

ESE 123 Syllabus for Fall 2017

Objectives:

ESE123 is an introductory course intended to introduce students to basic electrical engineering concepts, equipment usage, and laboratory procedures. Our primary interest will be in developing familiarity with the basic tools of the working engineer: test equipment, simulation software, and basic circuit construction techniques. You still have another three years to fill in the details. We will not cover topics in great mathematical depth, but we will cover a vast breadth of material.

You will get to experience the thrill and challenge of building a working circuit, as well as the despair of report writing. The class is centered on building and programming a microcontroller based digital clock with an integrated switch-mode USB power supply. We will discuss engineering careers, and we will try to answer the most important question of the course: will you enjoy an engineering career?

There is no text for the class.

Course Learning Outcomes: After completing this course, students should be able to:

1. Analyze simple circuits
2. Demonstrate proficiency in the use of electrical test equipment
3. Demonstrate basic circuit assembly techniques
4. Utilize computer automated design (CAD) tools to model circuits
5. Describe how example circuits work
6. Effectively document experimental results with written laboratory reports
7. Perform some basic assembly language programming

Topics:

The course will be presented in three main sections as outlined below. Within each section multiple sub topics will be explored:

- Use of laboratory equipment and basic circuit theory
 - Electrical units (volt, amp, ohm, watt, coulomb, hertz)
 - Conductors, insulators, and semiconductors
 - Laboratory safety and procedures
 - Ohm's law
 - Series and parallel connections
 - Power dissipation in a resistor
 - Kirchoff's voltage and current laws
 - Soldering and prototyping
 - Circuit simulation software
- Construction and evaluation of a switching USB power supply
 - Reading specifications
 - Transformers

- Capacitors
- Diodes and bridge rectifiers
- Basic buck converter topology
- Power supply efficiency
- Crowbar voltage limiter
- Construction of a digital clock
 - Digital logic levels
 - Digital representation of numbers
 - Display drivers
 - Microcontrollers
 - Assembly language programming

Laboratory work:

Modern engineering is very much a team activity, and you will be working in the laboratory in groups of two. Each laboratory assignment consists of a prelab assignment that must be completed *before* the laboratory section begins and a laboratory procedure that will be followed during the lab. The lab procedure will be made available on blackboard and must be brought to the laboratory as the lab computers are not connected to the Internet. A USB flash drive will be useful to record your results.

Each student will be required to present a completed prelab assignment to their teaching assistants (TAs) at the beginning of the laboratory section. After the completion of the lab, the lab group will work together to answer the questions presented in the laboratory procedure. The prelab assignment and answered questions will be submitted to the TAs at the end of the laboratory section for grading.

Written communication is an essential part of the engineering profession. Each student will be required to prepare a written laboratory report. A report guideline will be posted on blackboard.

Exams:

There will be two midterm exams in addition to the final exam. We will have an exam after the completion of each major section of the course. The midterm exams will be held in our regular classroom during our regular class time. The final exam will be held in our regular room at a time determined by the registrar.

Course materials including practice exams will be posted on Blackboard.

Grading:

The grading will be broken down as follows:

Weekly laboratory assignments:	35%
Laboratory report:	5%

Quizzes	5%
Midterm 1	15%
Midterm 2	15%
Final exam:	25%

Schedule:

The lecture meets from 5:30 pm to 6:50 pm on Mondays and Wednesdays in Frey Hall room 104.

Most laboratories will be conducted in Light Engineering room 283. The laboratory sections will begin meeting on September 12th.

My office hours will be on Tuesdays from 8 p.m. to 9 p.m. and Wednesdays from 3:00 p.m. to 5:00 p.m. in Light Engineering 215. I will be happy to meet with students at other times by appointment.

Each of the Teaching Assistants will also hold office hours that will be posted on blackboard.

Contact Information: David Westerfeld x21358, david.westerfeld@stonybrook.edu.

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.

Document revised by David Westerfeld 28 August 2017.