**Introduction to Electrical Engineering**

**EE1106:** Electrical Engineering Freshman Practicum

Fall 2014

**Instructor:** Greg Turner – Senior Lecturer

**Office Number:** 219 ELB Microgrid Lab (temporary)

**Office Telephone Number:** TBD

**Email Address:** gregory.turner@mavs.uta.edu (student), gkturner@uta.edu (faculty)

**Faculty Profile:** <https://www.uta.edu/profiles/gregory-turner>

**Office Hours: MW 11am – 1pm.**

**Section Information:** EE1106-001 (89140), EE1106-003 (89153)

**Time and Place of Class Meetings:**

Section 001/101 - M 1pm – 1:50pm – (WH) 210: Lab M 2pm – 4pm (NH) 148

Section 003/103 - W 1pm – 1:50pm – (WH) 210: Lab W 2pm – 4pm (NH) 148

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| **Course Prerequisites:**  |
| * EE 1104 (co-requisite), or permission from advisor.
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| * General computer skills, word processing, email, etc.
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**Required Readings/Materials:**  |
| **Textbook:*** Text Book: F.T. Ulaby and M.M. Maharbiz, Circuits, National Technolgy and Science Press, 2009, ISBN 978-1-934891-00-1 (**required**)

**Other materials (on library reserve & online)*** *Introduction to Electric Circuits*, 9th Edition, by Richard C. Dorf and James A. Svoboda, © 2014 by John Wiley & Sons, Inc.;  ISBN 978-1-118-47750-2
* *Robotics, by* Appin Knowledge Solutions, 2007, Infinity Science Press, ISBN 978-1-934015-02-5
* *Electrical Engineering: Principles & Applications (6th Edition),* by Alan Hambley, Prentice Hall, 2013, ISBN: 978-0133116649
* An introduction of NI MyDAQ and LabVIEW - <http://www.ni.com/mydaq/>
* An introduction to TI-MSP430 - <http://www.ti.com/tool/msp-exp430g2>
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| **Course Description:**  |
| **EE 1106 INTRODUCTION TO ELECTRICAL ENGINEERING** (1-2) 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, electromagnetics, signal processing, photonics, energy management, and telecommunication systems. Corequisites: EE 1104.  |
| **Course Learning Goals/Objectives:**  |
| Practicum: Introduces basic EE laboratory concepts, measurements equipment and techniques, as well as modern hardware and software such as LABVIEW, data acquisition MyDAQ, and digital microcontroller TI MSP 430.The lecture and lab material is divided between several areas offering an introduction to:* *Intellectual themes of EE*
* *Basic resistive circuit concepts*
* *Non-mathematical exposure to dynamic and electronic circuit elements*
* *Non-mathematical introduction to signals and systems*
* *Basic measurements and lab techniques*
* *Signals, circuits and systems using NI MyDAQ*
* *Digital circuits and programming using TI-MSP430*

The ABET outcomes for the course are as follows:* (a) an ability to apply knowledge of mathematics, science, and engineeringThis is a strong component of EE 1106, assessed through lab reports and exams.
* (b) an ability to design and conduct experiments, as well as to analyze and interpret dataThis is a strong component of EE 1106, assessed through lab reports and lab proficiency exam.
* (c) an ability to design a system, component, or process to meet desired needsEE 1106 provides limited exposure to this topic, assessed through pre-lab assignments.
* (e) an ability to identify, formulate, and solve engineering problemsEE 1106 provides moderate exposure to this topic assessed through pre-lab reports.
* (g) an ability to communicate effectivelyEE 1106 provides limited exposure to this topic assessed through lab reports.
* (j) a knowledge of contemporary issuesEE 1106 provides moderate exposure to this topic assessed through lab reports and lab proficiency exam.
* (k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.EE 1106 provides moderate exposure to this topic assessed through labs reports, and exams.
* (l) an ability to apply probability and statistics, including applications appropriate to electrical engineeringEE 1106 provides limited exposure to this topic assessed through lab reports.
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| **Tentative Lecture/Topic Schedule:**  |
| * Week 1 - **August 25-29**
	+ Lab-lecture 1: Introduction to EE 1106
		- Syllabus, expectations, grading, basic concepts
		- [Online material](http://www.uta.edu/faculty/popa/intro_EE/lecture1-1106.ppt)
	+ Lab 1: Lab orientation, safety, basics of lab equipment
		- Lab instruments
		- Toolbox
		- NI MyDAQ
		- TI MSP 430 LaunchPad
		- **Prelab #2 handed out** (see bottom of page)
* Week 2 - **August 1- Sept 5**
	+ Lab-lecture 2:
		- Abstraction, Modularity, and Models with Circuit examples
		- Introduction to LabVIEW
	+ Lab 2: Introduction to MyDAQ and LabVIEW
		- Intro to LabVIEW programs
		- Build your own VI's
		- **Prelab #3 handed out** (see bottom of page)
* Week 3 - Sept 8 - Sept 12
	+ Lab-lecture 3:
		- Measurements, Charge, Resistance, Voltage, Current and conventions
		- More LabVIEW
	+ Lab 3:  Digital Multimeter and Voltage Generator using MyDAQ
		- **Prelab #4 handed out** (see bottom of page)
* Week 4 - Sept 15- Sept 19
	+ Lab-lecture 4:
		- Circuital Laws (Ohm, Kirkhoff) and examples
	+ Lab 4:  Resistor circuit measurements
		- **Prelab #5 handed out** (see bottom of page)
* Week 5 - Sept 22 - Sept 26
	+ Lab-lecture 5:
		- Circuit Theorems (Superposition, Thevenin, Norton)
	+ Lab 5:  MultiSim Simulation of Circuits using MyDAQ (Part 1)
		- **Prelab #6 handed out** (see bottom of page)
* Week 6 - Sept 29 - Oct 3
	+ Lab-lecture 6: Circuit Theorems (Superposition, Thevenin, Norton)
		- Circuit analysis: examples
	+ Lab 6:  MultiSim Simulation of Circuits using MyDAQ (Part 2)
		- **Prelab #7 handed out** (see bottom of page)
* Week 7 - Oct 6 - Oct 10
	+ Lab-lecture 7:  Wheatstone bridge, Y-Delta and Delta-Y equivalents
		- Resistive circuit, Wheatstone Bridge, equivalents
		- Pressure sensors (strain gage)
	+ Lab 7:  Build a pressure sensor using the Wheatstone bridge
* Week 8 - Oct 13 - Oct 17
	+ Lab-lecture 8:  Lab Exam 1
	+ Lab 8: Lab Exam 1
* Week 9 - Oct 20 - Oct 24
	+ Lab-lecture 9:  Printed Circuit Board design
	+ Lab 9: Soldering and Assembly of a Circuit
		- **Prelab #10 handed out** (see bottom of page)
* Week 10 - **Oct 27 - Oct 31**
	+ Lab-lecture 10:
		- Maximum power transfer theorem
		- Nonlinear Circuit elements: diode, transistor
	+ Lab 10: Solar Panel Experiment using MyDAQ
		- **Prelab #11 handed out** (see bottom of page)
* Week 11 - **Nov 3 - Nov 7**
	+ Lab-lecture 11:  Systems Concepts
		- Signals and Systems (basics)
		- Linear Circuit elements: Capacitor, Inductor
	+ Lab 11: Transient behavior in RLC circuit
		- **Prelab #12 handed out** (see bottom of page)
* Week 12 - **Nov 10 - Nov 14**
	+ Lab-lecture 12: Digital Circuits and Embedded Systems
	+ Lab 12: Introduction to TI MSP 430 and Code Composer
		- **Prelab #13 handed out** (see bottom of page)
* Week 13 - **Nov 17 - Nov 21**
	+ Lab-lecture 13:  Operational amplifiers
		- Op-amp Circuits
		- D/A and A/D conversion
	+ Lab 13:  Amplify pressure sensor signal with MSP 430
		- **Prelab #14 handed out** (see bottom of page)
* Week 14 - **Nov 24 - Nov. 28**
	+ Lab-lecture 14:  Motors and motor control
		- Brushed DC motor
		- Role of Feedback
		- Control block diagrams and examples
	+ Lab 14: Actuate a DC motor using MSP 430
* Week 15 - Dec 1 - Dec 5
	+ Lab-lecture 15:  EE 1105 Recap and Review
	+ Lab 15:  EE 1205 Recap and Review: NI MYDAQ and TI MSP 430
* Week 16 - **Dec 8 - Final's week**
	+ Lab 16:  Lab Proficiency Exam

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**Specific Course Requirements:**

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| * **EE 1106 Laboratory Sessions:** We will hold 13 lab sessions in room NH 250. There will be mandatory pre-lab assignments posted on this website the week prior to each lab session.
* **EE 1106 Examinations:** One midterm exam (in class and lab)**,** and one lab proficiency exam (in class and lab).
* **Missed deadlines for assignments:** Maximum grade drops 25% per late day
* **Grading Format Weighting 1106:** 20% - Lab Exam 1, 20% - Lab Proficiency Exam, 20% - Pre-labs, 30% - Lab Reports, 10% - class participation.
* Grading will be based on the following chart:

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| **Percentages for Grades** |
|   | ♦ 85% -100% | A |
|   | ♦ 70% -  84% | B |
|   | ♦ 55% -  69% | C |
|   | ♦ 40% -  54% | D |
|   | ♦   0% -  39% | F |

* **Academic Dishonesty will not be tolerated.** All homeworks and exams are individual assignments. Discussing homework assignments with your classmates is encouraged, but the turned-in work must be yours. Discussing exams with classmates is not allowed. Your homeworks will be carefully scrutinized to ensure a fair grade for everyone.
* **Random quizzes on turned-in work**: Some student will be required to answer quizzes in person at least once during the semester for homework and lab reports. You will receive invitations to stop by during office hours. Credit for turned in work may be rescinded for lack of familiarity with your submissions.
* **Attendance and Drop Policy:** Attendance is mandatory in order to receive the 10% participation part of the grade. In addition, pre-lab reports must be turned in during the first 5 minutes of the laboratory session. If you skip classes and labs, you will find the exams much more difficult. Assignments, lecture notes, and other materials are going to be posted here, however, due to the pace of the lectures and labs, copying someone else's notes may be an unreliable way of making up an absence. You are responsible for all material covered in class regardless of absences.
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**Drop Policy:** Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. **Students will not be automatically dropped for non-attendance**. Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (<http://wweb.uta.edu/aao/fao/>).

**Americans with Disabilities Act:** The University of Texas at Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including the *Americans with Disabilities Act (ADA)*. All instructors at UT Arlington are required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of that disability. Any student requiring an accommodation for this course must provide the instructor with official documentation in the form of a letter certified by the staff in the Office for Students with Disabilities, University Hall 102. Only those students who have officially documented a need for an accommodation will have their request honored. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at [www.uta.edu/disability](http://www.uta.edu/disability) or by calling the Office for Students with Disabilities at (817) 272-3364.

**Title IX:** The University of Texas at Arlington is committed to upholding U.S. Federal Law “Title IX” such that no member of the UT Arlington community shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity. For more information, visit [www.uta.edu/titleIX](http://www.uta.edu/titleIX).

**Academic Integrity:** Students enrolled all UT Arlington courses are expected to adhere to the UT Arlington Honor Code:

*I pledge, on my honor, to uphold UT Arlington’s tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.*

*I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.*

UT Arlington faculty members may employ the Honor Code as they see fit in their courses, including (but not limited to) having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System *Regents’ Rule* 50101, §2.2, suspected violations of university’s standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student’s suspension or expulsion from the University.

**Lab Safety Training: Students registered for this course must complete all required lab safety training prior to entering the lab and undertaking any activities.** Once completed, Lab Safety Training is valid for the remainder of the same academic year (i.e., through the following August) and must be completed anew in subsequent years. There are no exceptions to this University policy. Failure to complete the required training will preclude participation in any lab activities, including those for which a grade is assigned.

**Electronic Communication:** UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at <http://www.uta.edu/oit/cs/email/mavmail.php>.

**Student Feedback Survey:** At the end of each term, students enrolled in classes categorized as “lecture,” “seminar,” or “laboratory” shall be directed to complete an online Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student’s feedback enters the SFS database anonymously and is aggregated with that of other students enrolled in the course. UT Arlington’s effort to solicit, gather, tabulate, and publish student feedback is required by state law; students are strongly urged to participate. For more information, visit <http://www.uta.edu/sfs>.

**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 syllabus*. 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. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

**Emergency Exit Procedures:** Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit. When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist individuals with disabilities.

**Student Support Services**:UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring, major-based learning centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at 817-272-6107, send a message to resources@uta.edu, or view the information at [www.uta.edu/resources](http://www.uta.edu/resources).

**Writing Center.** **:** The Writing Center, 411 Central Library, offers individual 40 minute sessions to review assignments, *Quick Hits* (5-10 minute quick answers to questions), and workshops on grammar and specific writing projects. Visit [https://uta.mywconline.com/](https://owa.uta.edu/owa/luket%40exchange.uta.edu/redir.aspx?C=jqplelmmw0KcvkWv1pRv_rHS8ofUUtFIXl_CWZTLffEmCPyZf3x4ncUbBmD9p3gSPROCbhSJj7U.&URL=https%3a%2f%2futa.mywconline.com%2f) to register and make appointments. For hours, information about the writing workshops we offer, scheduling a classroom visit, and descriptions of the services we offer undergraduates, graduate students, and faculty members, please visit our website at [www.uta.edu/owl/](http://www.uta.edu/owl/).

**Librarian to Contact:** <http://www.uta.edu/library/help/subject-librarians.php>

**Emergency Phone Numbers**: In case of an on-campus emergency, call the UT Arlington Police Department at **817-272-3003** (non-campus phone), **2-3003** (campus phone). You may also dial 911.

**Sign and Submit Statement on Ethics, Professionalism:**

The following is an excerpt from the College of Engineering's statement on Ethics, Professionalism, and Conduct of Engineering Students.  Read the statement carefully.

If you did not fill out and sign a similar statement on the first class day, use the form below. Complete it and return it to your instructor as soon as possible.   Retain a copy of this for your records.

**STATEMENT ON ETHICS, PROFESSIONALISM, AND CONDUCT OF ENGINEERING STUDENTS**

**COLLEGE OF ENGINEERING**

**THE UNIVERSITY OF TEXAS AT ARLINGTON**

**(FALL 2014 – EE2441)**

The College cannot and will not tolerate any form of academic dishonesty by its students.  This includes, but is not limited to 1) cheating on examination, 2) plagiarism, or 3) collusion.

Definitions:

A.  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.

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

C.  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.

            Student's signature:                   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_

            Student's name, printed:            \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

            Students' ID number:    \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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            Student's name, printed:            \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

            Students' ID number:    \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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