

**COURSE SYLLABUS**  
**Embedded Systems**  
**CSC522**  
**Winter 2012**

**PROFESSOR:** Dr. Craig Reinhart  
**CLASSROOM:** D8  
**TIME:** Thursday, 6:00 – 9:30  
**OFFICE HOURS:** TBA  
**CONTACT INFORMATION:** email: [reinhart@clunet.edu](mailto:reinhart@clunet.edu)  
phone: 493-3320  
room : D6

**TEXTBOOK:** Embedded Systems Design: An Introduction to Processes, Tools, & Techniques  
Arnold S. Berger  
CMP Books, 2002  
ISBN: 1-57820-073-3

Propeller Education Kit – PropStick USB Version

[Available here](#)

<http://www.parallax.com/Store/Microcontrollers/PropellerKits/tabid/144/CategoryID/20/List/0/SortField/0/Level/a/ProductID/506/Default.aspx>

**COURSE DESCRIPTION:**

Computers are everywhere: your cell phone, your car, your wrist watch, your home security system, etc. This is an introductory course on embedded systems design – the use of computers in devices rather than as stand-alone units. We will discuss the characteristics that define an embedded system and contrast those against that of a stand-alone computer. We will also look at a variety of applications utilizing embedded processors. Finally, we will write programs that interact directly with external hardware utilizing a Stamp microprocessor development board.

**GOALS/OBJECTIVES:**

- Goal 1: Demonstrate an understanding of the basic principles and concepts that characterize an embedded system.
1. Define/identify/describe an embedded system.
  2. Classify a system as either an embedded or a stand-alone computer system.
  3. Illustrate/identify the use of an embedded system in a real-world application.
- Goal 2: Apply the principles and concepts of embedded systems to real problems.
1. Implement simple electronic circuits based on given schematics.

2. Design and implement software to interface an embedded processor to external electronic circuitry.
- 3.

**ACADEMIC HONESTY:**

Intellectual property rights are to be respected at all times, with appropriate recognition/reference given to informational sources. Plagiarism occurs whenever a source of any kind has not been acknowledged. Every student must understand the correct procedures for acknowledging and identifying sources of borrowed material. The basic rule is this: Give credit where credit is due. In other words, if you include any material which is beyond your first hand experience, and which is not common knowledge of scholars in your field, you must cite your source in a way that your reader can [a] find the source from the information in your reference and [b] immediately determine which information is your source’s contribution to scholarship and which is yours.

**GROUP PROJECTS/ACTIVITIES:**

The Stamp development board (either Basic or Javelin) will be used for practical application/demonstration of embedded systems concepts. Students will work either individually or in teams implementing circuits and programs in either the Java programming language (Javelin Stamp) or the Basic programming language (Basic Stamp.)

**CASE ANALYSIS:**

Various examples of embedded systems will be presented through the professional experience of the professor and published case analyses.

**GRADING CRITERIA:**

Course grades will be assigned based on your performance on homework assignments, exams, and classroom participation. Late homework assignments and projects will be penalized 10% for the first week past the due date (following class meeting) and will not be accepted after the first week past the due date. Homework assignments and exams can usually be assigned objective grades (you either answered the questions correctly or you didn’t.) Classroom participation is naturally somewhat subjective. I realize that some students are more “outgoing” than others and I will take this into consideration as I get to know you. The university allows for the assignment of +/- grades thus the following scale will be used for homework and exams:

A	100-95	B	86-83	C	76-73	D	66-63
A-	94-90	B-	82-80	C-	72-70	D-	62-60
B+	89-87	C+	79-77	D+	69-67	F	59-0

Your course grade will be determined as follows:

Projects/Homework	60%
Final Exam	30%

Class participation	10%
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**COURSE EVALUATION STATEMENT:**

All course evaluations are conducted online. Your feedback is important to us. You will receive an email message reminding you when the website is open for your feedback. The link is:

<http://courseval.callutheran.edu>

**DISABILITY STATEMENT:**

California Lutheran University is committed to providing reasonable accommodations in compliance with ADA of 1990 and Section 504 of the Rehabilitation Act of 1973 to students with documented disabilities. If you are a student requesting accommodations for this course, please contact your professor at the beginning of the semester and register with the Accessibility Resource Coordinator, Wendy Perkins, for the facilitation and verification of need. The Accessibility Resource Coordinator is located in the Center for Academic and Accessibility Resources (CAAR) Office in the Pederson Administration building, and can be contacted by calling 805.493.3878 or emailing

[wperkins@callutheran.edu](mailto:wperkins@callutheran.edu)

**STATEMENT ON ACADEMIC HONESTY:**

The educational programs of California Lutheran University are designed and dedicated to achieve academic excellence, honesty and integrity at every level of student life. Part of CLU's dedication to academic excellence is our commitment to academic honesty. Students, faculty, staff and administration share the responsibility for maintaining high levels of scholarship on campus. Any behavior or act which might be defined as "deceitful" or "dishonest" will meet with appropriate disciplinary sanctions, including dismissal from the University, suspension, grade F in a course or various forms of academic probation. Policies and procedures regarding academic honesty are contained in the faculty and student handbooks.

Plagiarism, cheating, unethical computer use and facilitation of academic dishonest are examples of behavior which will result in disciplinary sanctions. Plagiarism includes, but is not limited to:

- word for word copying without using quotation marks or presenting the work as yours
- using the ideas or work of others without acknowledgement
- not citing quoted material. Students must cite sources for any information that is not either the result of original research or common knowledge.

**PEARSON LIBRARY:**

At Cal Lutheran we won't tell you what to think — we'll teach you how to think. You'll learn how to gather information, analyze and synthesize. Don't worry about the "gathering"... that's the easy part. We have technicians, information specialists, and trainers to help you find the information you need. Pearson Library provides access to scholarly books, journals, ebooks, and databases of full text articles from scholarly journals. To begin using these materials, visit the library web page

<http://www.callutheran.edu/iss/research/> . Librarians are available to assist you at the Thousand Oaks campus or via Meebo chat on the Library's home page or emailing [CLULibrary@callutheran.edu](mailto:CLULibrary@callutheran.edu). You may contact the library at (805) 493-3250. If you attend classes at one of CLU's satellite locations, see <http://www.callutheran.edu/iss/research/satellite.php> for the full range of services provided.

**CLU WRITING CENTER:**

Experienced Writing Center tutors help CLU's undergraduate and graduate students with their writing projects: reading free writes to find the best ideas; refining thesis statements; showing students how to structure paragraphs; and using specific exercises to improve sentence syntax. They work with whole classes as well as with individual students on the style guidelines required for papers in the various disciplines.

All enrolled CLU students are invited to make use of our services. For additional information, please visit [http://www.callutheran.edu/writing\\_center/](http://www.callutheran.edu/writing_center/) , call 805-493-3257, [book online at GenBook](#), or stop by the Writing Center (The Darling Collaboration Suite in the library) to schedule an appointment.

**DISCLAIMER:**

This syllabus may change from time to time to accommodate changing circumstances. Every effort will be made to alert students to changes that occur in a timely manner. The class schedule is presented below. While the material will be covered in the order presented in the schedule, the actual timing may change from week to week as the course progresses.

**CLASS SCHEDULE:**

You will be notified of reading assignments and class topics at least 1 week ahead of time. Please consult Blackboard for up-to-date schedule information.

Week 1:	Introduction State Machines
Reading:	Chapter 1 State Machines -- Embedded Systems Design State Machines -- Embedded Systems Programming Lab book -- TBA
Homework:	TBA
Week 2:	Propeller Instruction Set Circuit Design
Reading:	Chapter 1 from Text (Berger)
Homework:	TBA
Week 3:	Embedded Systems Design Process Input/Output Pin Test circuits Propeller Board Pin Test Report Input/Output Pin Test Software (1 pin at a time) Input pin test software (> 1 pin at a time)

	Output pin test software (> 1 pin at a time)
Reading:	Chapter 2
Homework:	Part 1: Embedded Systems Usage Journal Part 2: see week 3 PowerPoint presentation for specification
Week 4:	Operating Systems
Homework	TBA
Reading:	Chapter 3
Week 5:	Design Partitioning Servo Motor Control
Reading:	Lab book – TBA
Homework:	TBA
Week 6:	Potentiometer Lab
Reading:	Chapter 9 Testing (text book)
Homework:	TBA
Week 7:	Testing Embedded Systems Photoresistor Lab
Reading:	Chapters 5 (software techniques) and 6 (toolsets) (text book)
Homework:	TBA
Week 8:	Tools and Software Techniques Seven Segment Display (LED)
Reading:	Lab book – TBA
Homework:	TBA
Week 9:	Digital Potentiometer Lab
Reading:	
Homework:	See PowerPoint presentation for final project specification
Week 10:	Course Review
Reading:	
Homework:	Prepare Final Project
Week 11:	TBA – Final Exam (Final Project due)