

EE 1350 – Introduction to Electrical and Computer Engineering

Spring 2020

Course Catalog Description:

EE 1350 (3). INTRODUCTION TO ELECTRICAL AND COMPUTER ENGINEERING.

Introduces contemporary electrical and electronic devices, concepts, and systems. Includes principles of engineering design; electrical components and systems such as generators, motors, relays, transistors, and integrated circuits; physical laws; signals and systems for audio and images; signal conversion and manipulation; digital logic; binary representation and coding; radio transmission; and electrical power.

Time: MWF 10:00-10:50 AM

Location: Junkins 203

Instructor: Duncan MacFarlane

Office: Room 101B, Embrey

Phone: 214-768-1891

E-mail: dmacfarlane@smu.edu

Office hours: MWF 11am and by appointment (email me at dmacfarlane@smu.edu)

Website for the course:

<https://s2.smu.edu/~dmacfarlane/ece1350%20intro%20to%20ece/intro%20to%20ece.htm>

(It might be easier to go to <https://s2.smu.edu/~dmacfarlane/> and click through to our course page)

Course Structure

On Mondays (and some Wednesdays) I will lecture on selected topics taught in Johnson, Chapters 1-4.

Skills and techniques useful to the electrical/computer engineer will be presented on Wednesdays. Examples of such topics include:

- Errors and Noise
- Intellectual Property
- Shaping and Evaluating Projects
- Sizes and Scales
- Study Skills

On Fridays, 'cases' in the field of electrical/computer engineering will be discussed. Please come to class prepared to contribute insights on the opportunities, implications and ethics of the case.

Topics covered by these discussions include:

- Computing
- Communications
- Energy
- Management and leadership

Laboratory

The laboratory for this course will be self-paced and your accomplishments will earn you extra credit towards your final grade. The Deason Innovation Gymnasium offers 10 DIG Badges that commemorate your competency in those basic skills. These are:

1. Woodworking

2. CAD Modeling
3. CNC Carving (Carvey)
4. 3D Printing
5. Graphic Design
6. Power Tools
7. Sewing
8. Laser Cutter
9. Soldering & Circuits
10. Vinyl Cutter

In addition to those DIG Badges, you will have the opportunity to acquire and demonstrate your competency in 5 important electronic measurement instruments:

11. Power Supply and Digital Multi-Meter
12. Function Generator and Oscilloscope
13. Spectrum Analyzer
14. Network Analyzer
15. Lock-in Amplifier

Completing each of these orientations will earn you 1 extra credit point (out of 100 total course points). Thus you can potentially turn an 85 into a perfect 100.

Required Textbooks:

The website for the course contains links for all the materials for the course. Most of these are free to download or stream.

Fundamentals of Electrical Engineering I

Don Johnson, Rice University

OpenStax, available at:

<https://www.ece.rice.edu/~dhj/courses/elec241/col10040.pdf>

https://cnx.org/contents/fpkWedRh@2.3:tQa_RWkY@3/Dedication-of-A-First-Course-in-Electrical-and-Computer-Engineering

How We Got Here

Andy Kessler

https://www.andykessler.com/andy_kessler/2005/04/hwgh.html

https://www.andykessler.com/andy_kessler/2011/07/audio-version-of-how-we-got-here-available-for-free-download.html (audio)

Suggested Course Materials

MatLab, LabView, Mathematica or other computational software package that supports FFTs and Graphing.

Introduction to Matlab material can be found at www.lyle.smu.edu/~dmacfarlane

Course Topics:

- Introduction to the analysis and applications of electrical and electronic signals, systems and circuits
- Mathematics that govern the interaction between signals and circuits

- Understanding the context of electrical and computer engineering in society

Student Learning Outcomes:

- The students will learn fundamental manipulations of signals.
- The students will learn to model the interaction of signals with Linear Time Invariant (LTI) Systems
- The students will learn fundamentals of Fourier Analysis

Relationship to EE Program Outcomes:

This course includes, but is not limited to, content that supports the Electrical Engineering Program educational objectives and outcomes. Specifically, this course furthers the student's knowledge and skills involving the following outcomes:

1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
2. An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, environmental, and economic factors.
3. An ability to communicate effectively with a range of audiences.
4. An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Homework:

- I will assign, periodically, homework problems and/or small projects that cover the material in Johnson, Chapters 1-4. I encourage honest teamwork on these assignments.
- Skills and cases may lead to additional papers, and presentations.

Exams:

There will be one midterm exams and a comprehensive in-class final exam (given at the official time determined by the University. These must be individual efforts. The exams will be closed book, closed notes, no calculator.

Grading Policy:

Class Attendance and Participation: 20%

Homework, Projects, Papers and Presentations: 20%

Midterm Exam: 25%

Final Exam: 35%

(and an additional 15% extra credit from the self-paced laboratory)

Incomplete Policy: An Incomplete(I) may be given if the majority of the course requirements have been completed with passing grades but for some justifiable reason acceptable to the instructor, the student has been unable to complete the full requirements of the course. Before an (I) is given, the instructor should stipulate in writing to the student the requirements and completion date that are to be met and the grade that will be given if the requirements are not met by the completion date. The maximum period of time allowed to clear the Incomplete grade is 12 months (except for graduate thesis and dissertation courses.) If the Incomplete grade is not cleared by the date set by the instructor or by the end of the 12-month deadline, the (I) may be changed to an F, WP or other grade, each of which is prescribed for other specific purposes. If the student's work is incomplete and the quality has not been passing, an F will be given. The grade of (I) does not authorize the student to attend the course during a later semester. Graduation candidates must clear all Incompletes prior to the deadline in the University Calendar, which may allow less time than 12 months. Failure to do so can result in removal from the degree candidacy list and/or conversion of the (I) to the grade indicated by the instructor at the time the (I) was given.

Disability Accommodations: Students needing academic accommodations for a disability must first register with Disability Accommodations & Success Strategies (DASS). Students can call 214-768-1470 or visit <http://www.smu.edu/Provost/SASP/DASS> to begin the process. Once approved and registered, students will submit a DASS Accommodation Letter to faculty through the electronic portal *DASS Link* and then communicate directly with each instructor to make appropriate arrangements. Please note that accommodations are not retroactive and require advance notice to implement.

Religious Observance: Religiously observant students wishing to be absent on holidays that require missing class should notify their professors in writing at the beginning of the semester, and should discuss with them, in advance, acceptable ways of making up any work missed because of the absence (<https://www.smu.edu/StudentAffairs/Chaplain/ReligiousHolidays>).

Excused Absences for University Extracurricular Activities: Students participating in an officially sanctioned, scheduled University extracurricular activity should be given the opportunity to make up class assignments or other graded assignments missed as a result of their participation. It is the responsibility of the student to make arrangements with the instructor prior to any missed scheduled examination or other missed assignment for making up the work. (See [2019-2020 University Undergraduate Catalogue](#) under “Excused Absences”)

Student Academic Success Programs: Students needing assistance with writing assignments for SMU courses may schedule an appointment with the Writing Center through Canvas. Students wishing support with subject-specific tutoring or success strategies should contact SASP, Loyd All Sports Center, Suite 202; 214-768-3648; <https://www.smu.edu/sasp>.

Caring Community Connections (CCC) program: This is a resource for anyone in the SMU community to refer students of concern to the Office of the Dean of Students. Faculty play a critical role in identifying students who are experiencing challenges, as you may be the first to notice a change in behavior such as class attendance or performance. The online referral form can be found at smu.edu/deanofstudentsccc. After a referral is submitted, students will be contacted to discuss

the concern, strategize options, and be connected to appropriate resources. Additionally, should you have concerns about students and are unclear about what to do, please see the [CCC Reference Guide](#), or contact the Office of the Dean of Students at 214-768-4564.

Academic Honesty: Academic dishonesty may be defined broadly as a student's misrepresentation of his or her academic work or of the circumstances under which the work is done. This includes plagiarism in all papers, projects, take-home exams, or any other assignments in which the student represents work as being his or her own. It also includes cheating on examinations, unauthorized access to test materials, and aiding another student to cheat or participate in an act of academic dishonesty. Failure to prevent cheating by another may be considered as participation in the dishonest act.

The SMU Honor Code: (http://www.smu.edu/studentlife/PCL_05_HC.asp) states:

“Intellectual integrity and academic honesty are fundamental to the process of learning and of evaluating academic performance, and maintaining them is the responsibility of all members of an educational institution. The inculcation of personal standards of honesty and integrity is a goal of education in all the disciplines of the University. The faculty has the responsibility of encouraging and maintaining an atmosphere of academic honesty by being certain that students are aware of the value of it, that they understand the regulations defining it, and that they know the penalties for departing from it. The faculty should, as far as is reasonably possible, assist students in avoiding the temptation to cheat. Faculty members must be aware that permitting dishonesty is not open to personal choice. A professor or instructor who is unwilling to act upon offenses is an accessory with the student offender in deteriorating the integrity of the University. Students must share the responsibility for creating and maintaining an atmosphere of honesty and integrity. Students should be aware that personal experience in completing assigned work is essential to learning. Permitting others to prepare their work, using published or unpublished summaries as a substitute for studying required materials, or giving or receiving unauthorized assistance in the preparation of work to be submitted are directly contrary to the honest process of learning. Students who are aware that others in a course are cheating or otherwise acting dishonestly have the responsibility to inform the professor and/or bring an accusation to the Honor Council. Students and faculty members must mutually share the knowledge that any dishonest practices permitted will make it more difficult for the honest students to be evaluated and graded fairly and will damage the integrity of the whole University. Students should recognize that both their own interest, and their integrity as individuals, suffers if they condone dishonesty in others.”