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

DEPARTMENT:	Electrical and Telecommunications Engineering Technology
SUBJECT CODE AND TITLE:	EET2122 Advanced Circuit Analysis
COURSE DESCRIPTION:	Transient response of RL, RC, and RLC circuits utilizing both classical and Laplace transform techniques. Laboratory exercises and computer simulation software included.
PREREQUISITE:	EET1222
COREQUISITE:	MAT 1475
TEXTBOOK:	Network Analysis with Applications By Stanley, Publisher Prentice Hall 2003
COURSE OBJECTIVES/ COURSE OUTCOMES:	Upon completion of this course the student will be able to: 1. Analyze and solve first order RL & RC circuits via classical differential equation methods. (ABET Criteria 3.1, PC b). 2. Analyze and solve first order RL and RC using Laplace Transforms. (ABET Criteria 3.1, 3.2 PC b, PCa) 3. Analyze and solve second order RLC circuits using Laplace Transforms (ABET Criteria 3.1, 3.2, PC a, PC b). 4. Analyze and solve system responses using appropriate software (ABET Criteria PC a).
TOPICS:	Topics include dc, pulse, and ac analysis of first order and second order systems when solving the transient and steady state responses of a given network. Graphical plotting, analysis of findings are discussed.
CLASS HOURS:	2
LAB HOURS:	2
CREDITS:	3
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ET2122 Experiments

Week	
1-2	Review of Differential Calculus
3-4	Review of Integral Calculus
5-6	Transient Behavior of RC and RL Circuits
7	EWB simulation and techniques of first order networks
8	Midterm
9-10	Steady State and Transient behavior of second outer networks
11-12	Computer simulation and techniques of second order systems12-14 Project
15	Final Examination

EVALUATION:

Exam #1	20%
Exam #2	20%
Lab Report	20%
Final Exam	40%

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 ABET Criteria 2 outcomes (3.1, Ca, PC b).	**Assessment** The student will be able to:
Course Objectives 1. Analyze and solve first order RL, RC circuits via classical differential methods.	1.1 Define a first order electrical network. 1.2 Solve, analyze, and plot transient and steady state responses of first order systems using linear differential equation theory.
2. Analyze and solve first order RL, RC circuits using Laplace Transforms.	2.1 Solve, analyze, and plot transient and steady state responses of first order systems using Laplace Transforms.
3. Analyze, and solve second order RLC circuits using Laplace Transforms.	3.1 Define a second order electrical network. 3.2 Solve, analyze, and plot transient and state responses of second order systems with dc or ac inputs using Laplace Transforms.
4. Analyze and determine the stability of first order and second order systems.	4.1 Determine the stability of a network via several methods.
5. Analyze and solve system responses using appropriate software.	5.1 Using EWB and or appropriate software, students will solve, and graphically display second order systems responses.

WEEK	TOPIC	READING ASSIGNMENTS	PROBLEMS
1	Orientation		
2	Differentiation of functions such as sine, cosine, algebraic and exponential; graphical significance.	Lab Manual pages 2-9 Chapter 3, pages 125-133	Lab Manual Problems 1-10 Chapter 3:1,2
3	Integration Cover only the functions sine, cosine, indefinite integration using the table in the manual and definite integration as area under a curve.	Lab Manual pages 13-22 Chapter 3: pages 133-138	Lab Manual Problems 1-8 Chapter 3: 3,4
4	DC (Average) Value and RMS Find values for repetitive waveforms Discuss the CUE initiative at City Tech.	Chapter 10, Pages 523-530	Chapter 10 1,2,3,4,
5	Capacitive and Inductive Transients Given simple functions of time as inputs, develop voltage and Current equations	Chapter 3, pages 137-154	Chapter 3: 5-20, 31-33
6-7	Initial and Final Values In RL, RC, and RLC Circuits with DC inputs DC source. Develop current and voltage equations	Chapter 4, pages 203-251	Chapter 4: 1-8 Chapter 4: 9-12 13-16, 18
8	Laplace Transforms of functions such as sine, cosine, algebraic, exponential and operations	Chapter 5, pages 267-278	Chapter 5: 1-10
9	Inverse Laplace Transformation Functions with first and second order roots.	Chapter 5, pages 278-292	Chapter 5: 11-20, 21-23, 25, 29, 33

WEEK	TOPIC	READING ASSIGNMENTS	PROBLEMS
10	Circuit Analysis Using Laplace Transforms – as applied to RL, RC, RLC circuits with DC, AC, and exponential sources. Do experiment No. 6	Chapter 6, pages 299-312	Chapter 6: 1,3, 6-8, 11-13
11-12	First Order Circuits – Using Laplace transforms Develop voltage/ current equations for circuits with arbitrary source inputs. Have students brainstorm and critique selected responses from the CUE assignment.	Chapter 6, pages 313-319	Chapter 6: 17-22, 24
13-14	Second Order circuits – Using Laplace Transforms, develop voltage/current equations for circuits with DC and AC sources. Discuss damped responses.	Chapter 6, pages 320-331	Chapter 6: 25-30
15	Review and Final Exam		

Contribution of course to meeting the requirements of Criterion 5:

EET 2122 meets criterion 5 by providing students with a strong foundation of analytical and theoretical concept of Laplace Transform and circuit analysis. Academic benchmarks, course outcomes, and assessment requirements have been established to determine students' ability of designing a circuit using Multisim, and performing various analyses. By fostering critical thinking, communications, and teamwork, the students develop the skills needed to solve problems in a laboratory environment, which later will serve them in their work place.

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.