



Fundamentals of Electricity

The University of Toledo

Engineering Technology, Electrical Engineering Technology, College of Engineering
Fundamentals of Electricity – L1 – 41293 – ENGT 3050-001, 002, 003

Name:	William T Evans	Class Location:	PL 3050
Email:	william.evans@utoledo.edu	Class Day/Time:	12:55-2:15pm T, R
Office Hours:	9:30-12:00 M, W	Lab Location:	NE 2330
Office Location:	NE 1607	Lab Day/Time:	Lab Section 1 – T 11:05=12:45 pm Lab Section 2 – R 11:05=12:45 pm
Instructor Phone:	419-530-3349	Credit Hours:	4
Offered:	Fall, Spr, Su		

CATALOG/COURSE DESCRIPTION

This course constitutes an introduction to basic analytical and laboratory techniques for resistive and reactive DC and AC electric circuits, and an introduction to electronic devices, including diodes and transistors.

COURSE STATEMENT

The objective of this course is to familiarize the student with the electrical curriculum including dc circuits, ac circuits and semiconductor circuits. While not exhaustive, the problems in this chapter give depth of understanding to non-electrical majors. The course includes both theoretical and practical aspects of electrical and electronic circuits as well as an understanding of electrical safety.

Upon completion of this course, the students will be able to have a(n):

1. Basic electrical components and quantities
2. Definitions of voltage, current and electrical resistance
3. Ohm's Law, electrical energy and power
4. Series DC circuit analyses
5. Parallel DC circuit analyses
6. Series / parallel DC circuit analyses
7. Circuit theorems – superposition and Thevenin's theorem
8. Basic mesh current analysis techniques
9. Sinusoidal waves
10. Inductors in DC circuits
11. RL circuits with AC sources
12. Transformers
13. Capacitors in DC circuits
14. RC circuits with AC sources
15. RLC circuits with AC sources
16. Semiconductors and diodes
17. Introduction to transistors
18. Introduction to National Electric Code (NEC)



STUDENT LEARNING OUTCOMES

ABET

1. an ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly-defined engineering problems appropriate to the discipline;b - an ability to select and apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require the application of principles and applied procedures or methodologies;
2. an ability to design systems, components, or processes meeting specified needs for broadly-defined engineering problems appropriate to the discipline;e - an ability to function effectively as a member or a leader on a technical team;

Discipline Specific Content (Criteria 5):

D. Include design considerations appropriate to the discipline and degree level such as: industry and engineering standards and codes; public safety and health; and local and global impact of engineering solutions on individuals, organizations and society; and

E. Include topics related to professional responsibilities, ethical responsibilities, respect for diversity, and quality and continuous improvement.

EET Specific Outcomes:

Ec - the ability to analyze, design, and implement control systems, instrumentation systems, communications systems, computer systems, or power systems.

Ed - the ability to apply project management techniques to electrical/electronic(s) systems.

PHILOSOPHY OF TEACHING (TEACHING METHODOLOGY)

This course requires students to participate in lab activities with the goal of making a set of requirements work successfully in a manner similar to an automation project in a factory. Lectures provide examples of how instructions in the PLC can be used to build a program and how to implement the program successfully. There are many correct answers and students are encouraged to implement the program from his or her own ideas. Creativity is encouraged.

Homework is encouraged to build the student's confidence in successful writing of control programs.

Recommendations for success:

- Come to lectures and take notes
- Read the relevant contents in the textbook
- Solve examples in the textbook and do homework
- Review the relevant contents and homework before each test or exam
- Finish each of the lab assignments and demonstrate a successful program



Never hesitate to ask for help from the instructor

PREREQUISITES AND COREQUISITES

varies

REQUIRED INSTRUCTIONAL MATERIALS (TEXTS AND ANCILLARY MATERIALS)

Text is free at site: www.eng.utoledo.edu/~wevans and then under ENGT 3050 “Text”

TECHNOLOGY EXPECTATIONS

None – Text is online at above website with assignments

UNIVERSITY POLICIES

Academic Accommodations

The University of Toledo is committed to providing equal opportunity and access to the educational experience through the provision of reasonable accommodations. For students who have an accommodations memo from Student Disability Services, it is essential that you correspond with me as soon as possible to discuss your disability-related accommodation needs for this course. For students not registered with Student Disability Services who would like information regarding eligibility for academic accommodations due to barriers associated with a potential disability, please contact the [Student Disability Services Office](#).)

ACADEMIC POLICIES

1. No eating, drinking, or smoking in classrooms.
2. There are no make-up exams for this course. If you have a problem or conflict and cannot attend an exam, let me know beforehand and we will try to work something out. No credit will be given for a missed exam that we haven't made arrangements about beforehand unless you have a **really excusable** emergency. Cell phone use will not be allowed. If you do not have a calculator, buy one and bring it to class.

Cheating is not allowed and will be punished by rules of U of Toledo Student Handbook.



The University of Toledo is committed to providing equal opportunity and access to the educational experience through the provision of reasonable accommodations. For students who have an accommodations memo from Student Disability Services, it is essential that you correspond with me as soon as possible to discuss your disability-related accommodation needs for this course. For students not registered with Student Disability Services who would like information regarding eligibility for academic accommodations due to barriers associated with a potential disability, please contact the [Student Disability Services Office.](#))

COURSE EXPECTATIONS

Students in this course should be familiar with policies that govern the institution's academic process. Please find a total list of undergraduate Academic Polices:

<http://www.utoledo.edu/policies/academic/undergraduate/>

Electronica Policy: No electronic items: cellular telephones, Blackberrys, personal digital assistants, digital music players or similar items that may disrupt the learning environment may be used at any time for any purpose during the classroom or laboratory time. If a cell phone must be kept on due to a potential emergency situation, it must be on a silent setting. If an emergency call must be taken during a class, the student must leave the classroom prior to answering the call and not return until the call is completed. See also Article IV.B Conduct Rules and Regulations of the Student Code of Conduct at the University of Toledo, which states, in part:

“Disruption of operations of the University Community. Disruption is an action or combination of actions by an individual or a group, which unreasonably interferes with, hinders, obstructs, or prevents the right of others to freely participate in its programs, services, or academic settings. This may include, but is not limited to a disruption by the use of pagers, cell phones and/or any other communication devices. “

Readings: Reading for the course is shown on the accompanying handout. Readings are to be completed prior to the lecture portion of the class.

Missed Class Policy: Students are required to be present for class. Should there be an unexpected absence on your part, you must notify me by e-mail or voicemail. The University's Policy for missed classes is available on the Faculty Senate website at:

http://www.utoledo.edu/facsenate/missed_class_policy.html

Students are expected to conduct themselves in a manner which is conducive to learning for themselves and others. Disruptive behavior is not acceptable and may affect a student's final grade, or in severe cases result in a student being removed from class.

If there is a conflict or misunderstanding, please see me privately to work out a resolution.



OVERVIEW OF COURSE GRADE ASSIGNMENT

Homework 10%, Pop Quizzes 10%, Labs 20 %, Hour Exam I 15%
Hour Exam II 15%, Hour Exam III 15%, Final Exam 15 % (Comprehensive)

(A >= 90, B >= 80, C >= 70, D >= 60)

COURSE GUIDELINES

Please use your UT student email address (XX@Rockets.Utoledo.edu) for all your communications. All others type of email address will go directly to Junk E-mail folder. Homework assignments are accepted only before or on the assigned day. The final answer alone is not enough to get credit. Solution steps must be shown to get credit. When not done in person, preferred communication between the instructor and students will take place via email to a student's Rocket email address. While the instructor will not communicate via email on a regular basis throughout the semester, it is advisable that students check their email regularly so as to keep abreast of any special instructions, clarifications on assignments or cancellations that may occur during the term

ACADEMIC SUPPORT SERVICES

In addition to visiting the instructor which is highly encouraged, several offers additional support, are available which could aid you in succeeding in this course:

- Engineering Technology Department Teaching Assistants - NE 1604 & NE 1606

SAFETY AND HEALTH SERVICES FOR UT STUDENTS

For safety and health services, please refer to the following website:

(<http://www.utoledo.edu/offices/provost/utc/docs/CampusHealthSafetyContacts.pdf>);



COURSE SCHEDULE

No Class Dates: Per university calendar

Final Exam Date: Per university schedule

Course Schedule (Subject to Change depending on the course progress)

<i>Week No.</i>	<i>Course Content</i>	
1	Electric Circuits Introduction	Ch. 1
2	Combinational Circuits	Ch. 2
3	Three Theorems	Ch. 3
4	Current and power	Ch. 4
5	Mesh and Node Equations	Ch. 5
6	Test 1	
7	Time Varying Signals	Ch. 6
8	ABET Criteria 5-D, E	
8	Inductance and DC Response to C and L's	Ch. 7
9	Complex Numbers and Sinusoidal Steady State	Ch. 8
10	RLC Circuits with AC Source	Ch. 9
11	Test 2	
12	Semiconductors - Diodes	Ch. 10
13	Semiconductors – Transistors	Ch. 11
14	Semiconductors – Op-Amps – Test 3	Ch. 12
15	Final Exam	

Due	Description	Page	Range
9-5-19	Ch. 1 Homework	3, 4	1.1 to 1.18
9-12-19	Ch. 2 Homework	20-23	2.1-2.10
9-17-19	Lab 1 Report		
9-19-19	Ch. 3 Homework	23-26	3.1-3.35
9-19-19	Ch. 4 Homework	11-14	4.1-4.24
9-24-19	Lab 2 Report		

9-26-19	Ch. 5 Homework	7	5.1
10-1-19	Lab 3 Report		
10-8-19	Test 1	Ch. 1-5	
10-15-19	Lab 4 Report		
10-15-19	Lab 5 Report		
10-17-19	Ch. 6 Homework	22	6.1-15
10-22-19	Lab 6 Report		
10-24-19	Ch. 7 Homework	Pg 5,-7 prob 7-1 to 7-6	Pg 12-13 prob 7-7 to 7-15
10-24-19	Ch. 8 Homework	Pg 14-18 prob 8-1 to 8-14	
10-29-19	Lab 8 Report		
10-31-19	Ch. 9 Homework	Pg 8, 9 Prob 9.1-5	Pg 11 Prob 9.6-9
11-5-19	Lab 9 Report		
11-7-19	Ch. 10 Homework	Prob. 1-6	
11-12-19	Lab 10 Report		
11-14-19	Ch. 11 Homework	Pg 17 Prob 1-20, 29	
11-19-19	Lab 12 Report		
11-26-19	Ch. 12 Homework	Pg. 2 Prob 11-17	
12-10-19	Final Exam	Tuesday 2:45-4:45	