

The University of Texas at Tyler
Department of Electrical Engineering

EENG 1301 – Engineering the Future (Required)

Syllabus

Catalog Description:

An introduction to the Electrical Engineering profession, sub-disciplines and careers; Basic principles of electric circuits, power systems; electronics, communications, and computer engineering; Familiarization with electrical engineering tools, software packages and equipment; Team Design Project; Integrated Weekly Lab.

Prerequisites: None

Credits: 3 (2 hours lecture, 3 hours laboratory per week)

**Text(s):
(Required)**

1. NI Multisim Software <https://www.studica.com/National-Instruments-students-ni-labview-mydaq/multisim-student-edition.html>
2. NI Labview Software https://www.studica.com/us/en/National-Instruments-students-ni-labview-mydaq/labview-student-edition/779252-02_3.html

**Additional
Material:**

(Recommended)

1. Fledderman, "Engineering The Future", Pearson Custom Publishing (ISBN-10: 0-5582-7308-4, ISBN-13: 978-0-5582-7308-8)
2. Brooke Stauffer, "NATIONAL ELECTRICAL CODE – Users Guide to the", Jones and Bartlett, 2008 (ISBN-10: 0-7637-5261-4, ISBN-13: 978-0-7637-5261-3)

Course Coordinator:

Mukul Shirvaikar, Professor of Electrical Engineering

Topics Covered:

1. The Electrical Engineering Profession: History of Electrical Engineering, Electrical Engineering Careers, Engineering your Career, Professional Society Meetings, Talks by Practising Engineers
2. Electrical Concepts and Components: Dimensions and Units – Greek Alphabet, Direct and Alternating Voltage and Current, Resistance, Capacitance and Inductance, Complex Variables
3. Basic Principles of Electric Circuit Analysis: Power Supplies, Ohm's Law and Kirchoff's Laws, Series Circuits, Parallel Circuits and Series-parallel Circuits
4. Digital Systems: Digital Electronics - Transistors and Integrated Circuits, Digital Logic, Basic Gates and Logic Families
5. Electric Power Systems Engineering National Electric Code (NEC®), Generation, Transmission, and Distribution of Electric Power, Electric Wiring and Design
6. Electronics: Components Basic Pulse and Switching Circuits – LM555 Timer
7. Communication Systems: Basic Concepts of Amplitude and Frequency Modulation, Wireless Communication
8. Computer Engineering: (History, Computer Organization, Basic Networking
9. Electrical and Computer Engineering Tools: Laboratory Instrumentation – Voltmeters, Ammeters, Soldering, MATLAB® and Simulink for Engineers, Circuit Analysis Software (Multisim, pSpice), Printed Circuit Board (PCB) Fabrication
10. Analysis Methodology: Data Analysis – Graphing and Statistics, Report Writing
11. Engineering Ethics – IEEE Code of Ethics
12. Team Design Project and Demonstration

Evaluation Methods: (only items in dark print apply):

1. Examinations / Quizzes
2. Homework
3. Reports / Paper
4. Computer Programming
5. Project / Model
6. Presentation
7. Course Participation *Peer Review*

Course Learning Outcomes (formerly Objectives)¹: By the end of this course students will be able to:

1. List and describe contributions of the electrical engineering profession to society. [1, 7]
2. List and describe electrical engineering careers paths and professional societies encouraging IEEE membership. [1, 7]
3. List and describe basic electrical concepts, components, dimensions and units and Greek alphabet. [1]
4. Apply Ohm's Law and Kirchoff's Laws to simple dc circuits. [1]
5. Compute resistance for series and parallel combination of resistors with real life examples. [1]
6. Perform computations with complex variables and basic phasor operations. [1]
7. Describe basic logic gates and truth tables in digital systems. [1]
8. List major components of the electric power system - generation, transmission and distribution. [1]
9. List the basic types of electrical machines. [1]
10. Describe the role of the NEC code in electric systems design. [1]
11. Describe basic electronic components and basic pulse and switching circuits. [1]
12. List and describe basic concepts of communication systems including modulation techniques. [1]
13. List and describe the basic structure of a computer and a networking system. [1]
14. Make measurements of voltage, current, frequency and resistance with laboratory equipment. [3]
15. Perform basic analysis and computations with software analysis tools (e.g. Matlab, Multisim). [4]
16. Demonstrate knowledge of data analysis including graphing and statistics. [3, 5]
17. Write a laboratory report in a simple memorandum format. [3]
18. Create a printed circuit board utilizing software, milling machine and soldering iron. [5]
19. Design a solution at the freshman level for an electrical engineering problem as a part of a team. [3, 5]
20. Participate in an engineering team project with a final presentation. [5, 6, 7]
21. Demonstrate knowledge of the IEEE Code of Ethics. [1]

¹Numbers in brackets refer to method(s) used to evaluate the course objective.

Relationship to Program Outcomes (only items in dark print apply)²: This course supports the following Electrical Engineering Program Outcomes, which state that our students will:

1. have the ability to apply knowledge of the fundamentals of mathematics, science, and engineering. [3, 4, 6, 7]
2. have the ability to use modern engineering tools and techniques in the practice of electrical engineering. [15, 18]
3. have the ability to analyze electrical circuits, devices, and systems [8, 9, 11-13, 16]
4. have the ability to design electrical circuits, devices, and systems to meet application requirements. [19]
5. have the ability to design and conduct experiments, and analyze and interpret experimental results. [14]
6. have the ability to identify, formulate, and solve problems in the practice of electrical engineering using appropriate theoretical and experimental methods. [5]
7. have effective written, visual, and oral communication skills. [17]
8. possess an educational background to understand the global context in which engineering is practiced, including
 - a. knowledge of contemporary issues related to science and engineering. [10]
 - b. the impact of engineering on society. [1]
 - c. the role of ethics in the practice of engineering.[21]
9. have the ability to contribute effectively as members of multi-disciplinary engineering teams.[20]
10. have a recognition of the need for and ability to pursue continued learning throughout their professional careers. [2]

²Numbers in brackets refer to course learning outcomes/objective(s) that address the Program Outcome.

Contribution to Meeting Professional Component: (in semester hours)

Mathematics and Basic Sciences:	0	hours
Engineering Sciences and Design:	3.0	hours
General Education Component:	0	hours

Prepared By:	Hassan El-Kishky	Date:	01/15/2009
Modified:	Mukul Shirvaikar, Hassan El-Kishky	Date:	07/18/2012, 08/15/2011
	Mukul Shirvaikar	Date:	08/26/2013
	Mukul Shirvaikar	Date:	07/12/2014
	Mukul Shirvaikar	Date:	08/21/2018

**EENG 1301: Engineering The Future
2019 Fall Semester**

COURSE OUTLINE

Course Coordinator:

Dr. Mukul Shirvaikar and Dr. Hassan El-Kishky
Electrical Engineering
Office: RBN 2014, RBN 2004
Phone:903-565-5620, 903-565-5580
E-mail: mshirvaikar@uttyler.edu, Hassan_Elkishky@uttyler.edu

Class Location/Time:

RBN 2007 / 9:30AM-10:25AM T R
Laboratory: RBN 2033 / T 2:00PM-4:45PM

Grading Policy:

Tests/Quizzes	40%
Laboratory Projects	30%
Semester Design Project	10%
Attendance	15%
IEEE Activities	5%

Note: Students are required to submit all lab reports to obtain a passing grade in the class. Instructor reserves the right to modify the above grading policy including final grade thresholds at any point of time.

WEEK	START DATE	TOPICS COVERED	LECTURE (T)	LABORATORY	LECTURE (R)
1	26-Aug-2019	Introduction, History, Dimensions and Units	Introduction - EE Areas, IEEE (Shirvaikar)	History of EE/Activity (Homework Activity)	Dimensions and Units, Greek Alphabet (Sundaravadivel)
2	2-Sep-2019	Electrical Concepts and Components, Lab Safety Training	Electrical Concepts and Components (Indic)	Circuits - Breadboard, Resistor codes, Power Supply, Lab Safety (Indic)	Career Success Day
3	9-Sep-2019	Electrical Concepts and Components, Lab Reports	Electrical Concepts and Components - Applications (Indic)	EE Lab Instruments - Multimeter, Scope, Function generator (Indic)	Report Writing (Indic)
4	16-Sep-2019	EE Tools	EE Tools - Multisim (Sundaravadivel)	EE Tools - Multisim (Sundaravadivel)	Test 1 (Shirvaikar)
5	23-Sep-2019	Applications to Real Life	Resistor Problems (Sundaravadivel)	PCB Layout Software - UltiBoard (Sundaravadivel)	Applications to Real Life (Sundaravadivel)
6	30-Sep-2019	Data Analysis	Data Analysis - Graphing (Indic)	Introduction to Matlab/Simulink (Indic)	Data Analysis - Statistics (Indic)
7	7-Oct-2019	Electronics	Electronics (Sundaravadivel)	Basic Electronics Lab - Soldering and Project (Sundaravadivel)	Electronics - Applications (Sundaravadivel)
8	14-Oct-2019	EE Tools, Communication Systems	Communication Systems and Applications (Sundaravadivel)	EE Tools - Labview (Indic)	Test 2 (Indic)

9	21-Oct-2019	Digital Systems	Digital Systems (Shirvaikar)	Basic Gates (Shirvaikar)	Digital Systems Applications (Shirvaikar)
10	28-Oct-2019	Group Project, Complex Variables	Introduction to Complex Variables (Sundaravadivel)	Group Project - Internet of Things (IoT) (Sundaravadivel)	Introduction to Complex Variables (Sundaravadivel)
11	4-Nov-2019	Power Systems	Power Systems (EI-Kishky)	Basic Power Systems Lab - Motors, Generators (EI-Kishky)	Power Systems - Applications (EI-Kishky)
12	11-Nov-2019	National Electrical Code	NEC (EI-Kishky)	Group Project - IoT (Sundaravadivel)	Test 3 (EI-Kishky)
13	18-Nov-2019	Computer Engineering	Computer Engineering Principles/Applications (Sundaravadivel)	Group Project - IoT Deadline (Sundaravadivel)	Biomedical Engineering Applications (Indic)
14	25-Nov-2019				Thanksgiving Holiday
15	2-Dec-2019	Ethics	Ethical Issues in Engineering (EI-Kishky)	Project Demonstration	Test 4 (Sundaravadivel)
16	9-Dec-2019	No Final Exam			ALL MATERIALS DUE Thursday, Dec. 5

NOTE: Please maintain a class folder with all your work including class notes, homework and lab assignments, quizzes, and mid-term exam.

Homework and Lab Project Policy:

Homework and project reports will be due in Canvas one week after assignment or other date if specified separately. Project reports should be written as per the guidelines provided. A 25% penalty will be assessed for missing the submission deadline and an additional 25% penalty will apply per week for late project reports and homework. Any deviation from this rule will be at the sole discretion of the instructor.

All submissions are required to be in Microsoft Word format with machine readable text and not images or other representations of text. This rule will be applied to all sections of the report including the appendices and program code with comments. All flowcharts and diagrams must be prepared using Microsoft Office and not by hand. Any attempts to defeat the plagiarism checking software by submission of documents that include images instead of body text or any other mechanism will result in a grade of zero. The instructor or responsible grader reserves all rights to make this judgement and reject a project report if the above rules are not followed. Any violations may result in ACADEMIC DISHONESTY charges to be filed against the student.

Student waives all rights to a make-up exam if they miss a scheduled testing date. Any make-up testing will be at the sole discretion of the instructor.

Academic Integrity:

Students should be aware that absolute academic integrity is expected of every student in all undertakings at The University of Texas at Tyler. Failure to comply can result in strong university-imposed penalties. **All lab reports and assignments will be verified using plagiarism checking software and violations will result in a grade of zero for the lab report or assignment at a minimum, and possibly stronger penalties such as a failing grade in the course and a scholastic dishonesty report submitted to the university.**

Attendance Policy:

Students are expected to attend all scheduled lectures and lab meetings. By signing up for the class it is understood that the student has checked for ANY significant recurring conflicts with lecture and laboratory meeting times (including work, family, or any other commitments). No exceptions can be made for attendance requirements as this will be unfair to the other students. **The progressive nature of the class means that perfect attendance is recommended if a good grade is desired. No more than three excused absences for valid reasons are allowed and documentation should be submitted for each absence.** Class participation is graded based on attendance, faculty and graduate assistant observation and involvement in class activities including invited talks and IEEE meetings.

Student Conduct Policy:

Any behavior which distracts from the learning experience of other students including sleeping in class is not allowed and will result in corrective action by the instructor/staff. Students are also expected to follow all safety rules and guidelines in the laboratory setting.

Students Rights and Responsibilities

To know and understand the policies that affect your rights and responsibilities as a student at UT Tyler, please follow this link: <http://www.uttyler.edu/wellness/rightsresponsibilities.php>

Grade Replacement/Forgiveness and Census Date Policies

Students repeating a course for grade forgiveness (grade replacement) must file a Grade Replacement Contract with the Enrollment Services Center (ADM 230) on or before the Census Date of the semester in which the course will be repeated. Grade Replacement Contracts are available in the Enrollment Services Center or at <http://www.uttyler.edu/registrar>. Each semester's Census Date can be found on the Contract itself, on the Academic Calendar, or in the information pamphlets published each semester by the Office of the Registrar.

Failure to file a Grade Replacement Contract will result in both the original and repeated grade being used to calculate your overall grade point average. Undergraduates are eligible to exercise grade replacement for only three course repeats during their career at UT Tyler; graduates are eligible for two grade replacements. Full policy details are printed on each Grade Replacement Contract.

The Census Date is the deadline for many forms and enrollment actions that students need to be aware of. These include:

- Submitting Grade Replacement Contracts, Transient Forms, requests to withhold directory information, approvals for taking courses as Audit, Pass/Fail or Credit/No Credit.
- Receiving 100% refunds for partial withdrawals. (There is no refund for these after the Census Date)
- Schedule adjustments (section changes, adding a new class, dropping without a "W" grade)
- Being reinstated or re-enrolled in classes after being dropped for non-payment
- Completing the process for tuition exemptions or waivers through Financial Aid

State-Mandated Course Drop Policy

Texas law prohibits a student who began college for the first time in Fall 2007 or thereafter from dropping more than six courses during their entire undergraduate career. This includes courses dropped at another 2-year or 4-year Texas public college or university. For purposes of this rule, a dropped course is any course that is dropped after the census date (See Academic Calendar for the specific date). Exceptions to the 6-drop rule may be found in the catalog. Petitions for exemptions must be submitted to the Enrollment Services Center and must be accompanied by documentation of the extenuating circumstance. Please contact the Enrollment Services Center if you have any questions.

Disability Services

In accordance with federal law, a student requesting accommodation must provide documentation of his/her disability to the Disability Services counselor. If you have a disability, including a learning disability, for which you request an accommodation, please contact the Disability Services office in UC 3150, or call (903) 566-7079.

Student Absence due to Religious Observance

Students who anticipate being absent from class due to a religious observance are requested to inform the instructor of such absences by the second class meeting of the semester.

Student Absence for University-Sponsored Events and Activities

If you intend to be absent for a university-sponsored event or activity, you (or the event sponsor) must notify the instructor at least two weeks prior to the date of the planned absence. At that time the instructor will set a date and time when make-up assignments will be completed.

Social Security and FERPA Statement:

It is the policy of The University of Texas at Tyler to protect the confidential nature of social security numbers. The University has changed its computer programming so that all students have an identification number. The electronic transmission of grades (e.g., via e-mail) risks violation of the Family Educational Rights and Privacy Act; grades will not be transmitted electronically.

Emergency Exits and Evacuation:

Everyone is required to exit the building when a fire alarm goes off. Follow your instructor's directions regarding the appropriate exit. If you require assistance during an evacuation, inform your instructor in the first week of class. Do not re-enter the building unless given permission by University Police, Fire department, or Fire Prevention Services.

Lecture Schedule:

DATE	DAY	LECTURE	FACULTY	READING ASSIGNMENT
8/27	Tuesday	Introduction - EE Areas, IEEE	Shirvaikar	Chapters 1, 2
8/29	Thursday	Dimensions and Units, Greek Alphabet	Sundaravadivel	Chapters 13,14,15
9/3	Tuesday	Electrical Concepts and Components	Indic	Chapter 3
9/5	Thursday	Career Success Day		
9/10	Tuesday	Electrical Concepts and Components - Applications	Indic	Chapter 4, 12
9/12	Thursday	Report Writing	Indic	Handouts/Slides
9/17	Tuesday	EE Tools - Multisim	Sundaravadivel	Chapter 6
9/19	Thursday	Test 1	Shirvaikar	
9/24	Tuesday	Resistor Problems	Sundaravadivel	Handouts/Slides
9/26	Thursday	Applications to Real Life	Sundaravadivel	Handouts/Slides
10/1	Tuesday	Data Analysis - Graphing	Indic	Chapters 7, 8
10/3	Thursday	Data Analysis - Statistics	Indic	Chapters 9, 17
10/8	Tuesday	Electronics	Sundaravadivel	Chapter 5
10/10	Thursday	Electronics - Applications	Sundaravadivel	Chapter 5
10/15	Tuesday	Communication Systems and Applications	Sundaravadivel	Handouts/Slides
10/17	Thursday	Test 2	Indic	
10/22	Tuesday	Digital Systems	Shirvaikar	Chapter 5
10/24	Thursday	Digital Systems Applications	Shirvaikar	Handouts/Slides
10/29	Tuesday	Introduction to Complex Variables	Sundaravadivel	Handouts/Slides
10/31	Thursday	Introduction to Complex Variables	Sundaravadivel	Handouts/Slides
11/5	Tuesday	Power Systems	EI-Kishky	Handouts/Slides
11/7	Thursday	Power Systems - Applications	EI-Kishky	Handouts/Slides
11/12	Tuesday	National Electric Code	EI-Kishky	Handouts/Slides
11/14	Thursday	Test 3	EI-Kishky	
11/19	Tuesday	Computer Engineering Principles/Applications	Sundaravadivel	Handouts/Slides
11/21	Thursday	Biomedical Engineering Applications	Indic	Handouts/Slides
12/3	Tuesday	Ethical Issues in Engineering	EI-Kishky	Chapter 18
12/5	Thursday	Test 4	Sundaravadivel	

Laboratory Schedule:

DATE	DAY	LABORATORY	FACULTY	ROOM
8/27	Tuesday	History of EE/Activity (Homework Activity)	Shirvaikar	
9/3	Tuesday	Circuits - Breadboard, Resistor codes, Power Supply, Lab Safety	Indic	RBN 2033/2035
9/10	Tuesday	EE Lab Instruments - Multimeter, Scope, Function generator	Indic	RBN 2033/2035
9/17	Tuesday	EE Tools - Multisim	Sundaravadivel	RBN 2033/2035
9/24	Tuesday	PCB Layout Software - UltiBoard	Sundaravadivel	RBN 2033/2035
10/1	Tuesday	Introduction to Matlab/Simulink	Indic	RBN 2033/2035
10/8	Tuesday	Basic Electronics Lab - Soldering and Project	Sundaravadivel	RBN 2046
10/15	Tuesday	EE Tools - Labview	Indic	RBN 2033/2035
10/22	Tuesday	Basic Gates	Shirvaikar	RBN 2021
10/29	Tuesday	Group Project - Internet of Things (IoT)	Sundaravadivel	RBN 2033
11/5	Tuesday	Basic Power Systems Lab - Motors, Generators	EI-Kishky	RBN 1027
11/12	Tuesday	Group Project - IoT	Sundaravadivel	RBN 2021
11/19	Tuesday	Group Project - IoT Deadline	Sundaravadivel	RBN 2033
12/3	Tuesday	Project Demonstration	All	RBN 2033

ASSIGNMENTS GRID

WEEK	START DATE	TEST SCHEDULE WITH TOPICS	LABORATORY REPORTS
1	26-Aug-2019	Test 1 – Thursday, September 19, 2019 Introduction, History, Dimensions and Units, Greek Alphabet, Electrical Concepts and Components	Lab Report 1 - Circuits Laboratory Due Tuesday, September 17, 2019
2	2-Sep-2019		
3	9-Sep-2019		
4	16-Sep-2019		
5	23-Sep-2019	Test 2 – Thursday, October 17, 2019 EE Tools, IEEE, Applications to Real Life, Data Analysis	Lab Report 2 – EE Tools Due Tuesday, October 1, 2019
6	30-Sep-2019		
7	7-Oct-2019		Lab Report 3 – Matlab/Simulink Due Tuesday, October 8, 2019
8	14-Oct-2019		Lab Report 4 – Electronics Lab Due Tuesday, October 22, 2019
9	21-Oct-2019	Test 3 – Thursday, November 14, 2019 Electronics, Communication Systems, Digital Systems, Complex Variables	Lab Report 5 – Digital Systems Lab Due Tuesday, November 5, 2019
10	28-Oct-2019		
11	4-Nov-2019		Lab Report 6 – IoT Lab Due Tuesday, November 12, 2019
12	11-Nov-2019		
13	18-Nov-2019	Test 4 – Thursday, December 5, 2019 Power Systems, National Electrical Code, Computer Engineering Ethics	Lab Report – Power Systems Lab Due Tuesday, November 19, 2019
14	25-Nov-2019		
15	2-Dec-2019		
16	9-Dec-2019	Group Project Presentation in Lab Sessions	
		No Final Exam	

Notes: Lectures normally are scheduled for 55 minutes but periods in which tests are scheduled can run a full 80 minutes

All lab reports should be turned in on Canvas. Graded reports will be typically available within a week online. Tests can be picked up from the Electrical Engineering Office RBN 2005. The following table clarifies the lab report format and grading for the labs.

Lab Report	Contents	Report Format	Grade
1	Circuits Laboratory (Lab 1a Circuits and 1b Electrical Concepts and Components)	Memorandum Style	100
2	EE Tools (Lab 2a Multisim and 2b Ultiboard) (50 points each)	Memorandum Style	100 (2a - 50, 2b - 50)
3	Matlab/Simulink	Memorandum Style	100
4	Electronics	Memorandum Style	100
5	Digital Systems	Full Report	100
6	Internet of Things (IoT)	Full Report	100
7	Power Systems	Memorandum Style	100

Lab reports 1-4 should be written in "Memorandum Style" and lab reports 5-6 should be full reports. Templates and examples of each style can be found on Canvas.