NEW YORK CITY COLLEGE OF TECHNOLOGY
The City University of New York

DEPARTMENT:	Electrical and Telecommunications Engineering Technology
SUBJECT CODE AND TITLE:	EET1122 Circuits Analysis I
COURSE DESCRIPTION:	Introduction to dc circuits. Topics include series, parallel, and series parallel circuits, network theorems, equivalent circuits, capacitive and inductive circuits, timing circuits and measuring instruments. Laboratory experiments include breadboarding, measurement techniques and troubleshooting. The writing of laboratory reports is taught, and written reports are required.
PRE /COREQUISITES:	EET1102, MAT 1275 or higher, PHYS 1433 or equivalent
TEXTBOOK:	Introductory Circuit Analysis, 13th Edition R. Boylestead, Prentice Hall, 2016
Needed Equipment:	Students **must** have a **calculator** capable of performing complex arithmetic – such as the Casio Fx300V Students **must** also have a **Digital Multimeter** (DMM) for use in the Laboratory
COURSE OBJECTIVES/ COURSE OUTCOMES:	Upon completion of this course, students will be able to: 1. Use Ohm's Law and Kirchhoff's voltage and current laws to analyze networks (ETAC/ABET Criteria 3.1). 2. Analyze and solve circuit problems using different methods such as Superposition, Mesh analysis, Nodal analysis, Thevenin's and Norton's equivalent circuits (ETAC/ABET Criteria 3.1,). 3. Analyze steady state and transient responses in RC and RL circuits (ETAC/ABET Criteria 3.1). 4. Assemble, test, and troubleshoot various DC circuits in order to measure and verify system behavior responses (ETAC/ABET Criteria3.4, 3.5, PC a). 5. Develop good communications skills by working in teams and writing laboratory reports (ETAC/ABET Criteria 3.3, 3.5).
TOPICS:	Topics include an analysis, Breadboarding and testing of series, parallel and series-parallel circuits.
CLASS HOURS:	3
LAB HOURS:	3
CREDITS:	4
Prepared by:	Professor M. Kouar Fall 2020
Revised by:	Professor Li Geng Spring 2022
Course Coordinator:	Professor Li Geng Email: LGeng@citytech.cuny.edu

EXPERIMENT: EET 1122

- Introduction to laboratory. Department rules, procedure, policies. Proper way to write a laboratory report.
- Lecture on nature of voltage, current and resistance. Simple Ohm's Law examples.
- Explain use of meters and the Feedback Kit Experiment

1. Experiment 1-Color Code.
2. Experiment 2-Ohm's Law.
3. Experiment 3-Series Circuits.
4. Experiment 4-Parallel Circuits.
5. Experiment 5-Series-parallel Circuits 1
6. Experiment 6-Series-parallel Circuits 11
7. Experiment 7-Troubleshooting (resistance measurements)
8. Experiment 7-Troubleshooting (voltage measurements)
9. Experiment 8-Meter Sensitivity & Accuracy
10. Experiment 9-Superposition
11. Experiment 10-Thevenin's Theorem

Contribution of course to meeting the requirements of ETAC/ABET Criterion 5:
EET1122 meets criterion 5 by providing students with a strong foundation of the theoretical principles and practical laboratory skills needed to construct, measure, analyze, and troubleshoot DC circuits and networks of varying applications and complexity. Academic benchmarks, course outcomes, and assessment requirements have been established to ascertain student comprehension of concepts and proper usage of test equipment. By also fostering critical thinking, communications, and team work, with a commitment to quality, timeliness, and continuous improvement, students develop the skills needed to solve problems in a classroom and laboratory environment which later serve them in the work place.

GRADING POLICY: EET 1122

Homework, Quizzes, Class Participation	20%
Class Midterm & Exams	35%
Lab Exam & Lab Reports	20%
Final Examination	25%

Letter Grade	Numerical Grade Ranges	Quality
A	93-100	4.0
A-	90-92.9	3.7
B+	87-89.9	3.3
B	83-86.9	3.0
B-	80.82.9	2.7
C+	77-79.9	2.3
C	70-76.9	2.0
D	60-69.9	1.0
F	59.9 and below	0.0

Assessment

The following assessment techniques are correlated to the course objectives as follows: In addition, each assessment technique incorporates one or more of the following ABET Criteria 3 outcomes (ABET Criteria 3a, 3b, 3c, 3d, 3e, 3f, 3i).

Course Objectives

1. Use Ohm's Law and Kirchhoff's voltage and current laws to analyze networks (ABET Criteria 3a, 3b, 3e).

2. Analyze and solve circuit problems using different methods such as Superposition, Mesh analysis, Nodal analysis, Thevenin's and Norton's equivalent circuits (ABET Criteria 3a, 3b, 3e)

3. Analyze steady state and transient responses in RC and RL circuits (ABET Criteria 3a, 3b, 3e).

4. Assemble, test, and troubleshoot various DC circuits in order to measure and verify system behavior responses (ABET Criteria 3c, 3d, PC a).

5. Develop good communications skills by working in teams and writing laboratory reports (ABET Criteria 3d, 3f, 3i).

Assessment

the students will be able to:

1.1 Understand the importance of Ohm's Law and how to apply it to variety of situations.

1.2 Plot Ohm's Law and understand how to "read" a graphical of voltage versus current.

1.3 Develop a clear understanding of Kirchhoff's Current and Voltage Laws and how important they are to the analysis of electric circuits.

2.1 To become familiar with the Superposition Theorem and its unique ability to separate the impact of each source on the quantity of interest.

2.2 Use Mesh analysis to find the currents of network with one or more independent paths, to use Nodal analysis to find the terminal voltages of any series-parallel network, to apply Thevenin's and Norton's Theorems to reduce any two terminal, series-parallel network with any number of sources to a single voltage source and series resistor and a single current source and a parallel resistor.

3.1 Analyze a circuit by determining the equivalent circuit capacitance and/or inductance.

3.2 Analyze the transient charging and discharging of capacitive circuits.

3.3 Analyze the current build-up and discharge of inductive circuits.

4.1 Measure resistance, voltage, and current for circuits they construct in each experiment.

4.2 Troubleshoot and determine faults of specific practice circuits.

5.1 Prepare and construct circuits in teams using MultiSim and Hardware.

5.2 Write a laboratory report for each experiment.

WEEK	TOPIC	READING ASSIGNMENT	HOMEWORK PROBLEMS
1	Introduction to the course. Units of measurement. Scientific and Engineering notation. Operation of a scientific calculator, significant figures, and rounding off.	Chapter 1 Pages 1-26	Chapter 1: 6,12, 16, 20, 26, 30, 32, 45, 48, 54.
2-3	Explain the nature of current, voltage and resistance. Basic electrical symbols. Ohm's Law. Types of resistors color coding of resistors. Power calculations Power ratings and safety factors as applied to resistors.	Chapter 2 Pages 33-59 Chapter 3 Pages 67-92 Chapter 4 Pages 105-117,120-121	Chapter 2: 10, 14, 16, 20, 22, 26, 28, 30 Chapter 3: 10, 20, 22, 26, 30, 34, 35, 40, 48, 50 Chapter 4: 2, 6, 8, 10, 20, 22, 26, 29, 34, 40, 44, 48
3- 4	Series Circuits Kirchoff's Voltage Law. Inter-changing series elements. Ideal dc voltage sources vs. non-ideal sources. Voltage division, single and double-subscript notation.	Chapter 5 Pages 143-178	Chapter 5: , 2, 4, 6, 10, 12, 14, 16, 20, 22, 24, 26, 28, 42, 46
5-6	Parallel Circuits Equivalent Resistance calculations. Power calculations. Kirchoff's Current Law. Current divider rule. Voltage sources in parallel.	Chapter 6 Pages 199-233	Chapter 6: 2, 6, 8, 10, 16, 22, 23, 24, 28, 34, 40, 42
7	Series-Parallel Networks. Block diagram approach. Reduction of series parallel circuits to a series circuit. Ladder network analysis. Power calculations. Voltage divider supply. Computer analysis of problems.	Chapter 7 Pages 255-279	Chapter 7: 2, 6, 8, 10, 16, 26, 28, 30 In addition, the instructor will select problems from the above set or other problems in chapter 7 to be solved by using MultiSim software.
8	Current Sources Multiple Sources Source conversions Methods of analysis Mesh Analysis Nodal Analysis	Chapter 8 Pages 297-, 335.	Chapter 8: 2, 6, 14, 16, 20, 24, 35, 42, 44, 52

WEEK	TOPIC	READING ASSIGNMENT	HOMEWORK PROBLEMS
9	Midterm		
10	Superposition Theorem Thevenin's Theorem Norton's Theorem Maximum Power Transfer Theorem	Chapter 9 Pages 359-385	Chapter 9: 2, 4, 10, 12, 14, 22, 24, 32 In addition, the instructor will select problems from the above set or other problems in chapter 9 to be also solved by MultiSim software.
11-12	Capacitance Physical factors determining capacitance. Types of capacitors. Analysis of capacitors in series and parallel circuits.	Chapter 10 413-431 455-459	Chapter 10: 3, 4, 12, 51, 52, 54, 58
12-13	RC time constant. Capacitor charge and discharge phenomena using equations and a calculator to analyze and graph. RC circuit responses using initial conditions	Chapter 10 Pages 431-455	Chapter 10: 20, 24, 26, 29, 40, 44, 48
13-14	Magnetism and inductance Concept of magnetic forces and fields. Basic magnetic properties including flux, flux density, permeability, magnetizing force, and BH curves Faraday's Law Lenz's Law, Physical factors determine inductance Ideal vs. non-ideal inductors RL time constant current buildup and discharge in RL circuits. Comparing solutions to RC circuits.	Chapter 11 479-511 Chapter 12 Pages 529-551	Chapter 11: 2, 4, 8, 10, 11, 15, 20, 29, 34, 38, 46 Chapter 12: 2, 4, 5, 8, 12, 14, 18, 19
15	Final Exam		

New York City College of Technology Policy on Academic Integrity

Students and all others who work with information, ideas, texts, images, music, inventions, and other intellectual property owe their audience and sources accuracy and honesty in using, crediting, and citing sources. As a community of intellectual and professional workers, the College recognizes its responsibility for providing instruction in information literacy and academic integrity, offering models of good practice, and responding vigilantly and appropriately to infractions of academic integrity. Accordingly, academic dishonesty is prohibited in The City University of New York and at New York City College of Technology and is punishable by penalties, including failing grades, suspension, and expulsion. The complete text of the College policy on Academic Integrity may be found in the catalog.