EE 1205-103
Introduction to Electrical Engineering

Spring 2013
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Catalog Course Description:
EE 1205 INTRODUCTION TO ELECTRICAL ENGINEERING (1-3) A project based course in which basic concepts in electrical engineering, such as electrical systems, power and energy, circuit laws, measurements, and data analysis will be introduced. Student teams will engage in laboratory experiments, application hands-on projects, which cover areas of study in electrical engineering including analog and digital electronics, robotics, semiconductors, electro-magnetics, signal processing, photonics, energy management, and telecommunication systems. Corequisites: EE 1104.

Topics:
EE 1205 is an introductory problem-solving course dealing with basic concepts of Electrical Engineering. The course begins with topics on electron energy and charge, current and voltage, and electrical power and energy. Also included are the important fundamental electrical engineering laws such as Kirchhoff's and Ohm's laws, and the application of these laws into the unified systematic analysis of dc resistive networks. The course concludes with the introduction to energy storage elements such as capacitors and inductors. Students will engage in laboratory experiments practically designed to involve hands-on application of course material. These experiments include the use of electronic tool kits, breadboards, and test and measurement equipment. Students will also learn how to read schematics, order parts, layout PCBs, and solder.

Corequisite:
EE 1104.

Textbooks:
1. F.T. Ulaby and M.M. Maharbiz, *Circuits*, National Technology and Science Press, 2009, ISBN 978-1-934891-00-1
2. H.T. Russell, Jr., *EE 1205 Introduction to Electrical Engineering Lab Manual, V1.3*, OPAL$_{tx}$, Fort Worth, TX, 2011.

Tools:
1. Scientific calculator. Calculators as components in communication devices are not suggested nor allowed on exams.
2. Breadboard (mandatory).
3. Toolbox (mandatory) – containing an assortment of electronics tools consisting of needle nose pliers, diagonal cutters, tweezers, precision knife set, pocket screwdrivers.

Times and Location:
Section 001 Seminar – Wednesday, 4:00 pm to 4:50 pm, TBD.
Section 103A Lecture – Thursday, 9:30 am to 10:25 am, NH112.
Section 103B Lab – Thursday, 10:30 am to 12:20 pm, NH129A.

GTA:
Lecture and lab:
TBD

EE 1205-001 Seminar Schedule			
Lecture/Date		**Topic**	**Instructor**
1	1-16	Introduction and logistics.	Alavi, Bredow, Dillon, Russell
2	1-23	Systems approach and system concepts.	Popa
3	1-30	Measurements and instrumentation.	Dillon
4	2-6	Disciplines of EE – Energy and power.	Davoudi
5	2-13	Disciplines of EE – Signals and systems.	Alavi
6	2-20	Disciplines of EE – Signals and image processing.	Devarajan, Alavi
7	2-27	**Mid-Term Exam**	
8	3-6	Disciplines of EE – Semiconductor physics, technology and industry.	Russell
9	3-13	**Spring Break**	
10	3-20	Disciplines of EE – Nanotechnology and MEMS.	Chiao
11	3-27	Disciplines of EE – EE and biomedical engineering.	Iqbal
12	4-3	Disciplines of EE – Controls and robotics.	Popa
13	4-10	Disciplines of EE – Electro-magnetics.	Bredow, Magnusson
14	4-17	Disciplines of EE – Telecommunications.	Liang
15	4-24	Disciplines of EE – Digital electronics and microprocessors.	Gibbs
16	5-1	Disciplines of EE – Analog electronics.	Russell
17	5-8	**Final Exam**	

EE 1205-103 Lecture/Lab Schedule				
Week/Date		**Lecture Topic**	**Lab Topic**	**Reading Assignment**
1	1-17	Fundamental quantities; electrical networks; polarity convention.	Lab Meeting No. 1 – lab introduction	1. Chapter 1 – 1-1 to 1-5.
2	1-24	Ideal two-terminal elements *Part 1* – the resistor; Ohm's law.	Lab Experiment No. 1	1. Chapter 2 – 2-1 to 2-2. 2. Ch1Notes – 1.1 to 1.2(b).
3	1-31	Resistor combos; ideal two-terminal elements *Part 2* – voltage and current sources.	Lab Experiment No. 2	1. Chapter 2 – 2-4 to 2-4.4. 1. Chapter 1 – 1-5 to end. 2. Ch1Notes – 1.2(e) to 1.2(g).
4	2-7	Source combinations and transformations.	Lab Experiment No. 3	3. Ch3Notes – 3.2 & 3.4.
5	2-14	Source dominance and shifting; ideal two-terminal elements *Part 3* – special elements.	Lab Experiment No. 3	3. Ch3Notes – 3.1 & 3.3. Class notes.
6	2-21	**Mid-Term Exam 1**	Open lab	
7	2-28	Network laws – KVL and KCL; Ohm's law.	Lab Experiment No. 4	1. Chapter 2 – 2-3 to 2-4.
8	3-7	Network laws – applications; voltage and current maps.	Lab Experiment No. 5	Class notes.
9	3-14	**Spring Break**		
10	3-21	Network theorems – superposition; Thevenin's and Norton's theorems.	Lab Experiment No. 5	1. Chapter 3 – 3-4 to 3-7. 3. Ch3Notes – 3.5.
11	3-28	Network theorems – dividers; maximum power transfer.	Lab Experiment No. 6	1. Chapter 2 – 2-4 to 2-5. 3. Ch3Notes – 3.6.
12	4-4	**Mid-Term Exam 2**	Open lab	
13	4-11	Wheatstone bridge – theory; applications.	Lab Experiment No. 7	1. Chapter 2 – 2-6 to 2-7.
14	4-18	The mesh analysis method and mesh equations.	Lab Experiment No. 8	1. Chapter 3 – 3-2 to 3-4. Class notes and handouts.
15	4-25	The node analysis method and node equations.	Lab Experiment No. 9	1. Chapter 3 – 3-1 to 3-4. Class notes and handouts.
16	5-2	Energy storage components – the capacitor and inductor.	Open lab	1. Chapter 5 – 5-2 to 5-4. 2. Ch1Notes – 1.2(b) to 1.2(d).
17	5-9	**Final Exam, 8:00am to 10:30am, NH112**	**Leftover lab reports due at noon.**	

References:

1. R.C. Dorf and J.A. Svoboda, *Introduction to Electric Circuits, 6th Edition,* John Wiley & Sons, Inc., 2004, ISBN 0-471-44795-1
2. Thomas L. Floyd, *Electric Circuits Fundamentals, 7th Edition,* Pearson Prentice Hall, Upper Saddle River, NJ, 2007, ISBN 0-13-219710-3
3. Robert T. Paynter and B.J. Toby Boydell, *Electronics Technology Fundamentals: Electron Flow Version,* Pearson Prentice Hall, Upper Saddle River, NJ, 2009, ISBN 0-13-501345-3
4. Allan R. Hambley, *Electrical Engineering: Principles and Applications, 3rd Edition,* Pearson Prentice Hall, Upper Saddle River, NJ, 2005, ISBN 0-13-147046-9
5. J. David Irwin and R. Mark Nelms, *Basic Engineering Circuit Analysis, 8th Edition,* John Wiley & Sons, Inc., 2005, ISBN 0-471-48728-7

Student Learning Outcomes:

EE 1205-103
Course Learning Objectives
and Assessment Approach

Number	Course Learning Objective	ABET Outcome	Assessment Approach
1	A comprehension of the transformation of physics quantities (charge and energy) into fundamental EE quantities (current and voltage).	a, e	exam problems
2	An understanding of voltage and current polarity convention, how to relate polarity convention to energy delivery or dissipation.	a, e	exam problems
3	An understanding of Ohm's law. The ability to analyze and design resistor connections such as series and parallel connections, and voltage and current dividers. Divider applications.	a, e	exam problems
4	An understanding of ideal voltage and current sources. The ability to analyze and design voltage and current source connections. The ability to transform voltage and current sources.	a, c, e	exam problems
5	An understanding of Kirchhoff's laws (KVL and KCL), and the ability to analyze simple resistive networks to obtain voltage and current maps.	a, e	exam problems
6	An understanding of fundamental network theorems such as superposition, Thevenin's, Norton's, and maximum power transfer.	a, e	exam problems
7	An understanding of the Wheatstone bridge and its applications.	a, e	exam problems
8	An understanding of energy storage devices (capacitor and inductor). The ability to analyze and design capacitor and inductor series and parallel connections.	a, e	exam problems
9	An ability to use basic electrical engineering instruments and equipment. An understanding of the accuracy and limits of instruments and equipment.	a, k	lab experiments
10	A working understanding of analytical principles.	a, e, k	lab experiments
11	An ability to work as a member of a team and to communicate effectively.	d, g	lab experiments

12	An understanding of the application of electrical engineering disciplines in addressing global and contemporary issues and problems.	h, j	seminar lectures
13	An understanding of the importance of maintaining ethical standards and professionalism in the electrical engineering workplace.	f	seminar lectures
14	An understanding of the importance of advanced degrees and lifelong learning.	i	seminar lectures

Outcomes a-k
(a-k as listed by ABET)

a. an ability to apply knowledge of mathematics, science, and engineering;
b. an ability to design and construct experiments, as well as to analyze and interpret data;
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;
d. an ability to function on multidisciplinary teams;
e. an ability to identify, formulate, and solve engineering problems;
f. an understanding of professional and ethical responsibility;
g. an ability to communicate effectively;
h. the broad education necessary to understand the impact of engineering solutions in a global and societal context;
i. a recognition of the need for, and an ability to engage in lifelong learning;
j. a knowledge of contemporary issues;
k. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

General Lecture/Lab Section Information:

1. There are 16 lecture/lab class meetings scheduled for the 17 weeks of the Spring 2013 Semester. Thirteen of these meetings are devoted to class lectures with three devoted to examinations – two mid-terms and one final. The ninth week is reserved for Spring Break. There will be no class or lab meeting that week.
2. Your 100% attendance in lectures and labs is mandatory and required. This requirement will not be waived for any reason.
3. There will be five to six homework assignments, usually given on two-week intervals. Each assignment requires about five to ten hours for completion. These assignments will be graded and will be included as part of your total course grade. Past experience has shown that students who spend the necessary time to work these assignments usually do quite well on the examinations. Solutions to homework problems will be e-mailed to all students by the end of the day the assignment is due. Homework turned in after the solutions have been sent out will not be counted and will receive a grade of zero.
4. Mid-term examinations will be given on the 6^{th} and 12^{th} weeks, and will be one hour written exercises.
5. The final examination will be given on **Thursday May 9, 2013** and will be a comprehensive written examination. **NOTICE**: The UTA registrar has demanded a firm, unforgivable final date (four calendar days after the last final examination date) for the submission of course grades from all instructors. Because of this rigid schedule, the date and time planned for the final examination (**Thursday May 9, 2013 8:00 am to 10:30 am**) is fixed and will not be changed for any reason. Therefore, all students, without exception, **must** take the final examination at this date and time.
6. You are respectively requested to turn off any and all communication devices while in the Seminar and the Lecture/Lab Sections. Communication devices of any type are not allowed to be used on any and all exams. No exceptions. Calculators without communication capability are permitted.
7. There will be absolutely no late or make-up mid-term examinations given unless a written request has been submitted to and approved by the instructor at least two weeks prior to the examination date. As a rule, make-up examinations are several orders of magnitude more difficult than examinations given on the scheduled dates. Please be advised that illness or any other absence on the examination date does not constitute a valid reason for a make-up examination.
8. The *total grade* (T) for the EE 1205 course is based on the grade received in the Seminar Section and that received in the Lecture/Lab Section. The grade for the *Seminar Section* (SS) is 20% of the total T and is computed from the following formula –

$$SS = 0.2 \cdot T = 0.05 \cdot ATT_s + 0.05 \cdot MTE_s + 0.1 \cdot FE_s$$

ATT_s = Seminar attendance grade

MTE_s = Seminar mid-term exam grade

FE_s = Seminar final exam grade (1)

The grade for the *Lecture/Lab Section* (LLS) is 80% of T and is computed from the following formula –

$$LLS = 0.8 \cdot T = 0.05 \cdot HW_l + 0.15 \cdot LA_l + 0.2 \cdot \left(MTE1_l + MTE2_l + FE_l \right)$$

HW_l = Lecture/Lab homework grade

LA_l = Lecture/Lab lab grade

$MTE1_l$ = Lecture/Lab mid-term exam 1 grade

$MTE2_l$ = Lecture/Lab mid-term exam 2 grade

FE_l = Lecture/Lab final exam grade (2)

These two grades are combined to yield the total grade T where

$$T = SS + LLS \tag{3}$$

9. In order to adhere to current privacy law requirements, class grades will not be posted. If you wish to receive your final examination paper and/or your class grade prior to their mailing by the registrar, please give me a large self-addressed and adequately stamped envelope prior to the final examination date so that I may mail your papers and grade to you.
10. Office hours are posted outside my office (NH526). If you have any questions and/or adverse difficulty with the lectures or class material, I strongly suggest that you call or e-mail me (during regular working hours, of course). If necessary, a scheduled office visit can be arranged.
11. Additional important dates:
    Census date – **Wednesday, January 30, 2013**.
    Last day to drop classes – **Friday, March 29, 2013**.
    Registration begins for Summer and Fall 2013 Terms – **Monday, April 1, 2013**.
    Last day of classes – **Friday, May 3, 2013**.

Drop Policy:

Refer to the University policy for dropping courses.

Americans With Disabilities Act:

The University of Texas at Arlington is on record as being committed to both the spirit and letter of federal equal opportunity legislation; reference Public Law 92-112 - The Rehabilitation Act of 1973 as amended. With the passage of federal legislation entitled *Americans with Disabilities Act (ADA)*, pursuant to section 504 of the Rehabilitation Act, there is renewed focus on providing this population with the same opportunities enjoyed by all citizens. As a faculty member, I am required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of that disability. Student responsibility primarily rests with informing faculty of their need for accommodation and in providing authorized documentation through designated administrative channels. Information regarding specific diagnostic criteria and policies for obtaining academic accommodations can be found at www.uta.edu/disability. Also, you may visit the Office for Students with Disabilities in room 102 of University Hall or call them at (817) 272-3364.

Student Support Services Available:

The University of Texas at Arlington supports a variety of student success programs to help you connect with the University and achieve academic success. These programs include learning assistance, developmental education, advising and mentoring, admission and transition, and federally funded programs. Students requiring assistance academically, personally, or socially should contact the Office of Student Success Programs at (817) 272-6107 for more information and appropriate referrals.

Final Review Week:

A period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week unless specified in the class syllabi. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. Classes are held as scheduled during this week and lectures and presentations may be given.

E-Culture Policy:

The University of Texas at Arlington has adopted the University email address as an official means of communication with students. Through the use of email, UT-Arlington is able to provide students with relevant and timely information, designed to facilitate student success. In particular, important information concerning registration, financial aid, payment of bills, and graduation may be sent to students through email. All students are assigned an email account and information about activating and using it is available at www.uta.edu/email. New students (first semester at UTA) are able to activate their email account 24 hours after registering for courses. There is no additional charge to students for using this account, and it remains active as long as a student is enrolled at UT-Arlington. Students are responsible for checking their email regularly.

Ethics:

Student Responsibility

Undergraduate and graduate students assume full responsibility for knowledge of all University rules, regulations and deadlines published in the Undergraduate and Graduate Catalogs and of all departmental and program requirements concerning their degree programs.

Academic Dishonesty

All students are expected to pursue their academic careers with honesty and integrity. Academic dishonesty includes, but is not limited to, cheating on a test or other coursework, plagiarism (offering the work of another as one's own) and unauthorized collaboration with another person. Students found responsible for dishonesty in their academic pursuits are subject to penalties that may range from disciplinary probation, suspension or expulsion from the University. In accordance with the Rules and Regulations of the Board of Regents of The University of Texas System (Part One, Chapter VI), institutional procedures regarding allegations of academic dishonesty are outlined in Part Two, Chapter 2, of the U.T. Arlington Handbook of Operating Procedures. This information may be obtained by accessing the Dean of Students' Web site at www.uta.edu/studentaffairs/dos or the Student Judicial Affairs' Web site at www.uta.edu/studentaffairs/judicial affairs. Copies of each regulation can be obtained in the Dean of Students' Office on the lower level of the University Center.

Definitions (UTA Handbook of Operating Procedures)

F. scholastic dishonesty, including, but not limited to, cheating on an examination or an assignment, plagiarism, and collusion;

1. *cheating on an examination or an assignment* includes:
    a. copying the work of another, engaging in written, oral or any other means of communication with another, or giving aid to or seeking aid from another when not permitted by the instructor;
    b. using material during an examination or when completing an assignment that is not authorized by the person giving the examination or making the work assignment;
    c. taking or attempting to take an examination for another, or allowing another to take or attempt to take an examination for a student;
    d. using, obtaining, or attempting to obtain by any means, the whole or any part of an un-administered examination or work assignment;
    e. any act designed to give unfair advantage to a student or the attempt to commit such an act;
2. *plagiarism* means the unacknowledged incorporation of the work of another in work that is offered for credit;
3. *collusion* means the unauthorized collaboration with another in preparing work that is offered for credit.

The following is an excerpt from the College of Engineering's statement on Ethics, Professionalism, and Conduct of Engineering Students. Read the statement carefully, sign it, and return it to your instructor. You may make a copy for your records. Additional copies of this statement can be obtained from your instructor or the Office of the Dean of Engineering.

STATEMENT ON ETHICS, PROFESSIONALISM, AND CONDUCT FOR ENGINEERING STUDENTS

COLLEGE OF ENGINEERING
THE UNIVERSITY OF TEXAS AT ARLINGTON

The College cannot and will not tolerate any form of academic dishonesty by its students. This includes, but is not limited to cheating on examination, plagiarism, or collusion.

Cheating on an examination includes:

1. Copying from another's paper, any means of communication with another during examination, giving aid to or receiving aid from another during examination;
2. Using any material during examination that is unauthorized by the proctor;
3. Taking or attempting to take an examination for another student or allowing another student to take or attempt to take an examination for oneself.
4. Using, obtaining, or attempting to obtain by any means the whole or any part of an un-administered examination.

Plagiarism is the unacknowledged incorporation of another's work into work which the student offers for credit.

Collusion is the unauthorized collaboration of another in preparing work that a student offers for credit.

I have read and I understand the above statement.

In addition, I understand that, in order to ensure fairness to all students, exams will be proctored and possibly videotaped.

Course and section number: ____EE 1205-103_____

Date: _____

Student's signature: _____

Student's name, printed: _____

Student's ID number: _____

Student's e-mail address: _____
(please print clearly)