COURSE SYLLABUS

BOROUGH OF MANHATTAN COMMUNITY COLLEGE
The City University of New York
Department of SCIENCE

Title of Course: CIRCUITS AND SYSTEMS I
Code: ESC 221
Semester: Fall 2017
Professor: Joel Hernandez

Class Hours: 6
Lecture hours per week: 3
Laboratory Hours per Week: 3
Credits: 4

Instructor Information (Phone#, Office#, email): 212-220-1311, N699M, jhernandez@bmcc.cuny.edu

Course Description: This course covers circuit elements and their voltage-current relations, Kirchhoff's laws, elementary circuit analysis, continuous signals, differential equations, first order systems and second order systems. Students will simulate circuits on the computer. A laboratory component is integrated into the course.

Basic Skills: MAT 056

Prerequisites: PHY 225

Corequisites: MAT 501 or departmental approval

Required Text: C. K. Alexander and M. N.O. Sadiku; "Fundamentals of Electric Circuits"; Prentice Hall Publishing; 4th Edition, 2009; ISBN 978-0-07-352955-4

Other Resources: Thomas & Rosa: *The Analysis and Design of Linear Circuits*, Prentice Hall Publishing, 2nd or later edition.

Use of Technology (If Applicable):

Evaluation and Requirements of Students:

Exams	80 %
Laboratory	20 %

LECTURE CONTENTS:

Basic Concepts: Charge and current; voltage, power and energy, circuit elements, passive sign convention.

Basic Laws: Ohm's Law, nodes, branches, loops, Kirchhoff's Laws, series and parallel resistor networks, voltage and current division.

Methods of Circuit Analysis: Nodal and mesh analysis.

Circuit Theorems: Linearity, superposition, source transformations, Thevenin and Norton's Theorem.

Operational Amplifiers: Ideal OP-AMP, voltage follower, inverting, non-inverting, summing and difference amplifier circuits.

Capacitors and inductors: Capacitors, series and parallel connections, inductors, series and parallel connections, integrators and differentiators.

First-Order Circuits: RC circuits, RL circuits, step response.

Second-Order Circuits: Introduction to series and parallel RLC circuits.

LAB CONTENTS:

DC instrumentation and electrical components.

Circuit simulation and data analysis software.

Voltage and current division.

Equivalent resistor circuits.

Node and mesh analysis.

Proportionality and superposition.

Thevenin and Norton theorems.

Signal waveforms and ac instrumentation.

RC circuit time response.

Series RLC circuit time response.

Course Student Learning Outcomes (Students will be able to…)	**Measurements (means of assessment for student learning outcomes listed in first column)**
1. Calculate the equivalent resistance of resistor networks.	**1. In class exam.**
2. Apply the techniques of node-voltages and mesh-currents to DC circuits.	**2. In class exam.**
3. Determine the Thevenin and Norton Equivalent of a circuit.	**3. In class exam.**
4. Compute the output of an OP-AMP circuit.	**4. In class exam.**
5. Analyze the behavior of first-order circuits.	**5. In class exam.**

Below are the college's general education learning outcomes, the outcomes that are checked in the left-hand column indicate goals that will be covered and assessed in this course. (Check at least one.)

	General Education Learning Outcomes	**Measurements (means of assessment for general education goals listed in first column)**
☐	**Communication Skills-** Students will be able to write, read, listen and speak critically and effectively.	
■	**Quantitative Reasoning-** Students will be able to use quantitative skills and the concepts and methods of mathematics to solve problems.	Graded homework and exams will measure how students apply mathematics to solve circuit analysis problems.
☐	**Scientific Reasoning-** Students will be able to apply the concepts and methods of the natural sciences.	
☐	**Social and Behavioral Sciences-** Students will be able to apply the concepts and methods of the social sciences.	
☐	**Arts & Humanities-** Students will be able to develop knowledge and understanding of the arts and literature through critiques of works of art, music, theatre or literature.	
☐	**Information & Technology Literacy-** Students will be able to collect, evaluate and interpret information and effectively use information technologies.	
☐	**Values-** Students will be able to make informed choices based on an understanding of personal values, human diversity, multicultural awareness and social responsibility.	

This syllabus is provided as a general informational guide. Some of the information may vary depending on the specific course section and instructor. Different sections of the same course may require different textbooks. Verify the section specific textbook information in the CUNY's Academic Course Schedule Web Page. Modifications of the grading system presented here will be communicated by the instructors of the sections when they meet the class.

College Attendance Policy
At BMCC, the maximum number of absences is limited to one more hour than the number of hours a class meets in one week. For example, you may be enrolled in a three-hour class. In that class, you would be allowed 4 hours of absence (not 4 days). In the case of excessive absences, the instructor has the option to lower the grade or assign an F or WU grade.

Academic Adjustments for Students with Disabilities
Students with disabilities who require reasonable accommodations or academic adjustments for this course must contact the Office of Services for Students with Disabilities. BMCC is committed to providing equal access to all programs and curricula to all students.

BMCC Policy on Plagiarism and Academic Integrity Statement
Plagiarism is the presentation of someone else's ideas, words or artistic, scientific, or technical work as one's own creation. Using the idea or work of another is permissible only when the original author is identified. Paraphrasing and summarizing, as well as direct quotations, require citations to the original source. Plagiarism may be intentional or unintentional. Lack of dishonest intent does not necessarily absolve a student of responsibility for plagiarism. Students who are unsure how and when to provide documentation are advised to consult with their instructors. The library has guides designed to help students to appropriately identify a cited work. The full policy can be found on BMCC's Web site, www.bmcc.cuny.edu. For further information on integrity and behavior, please consult the college bulletin (also available online).