

Syllabus

ESE380 Embedded Microprocessor Systems Design I

Fall 2017, revised August 11, 2017 6:42 pm

Instructor: Prof. Kenneth Short

(Office hours 12:00 to 2:00 pm. on Tuesdays and Thursdays in room 229 Light Engineering Bldg.)

Objectives

An enormous variety of electronic systems, ranging from trivial to extremely complex, are designed around an embedded microprocessor or embedded microcontroller. This course presents the fundamental hardware and software concepts and methodologies used in the design of these systems.

Textbook

There is no required textbook for this course. A textbook that uses an AVR microcontroller similar to the one used in ESE380 this semester is:

The AVR Microcontroller and Embedded System, Mazidi, Naimi, and Naimi, Prentice Hall, Copyright 2011, ISBN 0-13-800331-9.

If you are uncomfortable in the course without a textbook, you may wish to use this book. However, the microcontroller that we will use this semester, while very similar to the one in this textbook, has additional features.

Other Reference Materials

The microcontroller used in this course as the instructional example is Atmel's ATmega324PV-10PU. There are five primary Atmel reference documents used in this course:

1. ATmega324P/V Data Sheet
2. Atmel 8-bit AVR Instruction Set
3. AVR Assembler
4. Atmel Studio 7

The first two documents can be found on Blackboard under Documents > Atmel Documents. The other two documents are accessed through the Help tab in Studio 7. Other useful documents will also be available for download from Blackboard.

The ATmega324P/V Data Sheet will be your primary reference document.

A weekly reading assignment list is provided on Blackboard.

You should also have access to a good introductory digital logic design textbook. Your textbook from ESE 218 should suffice.

Blackboard

You can access class information on-line at: <http://blackboard.stonybrook.edu>. If you used Blackboard during the Spring semester, your login information (Username and Password) has not changed. If you have never used Stony Brook's Blackboard system, your initial password is your SOLAR ID# and your username is the same as your Stony Brook username, which is generally your first initial and the first 7 letters of your last name.

For problems logging in to Blackboard, go to the helpdesk in the Main Library SINC Site, you can also call: 631-632-9602 or e-mail: helpme@stonybrook.edu.

Lecture

The purpose of the course lectures is to clarify and extend concepts from the reading assignments and to elaborate on concepts required for the laboratory design work. Lectures are held in room 145 of the Old Engineering Building from 4:00 to 5:20 pm on Tuesdays and Thursdays.

Lectures are presented in a manner that assumes that you have completed all assigned reading prior to the lecture. Reading assignments are taken primarily from the reference material that is available on Blackboard, Atmel's web site (<http://www.atmel.com>), or Studio 7's Help files. Copies of the PowerPoint presentations used in the lectures are also available on Blackboard.

No electronic devices (this includes computers, recording devices, and cell phones) are to be ON or used during lecture.

Atmel Studio 7

The software development environment used in this course is Atmel Studio 7. Programs for this course are written in assembly language. Studio provides an assembler and simulator for developing and debugging programs for Atmel's AVR family of microcontrollers, including the ATmega324PV. You should download and install a copy of this software to your computer from Atmel's web site. A link to the appropriate web page is provided on Blackboard under Documents > ATMEL STUDIO 7.x. Atmel Studio is also available for use in the Embedded Systems Design Laboratory and the ECE CAD Laboratory.

Laboratory

Laboratory starts the first week of classes, the week beginning August 27th. During your assigned laboratory section that week you will be given an orientation to the operation and procedures of the Embedded Systems Design Laboratory (ESDL), receive your laboratory computer account, and select a partner to work with in the laboratory for the remainder of the semester. An understanding of the information given in that orientation is critical to your success in the laboratory portion of this course. Please be punctual.

In addition to the orientation the first week of the semester, you will perform an “out-of-lab laboratory” activity involving the creation of a schematic diagram of a very simple embedded system. The remainder of this document describes that schematic capture activity. The actual schematic that you create will not be due until the prelab for Laboratory 01, the second week of the semester.

You must be registered for and attend one of the following three-hour scheduled laboratory sections:

Lab. Sec. 1	Wednesday	8:55 to 11:55 am
Lab. Sec. 2	Wednesday	2:25 to 5:25 pm
Lab. Sec. 3	Thursday	8:25 to 11:25 am
Lab. Sec. 4	Friday	8:55 to 11:55 am
Lab. Sec. 5	Friday	1:00 to 4:00 pm

Laboratory sections meet once a week in the Embedded Systems Design Laboratory (ESDL) in room 230 of the Light Engineering building. **Starting the week beginning August 27th you must be present in your assigned section at its scheduled starting time.**

Laboratory assignments are performed by teams of two students. Your first laboratory session will consist of an orientation and an introduction to wiring techniques. At this laboratory session, you must select a partner who you are expected to work with for the entire semester. Teams of more than two students are not permitted. Attendance during the first laboratory session is mandatory.

Laboratory assignments are generally provided one week before they must be performed. Except for the first week, a portion of your pre-laboratory work must be electronically submitted the day before your assigned laboratory section meets. **Your completed laboratory report must be submitted, to your TA, by the end of your laboratory section. No work is accepted late.** Due to staff and equipment limitations, it is not possible for you to make up missed laboratory work.

Grading

Three exams and a final will be given. The exams cover lecture, laboratory, and reading material. Your course grade will be computed as follows:

Exams	45%	Thursday September 28th, Thursday October 26th, and Tuesday November 21st.
Final	20%	Monday December 18th (2:15 to 5:00 pm)
Labs	35%	

Any questions you have regarding the grading of an exam or laboratory work must be resolved within one week from the day the graded work is made available for return to your laboratory section. **After one week, no grade changes will be made for any reason!!!**

Being Successful in this Course

Your grade in this course is based solely on your performance in the exams and laboratories. A lot of material is covered in the course and much of it is rather detailed. Both hardware and software concepts are initially introduced at a very basic level to accommodate those who are completely new to the material. However, the ramp up in level is significant as the semester progresses.

You need to master concepts in a very short time after they are presented in class. If you have difficulty in understanding any course material, get help from the teaching assistants or instructors as soon as possible. You need to apply yourself from the start and continue to apply yourself throughout the semester. If you wait until later in the semester to get any needed assistance, it will be too late.

Provost's Statement

The University Senate Undergraduate and Graduate Councils have authorized that the following required statements appear in all teaching syllabi (graduate and undergraduate courses) on the Stony Brook Campus.

Americans with Disabilities Act:

If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Disability Support Services, ECC (Educational Communications Center) Building, room128, (631) 632-6748. They will determine with you what accommodations, if any, are necessary and appropriate. All information and documentation is confidential.

Academic Integrity:

Each student must pursue his or her academic goals honestly and be personally accountable for all

submitted work. Representing another person's work as your own is always wrong. Faculty are required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology & Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website at <http://www.stonybrook.edu/uaa/academicjudiciary/>

Critical Incident Management:

Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of Judicial Affairs any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures.

Electronic Communication Statement

Email and especially email sent via Blackboard (<http://blackboard.stonybrook.edu>) is one of the ways the faculty officially communicates with you for this course. It is your responsibility to make sure that you read your email in your official University email account. For most students that is Google Apps for Education (<http://www.stonybrook.edu/mycloud>), but you may verify your official Electronic Post Office (EPO) address at <http://it.stonybrook.edu/help/kb/checking-or-changing-your-mail-forwarding-address-in-the-epo>.

If you choose to forward your official University email to another off-campus account, faculty are not responsible for any undeliverable messages to your alternative personal accounts. You can set up Google Mail forwarding using these DoIT-provided instructions found at <http://it.stonybrook.edu/help/kb/setting-up-mail-forwarding-in-google-mail>.

If you need technical assistance, please contact Client Support at (631) 632-9800 or support-team@stonybrook.edu.