



**I. COURSE DESCRIPTION:**

This is a lab course designed to allow the students to develop their problem solving skills by carrying through to completion several Embedded Microcontroller projects. Each project will have hardware and software components. Source code for software will be written in Assembly Language and in C language.

**II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:**

Upon successful completion of this course, the student will demonstrate the ability to:

1. Writing Assembly Language Programs for a Microcontroller  
Potential Elements of the Performance:  
Write source code in assembly language for an embedded microcontroller.  
Assemble and debug the program.
2. Writing C Language Programs for a Microcontroller  
Potential Elements of the Performance:  
Write source code in C language for an embedded microcontroller.  
Compile and debug the program.
3. Building Interface Circuitry  
Potential Elements of the Performance:  
Design and build hardware interface circuitry for an embedded microcontroller.
4. Testing Completed Project  
Potential Elements of the Performance:  
Test the completed project and debug the problems.

**III. TOPICS:**

1. Three-Phase Inverter project
2. Analog to Digital Conversion project
3. Key-pad scanning and LED display project
4. Phase-Locked Loop project
5. Pulse-Width Modulation project

**IV. REQUIRED RESOURCES/TEXTS/MATERIALS:**

Handouts

**V. EVALUATION PROCESS/GRADING SYSTEM:**

This course is entirely a lab course. Evaluation will be based on the following:

- Completed lab projects
- Completed lab reports
- Written tests relating to lab work (source code or hardware)
- Attendance in the lab

If a test is missed for a legitimate reason, it can be rewritten at the end of the course.

The following semester grades will be assigned to students:

<b>Grade</b>	<b><u>Definition</u></b>	<i>Grade Point Equivalent</i>
A+	90 – 100%	4.00
A	80 – 89%	3.00
B	70 - 79%	2.00
C	60 - 69%	1.00
D	50 – 59%	0.00
F (Fail)	49% and below	
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field /clinical placement or non-graded subject area.	
U	Unsatisfactory achievement in field/clinical placement or non-graded subject area.	
X	A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.	
NR	Grade not reported to Registrar's office.	
W	Student has withdrawn from the course without academic penalty.	

**VI. SPECIAL NOTES:**

Special Needs:

If you are a student with special needs (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your professor and/or the Special Needs office. Visit Room E1101 or call Extension 703 so that support services can be arranged for you.

Retention of Course Outlines:

It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

Plagiarism:

Students should refer to the definition of “academic dishonesty” in *Student Rights and Responsibilities*. Students who engage in “academic dishonesty” will receive an automatic failure for that submission and/or such other penalty, up to and including expulsion from the course/program, as may be decided by the professor/dean. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, it is the policy of the department to employ a documentation format for referencing source material.

Course Outline Amendments:

The professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

Substitute course information is available in the Registrar's office.

**VII. PRIOR LEARNING ASSESSMENT:**

Students who wish to apply for advanced credit in the course should consult the professor. Credit for prior learning will be given upon successful completion of a challenge exam or portfolio.

**VIII. DIRECT CREDIT TRANSFERS:**

Students who wish to apply for direct credit transfer (advanced standing) should obtain a direct credit transfer form from the Dean's secretary. Students will be required to provide a transcript and course outline related to the course in question.