

New York City College of Technology
The City University of New York

Department of Computer Engineering Technology

Fall 2018

Instructor: Dr. Sunghoon Jang
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Lectures: Wed 02:30 – 05:00 pm (V602)
Office Hrs: Wed 01:30 – 02:30 pm (V635)
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EMT 1255 Electronics

Textbook:

- Analog Fundamentals – A System Approach by Thomas L. Floyd and David M. Bucha (Publisher: Pearson Prentice Hall Publishers, ISBN 0-13-293394-2)
- Class notes and handouts (Blackboard).

Pre/Co-requisite:

EMT 1250, MAT 1375

Prerequisite by topics:

- Knowledge of principles of DC and AC electric circuits.
- Solving for voltages/currents in series/parallel circuits.
- Ohm's law and circuit analysis/theorems.

Course Description & Objectives:

Introduction to semi-conductor devices (including Diodes, Bipolar Junction Transistors, Field-Effect Transistors, and Operational Amplifiers) and their applications in electronic-circuits. Students are expected to:

- Understand the structures and principles of semi-conductor devices (diodes, BJT, JFET, and Op Amp).
- Understand the configuration and principles of basic electronic circuits; master circuit analysis; to design electronic circuits.
- Acquire troubleshooting knowledge and hands-on technical skills (lab).

Final Letter Grades for the course will be awarded based on the percentage of the total points earned as follows:

4.0	93 – 100%	A
3.7	90– 92.9%	A-
3.3	87– 89.9%	B+
3.0	83– 86.9%	B
2.7	80– 82.9%	B-
2.3	77– 79.9%	C+
2.0	70– 76.9%	C
1.0	60– 69.9%	D
0.0	59.9 and below	F

Grading Policy

Attendance/Homework	10 %	(Based on attendance)
EMT1255L	25 %	(Fail lab → Fail course)
Midterm Exams	40 %	(Dates will be given later)
Final Exam	25 %	

Attendance Policy and Points for Attendance

Students can earn point for attendance. These points will be added to the total before the average is computed and are as follows:

1. Perfect attendance, 10 points;
2. One absence, 7 points;
3. Two absences, 4 points;
4. Three or more absences, no points. After the third absence, the student will receive a grade “F” in the course.
5. Students must be on time for class. Students who are late for class will receive a “tardy”, and each set of three “tardy” will equate to one absence.

Note: Absences mentioned above are “unexcused” absences. If student is really sick, or if the absence falls under the umbrella of school-related or family emergency, student should notify this to instructor that he/she will be absent. In some cases, the student may be asked to document for the absence in writing before the absence will be excused.

WEEK	TOPICS	HOMEWORK PROBLEMS
1 – 2	<p>Introduction to Electronics</p> <p>Chapter 1: Basic Analog Concepts</p> <ul style="list-style-type: none"> • Analog Electronics. • Conventional Current & Electron Flow • Analog and Digital Signals • Periodic Signals 	<p><i>Homework:</i> See Class note</p>
3 – 4	<p>Chapter 2. Diodes & Applications</p> <ul style="list-style-type: none"> • Atomic Structure & Semiconductors • Doping (N-Type & P-Type Materials) • PN-Junction & Depletion Layer • Forward & Reverse Bias • Diode Characteristic Curve • Diode Testing • Ideal & Practical Diode Models • Transformers • Parameters of Diode • Categories of Diodes • Half-Wave Rectifier • Full-Wave Rectifier • Bridge Rectifier • Capacitive Filter • Zener Voltage Regulator • IC Voltage Regulator <p style="text-align: center;">MIDTERM EXAM 1</p>	<p><i>Homework:</i> See Class note</p>
5 – 7	<p>Chapter 3. Bipolar Junction Transistors (BJTs)</p> <ul style="list-style-type: none"> • Transistor Structure & Operation DC Beta (β_{dc}) • Transistor Characteristic Curves • Transistor Testing • Cutoff & Saturation • The DC Load Line & Q-Point • Biasing (Base, Voltage Divider, & Emitter) • Amplifier Concepts □ AC Equivalent Circuit • Common-Emitter/Collector/Base Amplifiers • Bipolar Transistor Switching Circuit 	<p><i>Homework:</i> See Class note</p>
8 – 9	<p>Chapter 4. Field-Effect Transistors (FETs)</p> <ul style="list-style-type: none"> • The Basic Differences between BJTs & FETs • Structure & Functionality of the JFET • JFET Input Resistance • Self-Biasing & Voltage-Divider Biasing of JFET • JFET Common-Source Amplifiers <p style="text-align: center;">MIDTERM EXAM 2</p>	<p><i>Homework:</i> See Class note</p>

WEEK	TOPICS	HOMEWORK PROBLEMS
10	Chapter 6. Operational Amplifiers (OP Amps) <ul style="list-style-type: none"> • Introduction to op amps • OP-AMP Parameters • Negative Feedback in OP-AMPs • OP-AMP Configurations • Troubleshooting 	<i>Homework:</i> See Class note
11	Chapter 7. Op–Amp Response <ul style="list-style-type: none"> • Basic Concepts • OP-Amp Open - Loop Response • OP-Amp Closed - Loop Response • Troubleshooting 	<i>Homework:</i> See Class note
12	Chapter 8. Basic Op–Amp Circuits <ul style="list-style-type: none"> • Comparators • Summing Amplifiers • Integrators & Differentiators • Troubleshooting 	<i>Homework:</i> See Class note
13 – 14	Chapter 9. Active Filters <ul style="list-style-type: none"> • Basic Filter Responses • Filter Response Characteristics • Active Low-Pass Filters • Active High-Pass Filters • Active Band-Pass Filters • Active Band-Stop Filters Review for Final Exam	<i>Homework:</i> See Class note
15	FINAL EXAM	