EGR 422-01: Digital Electronics **Course Syllabus, Spring 2016**

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Office hours:	MW 1:30 – 2:30, TR 1:00-2:30 and by appointment
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Class Meeting Time:	(RS 211) 8:00 - 9:15 a.m. T-R, RS 236, Lab F 1:30-3:30 p.m.

PLNU Mission
To Teach ~ To Shape ~ To Send

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 becomes an expression of faith. Being of Wesleyan heritage, we aspire to be a learning community where grace is foundational, truth is pursued, and holiness is a way of life.

Materials – *Main text*: Practical Electronics for Inventors, by Scherz, P., and Monk, S., McGraw Hill, 2013, 3rd Edition, ISBN 978-0-07-177133-7.

Supplemental text: Foundations of Analog and Digital Electronic Circuits ISBN #9781558607354, Argawal, A., Lang, J., Elsevier Inc., 2005, 1st edition. Available in paperback, Kindle, and electronic format (downloadable).

Prerequisites or Co-requisites - PHY 142 or 242 University Physics; with analytic, and calculus-based study of mechanics, waves, and thermodynamics.

Canvas:
The online resource Canvas is integral for this course, and you are expected to login regularly. You need a reliable internet connection to be able to use this resource.

Course Description
The course of EGR 422 – Digital Electronics is an electrical engineering course in the understanding of Boolean algebra, logic design and switching theory, logic gates, combinational logic circuits, state minimization, flip/flops and sequential circuits, asynchronous and synchronous counters. There are two lecture classes and one laboratory class per week.

Disclaimer: The content of this syllabus and/or course outline may change during this semester.

Course Learning Outcomes - The objectives of the course are 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.

Class Meetings – Studying digital electronics requires active learning and participation during class. In preparation for each class meeting there is a reading assignment. To maximize your learning and participation during our meetings it is very important that you have read this material before class.

Class Conduct – Attendance and punctuality are requirements for the course to help the student maximize his overall learning experience. Class exercises, questions and other elements of participation are factors in the students' overall grade assessment. The student is accountable for *all material* covered in class. In addition, students need to respect the classroom environment, and activity such as cell phone use, talking during the class lecture portions (when not engaged in questions and answers) and/or any other related behavior that interferes with the learning experience will be addressed to the student by the instructor.

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Course Objectives – An emphasis is placed on both conceptual understanding and the ability to solve problems dealing with the concepts studied

(a) an ability to apply knowledge of mathematics, science, and engineering
(b) an ability to design a system, component, or process to meet desired needs
(c) an ability to identify, formulate, and solve engineering problems
(d) a recognition of the need for, and an ability to engage in life-long learning
(e) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
(f) an ability to apply principles of engineering, basic science, and math to model, analyze, design and realize physical systems, components or processes

General Education Learning Outcomes: GELO 1e will be assessed directly using problems on the final exam that are quantitative in nature.

Homework – Homework is worth 10% 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.

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.

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Exams – Examinations will be given in class, which count toward 40% of your final grade, consisting of three midterms. The final exam is comprehensive and counts for 15% 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.

Final Grades – The grade you earn in this course is roughly based on the following scale: 100%-88% A, 88%-85.5% A-, 85.5%-83% B+, 83%-78% B, 78%-75.5% B-, 75.5%-73% C+, 73%-68% C, 68%-65.5% C-, 65.5%-63% D+, 63%-58% D, 58%-55.5% D-. The points you receive during the course are weighted accordingly: in-class quizzes: 15%, homework: 10%, labs: 20%, exams (3): 40%, final exam: 15%.

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 Academic Policies for definitions of kinds of academic dishonesty and for further policy information.

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.

FINAL EXAMINATION POLICY
Successful completion of this class requires taking the final examination **on its scheduled day**. The final examination schedule is posted on the Class Schedules site. No requests for early examinations or alternative days will be approved.

The Final Exam will be held on Thursday, May 4, 2015 from 7:30 – 10:00 a.m.

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FERPA Policy: In compliance with federal law, neither PLNU student ID nor social security number should be used in publicly posted grades or returned sets of assignments without student written permission. This class will meet the federal requirements by (Note: each faculty member should choose one strategy to use: distributing all grades and papers individually; requesting and filing written student permission; or assigning each student a unique class ID number not identifiable on the alphabetic roster.). Also in compliance with FERPA, you will be the only person given information about your progress in this class unless you have designated others to receive it in the "Information Release" section of the student portal. See Policy Statements in the (undergrad/ graduate as appropriate) academic catalog.

Questions are always welcome and encouraged. The best way to learn is to ask questions and challenge what you are being taught. Feel free to talk to me after class or via email if you have any questions. I hope you enjoy my course!

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