

MITx

6.002x – Circuits and Electronics

General Information

September 5th, 2012

6.002x is a fundamental undergraduate electrical engineering course that introduces engineering in the context of the lumped circuit abstraction. Topics covered include: resistive elements and networks; independent and dependent sources; switches and MOS transistors; digital abstraction; amplifiers; energy storage elements; dynamics of first- and second-order networks; design in the time and frequency domains; and analog and digital circuits and applications. Design and lab exercises are also significant components of the course.

Materials taught in 6.002x are equivalent to those taught in 6.002. At MIT, 6.002 is in the core of department subjects required for all undergraduates in Electrical Engineering and Computer Science.

1 Prerequisites

In order to succeed in this course, students must have taken an Advanced Placement (AP) level physics course in electricity and magnetism. Students must know basic calculus and linear algebra, and have some background in differential equations. At MIT, the equivalent course 6.002 requires 18.03 and one of 8.02 and 6.01. All three courses can be found on MIT OpenCourseWare.

2 Course Overview

The course is organized by weeks. To keep pace with the class, you are expected to complete all the work by the due dates indicated. Homeworks and labs must be completed by the Sunday of the week following the one in which they are posted. Weekly coursework includes:

- Interactive video sequences;
- Readings from the textbook;
- Homework;
- Online laboratories;
- Tutorials.

The course will also have a midterm exam and a final exam. Those who successfully earn enough points will receive an honor code certificate from MITx.

3 Interactive video sequences

Lecture style videos are presented in interactive video sequences (or *sequences* for short), and are posted in the *Courseware* section of the website. Each sequence includes a succession of short video clips and online exercises, arranged in a logical progression. Two sequences will be given each week; please take the time to watch each video and each exercise in the sequence they are provided. Answer-check mechanisms are provided in these exercises, but they will not contribute towards your grade.

4 Textbook

The course textbook is the following:

Foundations of Analog and Digital Electronic Circuits. Agarwal, Anant, and Jeffrey H. Lang. San Mateo, CA: Morgan Kaufmann Publishers, Elsevier, July 2005. ISBN: 9781558607354.

The textbook may be purchased from Amazon. While recommended, the book is not required: relevant sections will be provided electronically as part of the online course for personal use in connection with this course only.

5 Homework & Online Laboratories

A variety of interesting circuit analysis problems will be assigned as homework. Those problems best illustrated through experimentation are given as online laboratories (or *labs* for short). Homework and labs will be issued at the start of each week, in the *Courseware* section under their corresponding weeks.

Homework and labs must be completed by the Sunday of the following week. **Late submissions in any format will not be accepted.**

While collaboration is welcomed and encouraged, **you are not allowed to post full solutions.**

6 Tutorials

Tutorials are conversational step-by-step videos designed to teach you how to solve the circuit problems that are encountered throughout 6.002x. Several tutorials are issued each week, each either working through a relevant problem or illustrating an interesting principle.

The tutorials will not cover new materials, and in this sense they can be considered optional. However, they do provide an invaluable reinforcement of concepts covered during the sequences and the homework, and we highly recommend that you take the time to watch each tutorial.

7 Midterm and Final Exam

A significant portion of your final grade in 6.002x will be determined by the midterm and the final exam. We will announce with the exams the deadline by which you must complete them. Exercises, homework and labs are critical to learning the material and for doing well on the exams. It is very likely that one or more of the exercise, homework or lab problems will appear in each of the exams.

Once you view an exam, you must work on your own till you have submitted all your work, and do not discuss the exam until the deadline for exam submissions is past. While the exams will be open book, we encourage you to create a couple of sheets of notes for each exam. These notes will not only help you prepare, but they will also serve as a convenient reference during the exam. You may use a calculator if needed.

You are not allowed to post answers to exam problems. Collaboration of any form is strictly forbidden in the midterm and the final exams.

8 Discussion Forum

We will provide a discussion forum on our website for all students of 6.002x. You may use these forums to discuss course concepts, problem solving approaches, interesting references, or anything else that may be of interest. You may just use it to ask questions. Please observe the appropriate online etiquette and be courteous to your fellow students when using the discussion forum. The forum is moderated by course staff.

Course staff will be available at periodic timeslots to answer questions on the discussion forum. A schedule of the timeslots will be posted in a separate document under the *Course Info* tab.

9 Grading

Letter grades will be based on the following weighting: homework 15%, labs 15%, midterm 30%, and final exam 40%. Each of the homework and labs carries equal weight. You will need to get a total mark of 60% for a C, 70% for a B, and 87% for an A.

Homework and labs will be graded based on the best ten out of twelve individual grades. Therefore, two homework assignments and two labs may be missed in total without a grade penalty.

10 Certification

As with all edX courses, 6.002x will have an option for students to receive an honor-code certificate free of charge.