

**ELEC 2200 - DIGITAL LOGIC CIRCUITS
SUMMER SEMESTER - 2017**

Bulletin Data: ELEC 2200. DIGITAL LOGIC CIRCUITS (3). Prereq. COMP 1200 or COMP 1210. Electronic devices and digital circuits; binary numbers; Boolean algebra and switching functions; gates and flip-flops; combinational and sequential logic circuits; hierarchical design of digital systems; computer-aided design tools for digital design, simulation, and testing.

Textbook: *Digital Logic Circuit Analysis and Design*, 2nd Edition, V.P. Nelson, B.D. Carroll, H.T. Nagle & J.D. Irwin.
You do not need to purchase a book for this semester. A draft of this new edition (PDF file) will be uploaded to the course Canvas page for your use.

Web Site: <http://www.eng.auburn.edu/~nelson/courses/elec2200>
(Copies of assignments, supplementary documents, etc.)

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Course Objectives:

1. To be able to analyze and design combinational logic circuits
2. To be able to analyze and design sequential logic circuits
3. To be able to develop and simulate gate-level models of digital logic circuits

Prerequisites by topic:

Introductory computer programming in a high level language (COMP 1200 or 1210 or equivalent)

Topics:

1. Introduction to digital systems
2. Number systems and codes
3. Boolean and switching algebra
4. Switching functions and canonical forms
5. Circuit minimization via Karnaugh maps
6. Design and analysis of combinational circuits
7. Modular design, decoder/encoder modules, multiplexers/demultiplexers
8. Arithmetic circuits and ALUs
9. Design examples
10. Latches and flip-flops
11. Registers, counters and shift registers
12. Synchronous sequential circuit analysis
13. Synchronous sequential circuit design
14. Sequential circuit design examples
15. Programmable logic devices (time permitting)
16. Exams and review

Textbook

Sections:

- 2.1
1.1 - 1.5
2.3.1
2.3.2 – 2.3.5
2.4.1 – 2.4.3
3.1 – 3.2
3.3.1 – 3.3.3
3.3.4
3.4
4.1 – 4.2
4.3 – 4.5
5.1
5.2 – 5.3
5.4
To be provided

Course Grades Will Be Determined As Follows:

Homework	50 points
Hour exams (2 @ 100 points each)	200 points
Final exam (Friday, August 4, 8:00-10:30 a.m.)	150 points
TOTAL: 400 points	

All exam and assignment grades will be posted to Canvas.

Reading Assignments:

You are responsible for studying all textbook sections listed above, in addition to material presented in class.

Exams:

The two hour exams and the final exam will be closed book and closed notes. Make-up exams will be given only in the case of university-approved activities or documented emergencies.

Homework:

The key to learning any engineering concept is to study it and understand how to apply it to solve problems. The role of the course instructor is to assist you in this endeavor by explaining concepts in class, providing meaningful homework to help you study and learn them, and reviewing homework problems after they have been graded and returned. The purpose of homework is to:

1. apply relevant engineering principles to specific applications, to improve mathematical, scientific, and analytical skills, and to identify technical points that need further clarification;
2. improve communication skills, to develop technical writing skills, to improve computer usage and graphical display skills, and to clarify concepts; and
3. encourage class participation and to promote class involvement, responsibility, and professionalism.

Each student is expected to develop his/her own solution to all homework problems. Collaboration and answer checking are acceptable; however, **each student must only submit his/her own work**. To submit the work of others is an academic honesty policy violation, which will be handled according to the procedures in the *Tiger Cub*. Late homework will be accepted only under extenuating circumstances and must be submitted using the procedure described above under class attendance. **Homework is late if it is submitted after class convenes (9:45 p.m.)!**

Homework should be submitted on 8.5" x 11" paper, with writing on one side only. To help me keep track of assignments, please staple all pages together and label the top of the first page of your assignment as follows. (*Please don't waste paper on a "cover page".*)

<p><i>Your Name</i> <i>ELEC 2200, Assignment Number</i> <i>Date submitted (May 23, 2017)</i></p>
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Homework will be graded on technical merit. Your presentation should be neat, easily legible, technically literate, technically correct, and well-organized (i.e. I need to be able to read what you've done.)

CLASS ATTENDANCE:

Class attendance is required; class convenes promptly at 9:30 a.m. Please notify the instructor of any absences or other issues via email. If you have an AU-approved excuse for absence, please submit documentation (or a scanned copy), identifying the class involved, the particulars, and your name.

Regular, on-time class attendance is important because:

- Your understanding of the material will be greater. You will receive a professionally prepared presentation on, and discussion of, the subject, which frequently includes supplementary material not in the text, plus opportunities to interact with your fellow students to promote learning.
- The course will be easier, and your grade will be higher.
- You are made aware of any administrative changes relating to the course, receive returned homework, quizzes, copies of handouts, etc.
- Late arrivals, or early departures, are distractions to the class, and are inconsiderate.
- It is expected that a 3-credit course receive at least 9 hours of effort per week (**13.5 hours on the summer schedule**). The most efficient and constructive use of three hours of this time is to spend it in class.

Therefore, your attendance record will be a factor in determining your course grade as follows.

- 3 unexcused absences will result in the final course grade being reduced by one letter grade.
- 4 or 5 unexcused absences will result in the final course grade being reduced by two letter grades.
- 6 or more unexcused absences will result in a final course grade of “FA” (failure due to excessive absences)

Academic Honesty Policy: All portions of the Auburn University student academic honesty code (Title XII) found in the Tiger Cub will apply to this class. All academic honesty violations or alleged violations of the SGA Code of Laws will be reported to the Office of the Provost, which will then refer the case to the Academic Honesty Committee.

Policy on Unannounced Quizzes: There will be no unannounced quizzes in this class.

Special Accommodations: Students who need special accommodations are asked to arrange a meeting during office hours the first week of classes, or as soon as possible if accommodations are needed immediately. If you have a conflict with my office hours, an alternate time can be arranged. To set up this meeting, please contact me by E-mail. Bring a copy of your Accommodation Memo and an Instructor Verification Form to the meeting. If you do not have an Accommodation Memo but need accommodations, make an appointment with The Program for Students with Disabilities, 1244 Haley Center, 844-2096 (V/TT).

Office Hours: You are encouraged to come by my office during posted hours to discuss problems or anything related to the course (or anything else that might be on your mind). This course builds on itself as it progresses, so it is important that you address and resolve problems as they arise, rather than waiting until the day before an exam.

Contribution of course to meeting the professional component:

Engineering science:	1 credit or 33%
Engineering design:	2 credits or 67%

Primary student outcomes related to this course:

Graduates will have achieved and demonstrated

- (a) an ability to apply knowledge of mathematics, science, and engineering
- (c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability