

Dordt College Engineering Department

EGR 117, Introduction to Engineering Electronics

Fall Semester, 2016

2016-17 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. (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	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 controlling an electronic device.
Prerequisites by topic	High-school algebra and trigonometry, 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	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 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. Portions of this course's "Canvas@dordt" information are available to the world via a public web portal at http://homepages.dordt.edu/ddeboer/F16/117F16.HTM
Academic Integrity	Students must do their own work. Students 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. Further policies appear on pages three and following of the full course syllabus.*
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 (45% each) Grades are calculated using "grade points." The course grade will be on an "A – F" scale with an optional "+" or "-". For details, follow the "grading philosophy" link near the end of the web page at http://homepages.dordt.edu/ddeboer Your course grade may be reduced for unexcused absences, homework not turned in, and other issues. See the policies on page three and following in the course syllabus* for more details.

*The course syllabus is this document, unless you have an abridged copy.

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Course Outline

Class meets for two 50-minute periods per week, Wednesday and Friday at 8:00 or 9:00 AM in SB1604 or SB1637 as posted on the Fall course schedule, available on Dordt College's DCC intranet site.

This course uses a "flipped classroom" strategy in which material is usually first presented in class only in summary form with much detail left for the reading assignments. Classroom time is intended to be used for discussion and answering students' questions. (Use a search engine to search the Web for "flipped classroom" to discover the advantages and drawbacks of this strategy.)

Dates (one group per week)	Class Topics (Timing is approximate. Adjustments may be needed.),	Laboratory-Studio
10/19	1. Basics: Charge, and Current	
	2. SI Units for Electrical Quantities	
	3. Voltage and Volts	
10/21	4. Electric Energy is Easily Transmissible. . .	
	5. "Free Niagara"	
	6. AC Circuits	
10/26	7. Resistors	
	8. Circuit Elements: Mathematical Models. . .	
10/28	TEST ON FRIDAY, 10/28	
11/02	9. History: Power Systems & Signal Processing	
	10. "CQD"	
	11. Bandwidth and the Shannon-Hartley Theorem	
	12. "1984 Won't Be Like 1984"	
11/04	13. Circuit Analysis	
	14. Single Loop Circuits and KVL	
11/09		Analog electronics
11/11	15. Single Node-Pair Circuits and KCL	
11/16	16. Mesh Analysis	
11/18	17. Digital electronics	
11/30		Digital electronics
12/02	TEST ON FRIDAY, 12/02	
12/07	(no class) (Review day, no class)	
Exam Week	There will be no final exam,	

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Note on the class schedule

The actual class schedule may vary from the content shown on the previous page to accommodate student interests and abilities. The schedule shown is merely a reasonable projection based on past offerings of this course.

Audience and Role of this Course

This course is taught at the freshman level. It is required for engineering majors and is optional for other students including those considering engineering as a major.

Missed Tests or Exams

Put this course's tests on your calendar.

Do not skip a test! If you anticipate a difficulty with a test date, discuss that in advance with Prof. De Boer. During the first two or three weeks of classes students may negotiate to change the test dates for the entire class to avoid a conflict for any one student. Negotiation of a changed test date may possibly occur at other times if there is good cause. However in the week before a test Prof. De Boer is very reluctant to negotiate the test date. If your reasons are sound for requesting a special test date, Prof. De Boer may schedule a special test time just for you. This special test time will usually be in advance of the regular test date. In this case Prof. De Boer reserves the right to give you a different test than he gives the others.

If you arrive late to a test you must still finish at the normal time.

This applies no matter how late you arrive. Additionally, if you have a pattern of tardiness or absence or if there are other demerits Prof. De Boer reserves the right to treat any test started late as a test entirely skipped.

If you miss a test entirely the test will go in the grade book as a blank score which will count as an "F." At the end of the semester Prof. De Boer will reassess the situation. He might choose to estimate what he thinks you might have earned on the test based on any evidence he can find relevant to the situation. Any grade given may be a docked grade if negligence is a factor in missing the exam. A malfunctioning cell phone alarm is an example of negligence. (Set a backup alarm for important times.)

If a test is missed due to illness Prof. De Boer will decide how to act on a case-by-case basis and may wait until the end of the semester to make a final decision. It is to your advantage if you **report your illness to student services** in as timely a way as is reasonable. Grounds for claiming illness are fever, nausea, etc. Unfortunately, a "bad cold" is too common to automatically exempt you from a test. If you have a cold come to the test as prepared as possible and talk to Prof. De Boer before the test. You will probably have to take the test.

If you become ill during a test Prof. De Boer will decide how act on a case-by-case basis and may wait until the end of the semester to make a final decision on how to handle the case.

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Late work. . . is unprofessional. **Start assigned work promptly.** You may need to **make use of office hours** to get questions answered. Working the assignments over more than one sitting, reading all assigned textbook sections, gathering questions for an office visit helps you use time efficiently and turn your work in on time with minimum stress.

All work is expected to be on time. If you expect to need extra time, at your earliest opportunity try negotiating an extension with Prof. De Boer so that your work does not get shunted. Prof. De Boer expects professional management of your due dates. He does not routinely keep track of “days late” and mark off for such, as might occur in high school. (Engineering companies demote or fire engineers for unexpectedly late work.) Any late work in this course will be handled on a case-by-case basis within the guidelines below:

Anything handed in late will be accepted for possible grading. If there is no pattern of lateness and Prof. De Boer or the grader has time, the work may be graded with the next regular assignment with no deduction for lateness. Otherwise he might hold it for a while, often until the end of the semester. If he decides to hold it, it will not be returned to you and the blank grade in the grade book will usually function equivalently to an “F.”

For work that is held, if in the judgment of Prof. De Boer, all the following conditions are true, he will grade the late work or estimate a grade for the late work. To get an estimated or actual grade, these conditions must be true:

- The work must be late for a reasonable cause.
- There is no pattern of carelessness or continuing late work.
- A non-zero grade on the item must matter relative to your course grade.

If a pattern of late work develops, Professor De Boer will privately warn you. After that warning if the problem is not resolved, **a discounted course grade might result** and/or the student may be classified as “uncooperative” which could lead to dismissal from the course.

Class Participation

Participation is expected of all students, thus Prof. De Boer does not routinely grade class participation or attendance. He does respond to non-participation. If there is a problem Prof. De Boer will talk about it privately with you. Usually mere attendance is adequate participation, presuming you are not sleeping in class or hung over or distracted by video games on your cell phone, etc. If class participation becomes a problem that is not resolved, then a discounted course grade may result.

A large fraction of this document, from this point onward, is copied from the Student Handbook as per policy in Dordt College’s “Syllabus Checklist.” There is some additional information specific to this course as well. Additional information specific to the course is in the normal typeface. *Copied information is rendered in italic text (except this sentence is not copied).*

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Attendance

Students are expected to be present for every class and laboratory period. Penalties for absence from class are left to the instructor. No designated number of skips is permitted.

Student Responsibility: *Students shall notify each professor concerning the reason for absence prior to or immediately upon returning to class or in accordance with the instructor's method of accounting for absences. Students shall notify student services concerning all illnesses.*

Professor De Boer expects to be notified by e-mail at least a day in advance any time when you will have to miss a class for a scheduled event of higher priority. An excused absence will most likely be granted. An excused absence does not automatically extend any due date. In addition to the options listed below, unexcused absences can be grounds for being classified as an "uncooperative student" which could lead to dismissal from the course. Professor De Boer will give a warning before invoking the uncooperative student process.

Unexcused absences are defined as failing to notify the instructor of the reason for the absence, or if the instructor deems the reason as illegitimate.

Faculty initiatives: *The instructor may contact student services to check on the illness record of the students. They should also alert student services and contact the student directly concerning excessive absences, and must, if asked, report attendance patterns. Any instructor may, after due warning and according to guidelines established in the class syllabus, penalize the student by reducing the semester grade by a given percentage.*

Student Services Responsibility: *Normally, student services does not notify instructors concerning student illness. Student services may alert instructors to serious problems. Decisions to inform instructors about serious problems will be made balancing the need to respect confidentiality and the responsibility to keep instructors appropriately informed about their students. Any student with serious problems is strongly advised to work closely with student services and follow the process to insure adequate communication between all parties in as efficient a way as possible.*

Excused Absence for Activities: *Students have obligations in many realms, so special care shall be taken not to demand commitments for participation in extra-curricular events that cause neglect in other areas. Sponsors/coaches shall inform students from the beginning of the time and effort expected of them. Sponsors/coaches shall demand a minimum of absences from other classes, restrict student involvement to only those crucially involved, and make efforts to choose a time/date for the event that is least invasive of classroom or lab time. In the case of conflicts, resolution shall be the responsibility of the sponsor/coach and the instructor with no penalty to the student (The appeals process outlined in the section titled Complaints Regarding Instruction in the Student Handbook shall be used if needed). The sponsor shall email faculty and student services a list of names, dates, and activities in advance of the event. The student must contact the instructor and make arrangements for any missed work.*

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Academic Integrity

Dordt College is committed to developing a community of Christian scholars where all members accept the responsibility of practicing personal and academic integrity in obedience to biblical teaching. . . .

Academic Dishonesty. Students found to be academically dishonest will receive academic sanctions from their professor (from a failing grade on the particular academic task to a failing grade in the course), who will report the incident and the sanction given to the Student Life Committee for possible institutional sanctions (from a warning to dismissal from the college).

Appeals in such matters will be handled by the student disciplinary process as outlined in the Student Handbook.

Definitions

Academic dishonesty at Dordt College includes, but is not limited to, the following behaviors:

Stealing/Plagiarizing: *copying another's work or ideas and creating the impression that they are one's own by failing to give proper credit or citation. This includes. . . [See the student handbook for the list.*

http://www.dordt.edu/campus_life/student_handbook/general_information.shtml#academic_integrity]

Cheating: *unauthorized use of any study aids, equipment, or another's work during an academic task. This includes using unauthorized aids or other equipment during an examination; copying or looking at another individual's examination; taking or passing information to another individual during or after an examination; taking an examination for another individual; allowing another individual to take one's examination; stealing examinations.*

All graded academic tasks are expected to be performed on an individual basis unless otherwise stated by the instructor.

An academic task may not be submitted by a student for course credit in more than one course without the permission of all instructors.

Lying/Fabricating: *the intentional, unauthorized falsification or invention of any information or citation during an academic task. This includes changing or adding an answer on an examination and resubmitting it to change the grade; inventing data for a laboratory exercise or report.*

Facilitating Academic Dishonesty: *knowingly allowing or helping another individual to plagiarize, cheat, or fabricate information.*

In Prof. De Boer's courses students may verbally discuss assigned work but may not show ungraded work to each other. This policy applies to the whole course, not just homework. Students may not share their course-related personally-created computer work in any form except with official team members (e.g. in a lab project), and except they may verbally discuss it with anyone. More detail on this policy can be found on the Web at

<http://homepages.dordt.edu/ddeboer/integrity/#DYOW>.