

Dordt College Engineering Department

EGR 117, Introduction to Engineering Electronics

Fall Semester, 2015

2015-16 Catalog Data	An introduction to the electrical engineering fundamentals relating to electrical energy and circuit analysis. Concepts in digital logic and digital electronics are also introduced. Students will explore the principles of electronic systems within the broader context of electrical engineering analysis and design. The course meets for two lecture periods per week for the second half of the semester, with an occasional lab-studio session being held in lieu of a lecture period. (1 credit hour)
Textbooks:	The handout by professor De Boer, <i>An Introduction to electrical Engineering</i> , (2010 version) plus additional handouts including problem sets will serve as the textbook for this course.
References	<i>Getting Started with Arduino</i> , available at http://arduino.cc/en . Any of several "Linear Circuits" textbooks. For example, Allan Robbins and Wilhelm Miller, <i>Circuit analysis: Theory and Practice</i> , Delmar Publishers. Available at Dordt College from the reserve desk at that John and Louise Hulst Library. Circuit Cellar magazine and Circuit Cellar Online (http://www.circuitcellar.com) Nuts and Volts magazine http://www.nutsvolts.com
Instructor	Douglas F. De Boer, Professor of Engineering, http://homepages.dordt.edu/ddeboer Office Phone: 722-6245; Office location: SB2608 (Office hours posted on homepage, or call.) E-mail Douglas.DeBoer@Dordt.edu , Home Phone: 722-1414, please call before 10 PM.
Goals	<i>Religious Orientation and Creational Development:</i> Students will consider the motivations of those involved in electrical-engineering-related late-twentieth-century developments. Students will consider their own motivations for studying engineering. <i>Creational Structure:</i> Students will memorize definitions of basic electrical quantities such as current, voltage, and electrical power. Students will learn basic analysis techniques for electrical circuits such as nodal and mesh analysis. <i>Contemporary Response:</i> Students will consider the application of norms for the design of appropriate ergonomics for a simple I/O interface.
Prerequisites by topic	High-school algebra, high-school physics.
Laboratory	The course includes two lab-studio experiences. One will deal with analog electronics and one with digital electronics. These will be designed mostly to provide the students with a view of what types of things can be accomplished via electrical engineering. The related theory will be glossed over. In-depth laboratory coverage of these topics is offered in later courses.
Computer use	A simple integrated development environment based on the C language will be used for one of the lab-studio sessions. (The Arduino IDE) Students are encouraged (but not required) to use programs such as Mathcad or Matlab for homework solutions where appropriate. An NCEES approved calculator will be a convenient tool for most homework problems however. See http://www.ncees.org/exams/calculator-policy
Canvas@Dordt	All assignments and most handouts will be available via Dordt College's course management system, "Canvas@Dordt." The logon URL is http://dordt.instructure.com . Use your Dordt College network user ID and password. Then find the EGR 117 course on the "Courses" tab. Portions of this course's "Canvas@dordt" information are available to the world via a public web portal at http://homepages.dordt.edu/ddeboer/F15/117F15.HTM
Academic Integrity	Students must do their own work. Student may discuss homework verbally but may not show ungraded papers to each other. This course is subject to policies on academic integrity as published in the Student Handbook and the "Canvas@dordt" web site for this course.
Accommodations	Students who require assistance or accommodations based on the impact of disability must contact the Coordinator of Services for Students with Disabilities, Marliss Van Der Zwaag, to access accommodations. Telephone 722-6490, e-mail Marliss.VanDerZwaag@dordt.edu
Means of Evaluation	Homework (10%), two tests (40% each) one or two laboratory reports (10% total or 5% each) For details, follow the "grading philosophy" link at http://homepages.dordt.edu/ddeboer A reduction in grade may be introduced if the professor observes poor performance on homework combined with tardy attendance or lack of a good-faith effort toward the course. You will be contacted by the professor if you are at risk of having this factor applied to you.

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Course Outline

Spring Semester, 2015

Class meets for two 50-minute periods per week, Wednesday and Friday at 8:00 or 9:00 AM in various rooms as posted on Canvas@Dordt, except for two weeks indicated below when the class meets in the electronics lab (room SB 2803) on Thursdays 9:25 – 11:45 AM, 12:40 – 3:00 PM, or 3:10 – 5:30 PM. The laboratory-studio meetings are 140 minutes long.

Dates (one group per week)	Class Topics (Timing is approximate. Adjustments may be needed.), Room SB 2602	Laboratory-Studio Room SB2803
10/21	1. Basics: Charge, and Current 2. SI Units for Electrical Quantities 3. Voltage and Volts	
10/23	4. Electric Energy is Easily Transmissible. . . 5. “Free Niagara” 6. AC Circuits	
10/28	7. Resistors 8. Circuit Elements: Mathematical Models. . .	
10/30	9. History: Power Systems & Signal Processing 10. “CQD” 11. Bandwidth and the Shannon-Hartley Theorem 12. “1984 Won’t Be Like 1984”	
11/04	TEST ON WEDNESDAY, 11/04	
11/06	13. Circuit Analysis 14. Single Loop Circuits and KVL	
11/12		Analog electronics
11/18	15. Single Node-Pair Circuits and KCL	
11/20	16. Mesh Analysis	
12/02	17. Digital electronics	
12/04	TEST ON FRIDAY, 12/04	
12/10		Digital electronics
Exam Week	There will be no final exam,	