DeVRY UNIVERSITY

Course Syllabus **Summer 2007**

Course Title:	Embedded Microprocessor Systems Laboratory
Course number:	EET387L
Credit/Contact hour:	0-2-1
Course Dependency:	**Prerequisite:** (none) **Required Co-requisite**: EET387
Instructor:	Tom Wheeler E-mail: twheeler@devry.edu Voice Mail: 816.941.0430 x5211
Office Hours:	Wed 12-12:50 pm; Thur 12-12:50 pm; Fri 2-2:50 pm Other times possible by appointment

Course Description

Students work individually on projects involving hardware and software design in embedded computer systems.

Textbooks and Materials

Textbook/s Title:	**Ed**	**Author**
EET387 LABS © 2007 TOM A. WHEELER	**1**	**Wheeler**

Reference:

Most of the course materials are available at http://faculty.kc.devry.edu/twheeler/eet387

Schedule of Experiments (Some of these have video demonstrations on CD-ROM or the website).

Number	Description	Due Week #
1	**Aircraft Failure Monitor (Ports, LED display design)**	**3 - Informal Report**
2	**Aircraft Failure Monitor II (LCD Display Interfacing)**	**5 - Informal**
3	**Gaming and Simulation (Keyboard Interfacing, UI Design)**	**8 - Formal**
4	**Temperature Monitor (Analog to Digital Conversion, simple power control circuits)**	**10 - Informal**
5	**Remote Temperature Monitor (Serial Communication using the USART, RS232 interfaces)**	**12 - Informal**
6	**Motor Control (Timers & Pulse Width Modulation)**	**13 - Formal**
7	**Interrupts and Threading**	**14-15**

Students in EET387L will work individually. Each student submits one written report for each experimental topic above. Reports must consist of the following parts (please pay attention to order):

All portions of the lab reports for EET387L (with the exception of raw data, which may be included in an appendix at the writer's discretion) must be created electronically. **No hand written work is acceptable**. Use the equation editor in Word (Insert -> Object -> Microsoft Equation 3.0) to type equations and formulas. Captured waveform data must be contained within the document file.

REPORT CONTENTS (FORMAL)

1) COVER PAGE contains:

a) Your name
b) Your class and section (EET387L 6DP)
c) Experiment Title
d) For: SR. PROFESSOR WHEELER
e) Due Date of report (Week # or date given in class)
f) Operational sign-off blank
g) Final sign-off blank.
h) The statement "This is the original work of (your name)."
i) Your signature.

2) SCHEMATIC DIAGRAM -- A schematic diagram of the complete circuit used for the lab. Must be completed using OrCAD or equivalent tool. Label all components with designator and value. Label all input/output points. Your name and an appropriate title must be on the schematic diagram.

3) THEORY OF OPERATION - This will be a written explanation of how the circuit and/or software work together to produce a working system. It must include:

a) A behavioral specification (usually from the lab instructions, but in some cases you will be required to devise your own specs).
b) Hardware theory of operation. Describe the function of all components, and include all design equations (see HOMEWORK standards of course syllabus for proper treatment of equations).
c) Software theory of operation. Describe the program flow, including I/O processing, computations, exception handling, and so forth.

4) SOFTWARE LISTING - The complete listing of your program.

a) Must have YOUR NAME on top.
b) Must have a comment block at the top stating ATMEGA16 pin allocation strategy.
c) Must be properly commented (see course syllabus).

Report Grading Criteria

The documentation for EET387L reports is evaluated by the following criteria:

- Mechanics - Correctness of spelling, punctuation, and grammar.
- Organization - Presentation of ideas in a logical order.
- Clarity - Minimization of the reader's workload.
- Appearance - Neatness and visual appeal of the work.
- Accuracy - Especially concerning the presentation of schematics and software listings.
- Validity - The design approach is correct.

The A paper consists of the following:

Central Idea:
- Is clearly expressed, responds to the assignment, provides focus.
- Is explicitly and logically supported with concrete details and examples.

Structure:
- A plan of organization is given in which ideas are arranged in a clear, logical order.
- Ideas are clearly connected.

Development:
- Generalizations are supported or explained with concrete details.
- Smooth transitions are used between sentences and paragraphs.

Style:
- Varied sentence length and structure.
- Consistent and appropriate tone.

Mechanics:
- Grammar, punctuation, capitalization, spelling are correct.

A B paper consists of the following:

Central Idea:
- Is clearly expressed, responds to the assignment, provides focus.
- Is explicitly and logically supported with concrete details and examples.

Development:
- Concrete details usually given to support ideas.
- Transitions are given in most instances where needed.

Style:
- Contains some variation of sentence length and structure.
- Tone is consistent throughout.

Mechanics:
- No more than eight mechanical errors.

A C paper consists of the following:

Central Idea:
- May be slightly askew, but seems to be somewhat clear.

Structure:
- A clear construction is attempted, but does not measure up consistently, and ideas are usually connected via transitions.

Development:
- Writer has attempted to give enough information to support his/her ideas, but there are "holes" where the reader may be uncertain.

Style:
- The writer has attempted a few times to vary sentence length and structure, and tone shifts often.

Mechanics:
- No more than 10 mechanical errors.

A D paper consists of the following:

Central Idea:

- Is somewhat unclear, but is stated.

Structure:

- The ideas are somewhat "rambling" in nature, and few transitions are given.

Development:

- Many ideas have little concrete information for their support. Thus, they often fade into mere opinion rather than rather than expressing "facts."
- Few transitions are given.

Style:

- Leaves the reader feeling unsure of the writer's own attitude toward the topic.

Mechanics:

- Has more than 15 grammar, punctuation, spelling errors.

An F paper consists of the following:

Central idea is missing, and writing wanders from topic to topic without a clear focus.

Structure -- no clear structure -- becomes a jumble of ideas without a stated reason given for why it was written.

Development -- very little development or support given for any discernable ideas.

Mechanics -- writer evidences very little basic understanding of grammar, punctuation, or spelling skills. Many errors of each kind.

EET/CET Program Objectives and Outcomes:

(Student competencies achieved at the time of graduation)

1. Conduct experiments involving electronic systems using modern test equipment, interpret test results and use them to improve products or methodologies.
   - 1.1. Performs Needs Analysis – define the problem
   - 1.2. States goals and objectives of the experiment
   - 1.3. Identifies resources to conduct experiment (parts, equipment, data sheets, etc.)
   - 1.4. Develops a procedure and collect data using modern test equipment
   - 1.5. Analyzes test results and draw conclusions.

2. Create, implement high-level and Assembly language programs in support of technical activities.
   - 2.1. Analyzes the problem logically
   - 2.2. Designs the solution
   - 2.3. Implements the solution
   - 2.4. Tests and debugs the software

3. For EET: Use the principles of science, mathematics, and engineering technology to design, implement, and evaluate hardware and software solutions to complex technical problems,
   - 3.1. Selects and defines a meaningful problem taking safety, ethical, social, economic, and technical constraints into consideration.
   - 3.2. Devises process to solve problem
   - 3.3. Applies appropriate knowledge of scientific, mathematical, and engineering design tools toward the design and analysis of problem solutions.
   - 3.4. Identifies key issues in designing and building a prototype
   - 3.5. Builds, tests and troubleshoots prototype
   - 3.6. Optimizes prototype with a commitment to quality, timeliness, and continuous improvement.

For CET: Use the principles of science, mathematics, software engineering, and engineering technology to design, implement, and evaluate software solutions to complex technical problems.
   - 3.1 Identifies a meaningful problem and defines preliminary solution specifications taking safety, ethical, social, economic, technical constraints, and user requirement into consideration
   - 3.2 Designs and implements appropriate data structures and algorithms
   - 3.3 Prepares a plan of action to implement the system
   - 3.4 Applies scientific, mathematical, software, and engineering design tools toward the design and analysis of problem solution
   - 3.5 Writes and tests readable and maintainable code
   - 3.6 Optimizes code with a commitment to quality, timeliness, and continuous improvement

4. Communicate effectively both orally and in writing.
   - 4.1 Communicates effectively in wiring
   - 4.2 Communicates effectively orally

5. Work effectively in a team environment.
   - 5.1 Exhibits good dialoguing skills
   - 5.2 As part of a small group project, when assigned roles, performs roles effectively

6. Apply applied research and problem-solving skills to support learning at DeVry as well as life-long personal and professional development.
   - 6.1 Recognizes the need to know information beyond one's own expertise and has the ability to gather and synthesize the necessary information into the solution of a problem
   - 6.2 Uses engineering problem-solving methodology in solving problems

7. Evaluate the broader effects of technology and to identify connections between technology and economics, politics, culture, ethical responsibility, social structure, the environment and other areas.
   - 7.1 Identifies linkages and causal relationships between technology and social, political, economic, cultural, and environmental conditions.
   - 7.2 Works effectively in diverse environments and adapts technical solution to solution a diverse audience
   - 7.3 Pursues technical work within guidelines for professional, ethical, and social responsibility

Class Policies and Procedures:

Attendance

Each student is required to attend every lecture and laboratory session in which he or she is enrolled. A swipe-card terminal (ATS) in each classroom is used to record attendance electronically. Students are responsible for arriving before class begins, sliding their identification card through the wall-mounted reader, and remaining for the duration of the course meeting. Students who are absent for two or more days should notify their Professor or assigned Academic Advisor in advance. Students who miss more than five (5) consecutive days of school are in violation of the DeVry attendance policy and will be dismissed.

Grading:

Each report in EET387L is worth 100 points; there are 7 reports due, for a total of 700 points in the course.

Each report must contain a sign-off for credit. A sign-off is provided by the instructor or other authorized person.

Course Grading Standards

A final letter grade is to be awarded to each enrolled student in accordance with the 4.00 grading system shown below:

Letter Grade	***Percent of Total Points***	***Grade Points***
A	90 – 100%	4.00
B	80 – 89%	3.00
C	70 – 79%	2.00
D	60 – 69%	1.00
F	Below 60%	0.00

Note: The grade for the laboratory is incorporated as a component of the EET387 course grade. You must maintain a passing grade in the laboratory to pass the course (EET387). See the EET387 syllabus for details.

Punctuality

Lab reports are due during the laboratory period of the week. For each day late, 5 points will be deducted from the overall report score. After seven (7) days, a grade of zero will be recorded for the report.

Academic Integrity Policy

Ideas and learning form the core of the academic community. In all centers of education, learning is valued and honored. No learning community can thrive if its members counterfeit their achievement and seek to establish an unfair advantage over their fellow students. The academic standards at DeVry are based on a pursuit of knowledge and assume a high level of integrity in every one of its members. When this trust is violated, the academic community suffers injury and must act to ensure that its standards remain meaningful. The vehicle for this action is the Academic Integrity Policy outlined in the *Student Handbook*.

The Academic Integrity Policy is designed to foster a fair and impartial set of standards upon which academic dishonesty will be judged. All students are required to read, understand, and adhere to these standards, which define and specify the following mandatory sanctions for such dishonest acts as copying, plagiarism, lying, unauthorized collaboration, alteration of records, bribery, and misrepresentation for the purpose of enhancing one's academic standing:

- The ***first recorded offense*** will result in the student receiving zero credit for the entire paper, exam, quiz, lab, homework assignment, or other graded activity in which the incident of academic dishonesty occurred. No partial credit may be given. Where the incident involved a graded assignment normally subject to a "drop" option, the student may not exercise that option.

- The ***second recorded offense*** will result in the student receiving a failing grade for the course in which the second offense occurs. The second offense need not be in the same course, program, or term as the first offense to invoke this sanction.

- The ***third recorded offense*** will result in the student being permanently expelled from the DeVry system. Again, the third offense need not be in the same course, program, or term as either the first or second offense to invoke the sanction.

Requirements for Writing

Documenting what you have done is an important part of the learning experience, and it is often very hard to write good reports. You should schedule adequate time for this task (and don't put it off until the last minute).

Each student is required to do his or her own work. There are no collaborative or group projects in EET387L. In addition, outside sources of information (such as photographs, quoted text, and so forth) must be properly cited. Either APA or MLA style may be used for citations. The site http://owl.english.purdue.edu/owl/resource/560/01/ contains much useful about proper use of information sources.

Changes to Syllabus:

The contents of this syllabus are subject to change with appropriate notice to the students.