Point Loma Nazarene University **Fall 2017**
EGR422-01: Digital Electronics
2 credits
Lecture: MWF 8:30-9:25, RS 219

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Office Hours: 11AM-12PM M-W, TR 1-2:30 and by appt, RS210
Class Materials:

Textbook – *BeBOP to the Boolean Boogie,* by Maxfield, C., Elsevier, 2009, 3rd Edition, ISBN 978-1-85-617507-4

Course Description – Boolean algebra, logic gates, combinational logic circuits, state minimization, flip/flops, sequential circuits, asynchronous and synchronous counters. Course emphasizes design aspects using electronic design software. Three lectures and one laboratory each week.

Learning Objectives –In this course there are a number of specific goals for you to meet from each chapter. These smaller goals fit into the following overall course learning objectives. Once you complete this course, you should be able to:

1. Understand the concepts of basic digital electronics, the theory of Boolean algebra, logic devices and switching theory.
2. Understand digital logic gates, combinational logic circuits, state minimization.
3. Learn and analyze multiplexers, demultiplexers, flip/flop devices, sequential circuits, asynchronous and synchronous counters and shift registers
4. Study the use of encoders and converters, analog signals and triggering logic responses.
5. Study Analog to Digital converters, LED displays, LCD crystal displays.
6. Study and analyze memory devices, memory size, organization and allocation, ROM, RAM, and programmable ROM.

Homework – Homework is worth 20% of your final grade.

Submission: Written homework solutions should be worked neatly in clear logical steps. (Solutions and explanations should be clear enough that one of your peers could easily follow what you did if they had not worked the problem before.)

Collaboration: We expect and encourage collaboration between you and your peers while working on your homework, but your work should be your own original solutions. Allow adequate time to work and think about problems by yourself first before you work together with your peers or ask questions of me. When you sit down to write up a problem, you should not use notes copied from someone else. The guideline is that you should have no trouble explaining or repeating work that you turn in.

Late Submission: Up to one late assignment per quad will be accepted late with a 10% reduction in grade for every day it is late. This begins with a 10% reduction for an assignment turned in later in the day after this homework has been collected at the beginning of class. Subsequent late assignments will not be graded and will receive a score of zero.

Lab – You will participate in a lab designed to give you hands-on experience with the concepts covered in the class meetings. Lab will also provide an opportunity for you to use instruments common to the physical sciences, perform measurements, and analyze data using the scientific method. Labs will be completed in small groups, with each member of the team completing his or her own worksheet. Labs comprise 20% of your final grade. You must pass the lab portion of the class to pass the course.

Late Submission: Up to one laboratory assignment per quad will be accepted late with a 10% reduction in grade for every day it is late. This begins with a 10% reduction for an assignment turned in later in the day after the subsequent lab has begun. Subsequent late assignments will not be graded and will receive a score of zero.

Exams – Examinations will be given in class, which count toward 40% of your final grade, consisting of two midterms (20% each). The final exam is comprehensive and counts for 20% of your grade. Exams will be closed book. Partial credit will be given for correct reasoning at any step of the problem, but only if it is communicated clearly enough for me to understand. For problems that call for a solution or explanation, no credit will be given for an answer alone; the method or reasoning must also be shown.

Late/missed exam and final policy: A missed exam or final will be scored as a zero unless there are extenuating circumstances approved by the instructor. Exams may not be missed due to travel and other personal reasons without prior approval from the instructor.

Final Grades – The grade you earn in this course is based on the following scale:

100%-92% A, 92%-89% A-,

89%-87% B+, 87%-82% B, 82%-79% B-,

79%-77% C+, 77%-72% C, 72%-69% C-,

69%-67% D+, 67%-60% D, 60%-55% D-.

The points you receive during the course are weighted accordingly:

homework: 20%, labs: 20%, exams (2): 40%, final exam: 20%.

The final exam will be given on Wednesday, Dec 13 at 7:30-10AM.

University Mission:

Point Loma Nazarene University exists to provide higher education in a vital Christian community where minds are engaged and challenged, character is modeled and formed, and service is an expression of faith. Being of Wesleyan heritage, we strive to be a learning community where grace is foundational, truth is pursued, and holiness is a way of life.

Department Mission:

The Physics and Engineering Department at PLNU provides strong programs of study in the fields of Physics and Engineering. Our students are well prepared for graduate studies and careers in scientific and engineering fields. We emphasize a collaborative learning environment which allows students to thrive academically, build personal confidence, and develop interpersonal skills. We provide a Christian environment for students to learn values and judgment, and pursue integration of modern scientific knowledge and Christian faith.

Attendance:

Attendance is expected at each class session. In the event of an absence you are responsible for the material covered in class and the assignments given that day.

Regular and punctual attendance at all classes is considered essential to optimum academic achievement. If the student is absent from more than 10 percent of class meetings, the faculty member can file a written report which may result in de-enrollment. If the absences exceed 20 percent, the student may be de-enrolled without notice until the university drop date or, after that date, receive the appropriate grade for their work and participation. See http://catalog.pointloma.edu/content.php?catoid=24&navoid=1581#Class_Attendance in the Undergraduate Academic Catalog.

Class Enrollment:
It is the student's responsibility to maintain his/her class schedule. Should the need arise to drop this course (personal emergencies, poor performance, etc.), the student has the responsibility to follow through (provided the drop date meets the stated calendar deadline established by the university), not the instructor. Simply ceasing to attend this course or failing to follow through to arrange for a change of registration (drop/add) may easily result in a grade of F on the official transcript.

Academic Accommodations:
If you have a diagnosed disability, please contact PLNU's Disability Resource Center (DRC) within the first two weeks of class to demonstrate need and to register for accommodation by phone at 619-849-2486 or by e-mail at DRC@pointloma.edu. See Disability Resource Center for additional information. For more details see the PLNU catalog:
http://catalog.pointloma.edu/content.php?catoid=24&navoid=1581#Academic_Accommodations

Students with learning disabilities who may need accommodations should discuss options with the instructor during the first two weeks of class.

Academic Honesty:
Students should demonstrate academic honesty by doing original work and by giving appropriate credit to the ideas of others. Academic dishonesty is the act of presenting information, ideas, and/or concepts as one's own when in reality they are the results of another person's creativity and effort. A faculty member who believes a situation involving academic dishonesty has been detected may assign a failing grade for that assignment or examination, or, depending on the seriousness of the offense, for the course. Faculty should follow and students may appeal using the procedure in the university Catalog. See http://catalog.pointloma.edu/content.php?catoid=24&navoid=1581#Academic_Honesty for definitions of kinds of academic dishonesty and for further policy information.

Final Exam: Date and Time:
The final exam date and time is set by the university at the beginning of the semester and may not be changed by the instructor. This schedule can be found on the university website and in the course calendar. No requests for early examinations will be approved. Only in the case that a student is required to take three exams during the same day of finals week, is an instructor authorized to consider changing the exam date and time for that particular student.

Copyright Protected Materials:
Point Loma Nazarene University, as a non-profit educational institution, is entitled by law to use materials protected by the US Copyright Act for classroom education. Any use of those materials outside the class may violate the law.

Credit Hour:
In the interest of providing sufficient time to accomplish the stated course learning outcomes, this class meets the PLNU credit hour policy for a 2 unit class delivered over 15 weeks. Specific details about how the class meets the credit hour requirements can be provided upon request.

FERPA Policy As a student at Point Loma, you have a legal right to privacy as outlined in the federal FERPA (Family Educational Rights and Privacy Act) legislation. See Policy Statements for full text.

Boolean algebra, logic gates, combinational logic circuits, state minimization, flip/flops, sequential circuits, asynchronous and synchronous counters. Course emphasizes design aspects using electronic design software

TENTATIVE Course Schedule

Week	ACTIVITY
1	Introduction to Digital Logic topics, Fall break
2	Binary, Hex, Decimal number systems
3	Logic Gates, Boolean Algebra
4	Combinational logic circuits, test 1 (Friday)
5	State minimization, Flip flops
6	Sequential Circuits, Thanksgiving break
7	Asynchronous and Synchronous counters, Test 2
8	Review and additional lab work