.

You, as the student, also have your share of responsibility:

Attendance: The scope of the material presented in this course is broad. Attendance is required to experience all the information as presented by the instructor. In addition, your input into the classroom discussion helps other students to better understand the material.

Preparation: It is your responsibility to complete all assignments, reading and written, in a timely manner. Thorough preparation will help instill greater confidence in the subject matter and will facilitate lively classroom discussions. Proper preparation for quizzes and tests is also expected.

Attitude and Behavior: It is your responsibility to make sure that your contributions to this course, and your attitude toward the people around you, are positive. Foul language and disruptive behavior will not be tolerated in this course. In addition, school property must be treated with respect at all times. This is especially true in laboratories. If you do not understand how to use a particular piece of equipment, you are encouraged to ask for assistance. You should report malfunctioning equipment immediately. Always return equipment and components to their proper locations. Leave your study or work area clean and neat for the next student.

Students with Special Needs:

Any student who feels s/he may need an accommodation based on the impact of a disability should contact the instructor privately to discuss your specific needs. Before any accommodations are put in place, you should contact the Office of Disability Services at 755-4785 or stop by Building 27/2nd Floor to coordinate reasonable accommodations for students with documented disabilities.