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**New York City College of Technology**

Dept. of Computer Engineering Technology

**Syllabus**

**Course:**  EMT 1240P – Fundamentals of Electrical and Electronics Technology

**Professor:**  M. Islam - V627 Email: Mislam@citytech.cuny.edu

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| **Hours / Credits:****Description & Objectives:** |  | 3 Class hour, 3 Lab Hours, 4 Credits* This course introduces to electrical safety, basic electrical theory, semiconductor devices, digital electronics, and applications. Topics address key fundamentals, including direct current circuits (DC), series and parallel resistive circuits, semiconductor diodes, logic gates, simplifying logic circuits, combinational logic circuits, sequential logic circuits, and digital computer basics. Hands-on laboratory experience will reinforce the students’ learning and provide opportunity to transfer theory learned in lecture to practical applications.
* Develop discipline-specific knowledge and skills.
* Acquire and use tools needed for communication, inquiry, and analysis.
* Integrate knowledge and application within and across disciplines.
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| **Attendance:** |  | You are allowed a MAXIMUM of 3 absences. If you exceed that number, you may receive a WU grade. EXCESSIVE LATENESS (more than 5 minutes) will be considered to be an absence from that class meeting. |
| **Pre- requisites:** **Co-requisites:** |  | CST 1100EMT 1240PL  |
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| **Textbook:** |  | Introduction to Basic Electricity and Electronics by Gates, Earl D.ISBN-10: 1133948510  |
| **Course Objectives:** |  | * Demonstrate basic knowledge how electrical circuits, semiconductor devices, and digital electronic systems fit into the context of professional careers, ethics, and societal needs. Demonstrate basic knowledge relating to direct current circuits (DC), semiconductor devices and digital electronics.
* Demonstrate knowledge of the Ohm’s Laws, Kirchhoff's Laws, and techniques to apply in series circuit and parallel circuit.
* Demonstrate basic knowledge of diode biasing.
* Understand combinational logic circuits and sequential logic circuits.
* Apply knowledge of logic gates, Boolean Algebra, K-Map, and DeMorgan's Theorems in digital circuits.
* Utilize the knowledge of mathematics and science to gain an understanding of the operation of electrical and electronics systems.
* Reinforce theory and techniques taught in the classroom through experiments in the laboratory.
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| **Lab Requirements:** |  | Students are required to submit a Lab Report after every experiment. |
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| **Grading:** |  | Final grade will be determined based on:* Exam 1 20 %
* Exam 2 (Midterm) 20 %
* Final Exam 20 %
* EMT1240 Lab 30 %
* QUIZs 10%
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| **Session** | **Main Topics** | **Homework Assignments** |
| 1 | Course outline, classroom conduct, academic integrity, attendance, and grading policy. A brief history of electricity, digital, and analog devices. Safety. Electrical quantities and units and measurements. Chapter 1 (Text book 1)  |  ***Homework # 1:*** (Chapter 1)  |
| 2 | Voltage, current, and resistance. Resistor color codes and standard resistor values. The electrical circuit and switches. Ohm’s law for calculating current, voltage, and resistance in DC circuit. Power in an electric circuit. Chapters 2 and 3 (Text book 1)  | ***Homework # 2:*** (Chapter 2 & 3)  |
| 3 | Connecting resistors in series. Current in a series circuit. Voltage sources in series. Kirchhoff’s voltage law. Application of Ohm’s law in series DC circuit. Chapters 5 (Text book 1)  |  ***Homework #3*** |
| 4 |  Connecting resistors in parallel. Voltage in a Parallel Circuit. Kirchhoff’s Current Law. Application of Ohm’s Law in parallel DC circuit. Open and Short Circuits. Chapters 6 (Text book 1) | ***Homework # 4:*** (Chapter 6) |
| 5 | 1st Test |  |
| 6 | Introduction to semiconductors. The *p-n* junction diodes. Diode characteristics. Special-purpose diodes. Chapters 16  | ***Homework # 5:*** (Chapter 16) |
| 7 | Digital concept. Binary Digits, Logic Level, and Digital Waveform. Overview of Basic Logic Functions and Integrated CircuitsChapter 1 (Text book 2)  | ***Homework*** |
| 8 | Digital concept. Binary Digits, Logic Level, and Digital Waveform. Overview of Basic Logic Functions and Integrated CircuitsChapter 1 (Text book 2)  |  |
| 9 | Logic gates and circuit: AND, OR, NAND, NOR. Logic gates and circuit: XOR, XNOR, Buffer. Chapter 3 (Text book 2)  |  |
| 10 | Boolean algebra, DeMorgan’s theorem, and reduction techniques (Karnaugh Maps). Chapter 4 (Text book 2)   |  |
| 11 | Exam 2 |   |
| 12 | Combinational Logic using the universal properties of NAND and NOR gates. Build binary Comparators.* Chapter 5
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| 13 | Functions of Combinational Logic, Adder and Decoder. Latches, Flip-Flops Chapter 7 (Text book 2) Chapter 6 |   |
| 14 | Registers and applications* Chapter 7 (Text book 2)
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| 15 | Final Exam |  |

***Remarks:*** *1) No make-up exams will be given. 2) Disturbing the lecture in the classroom is not allowed. Eating, drinking and cell-phone ringing are not permitted in the classroom. These will affect your final grade.*

**Appointment**: Must send an E-mail Request.

**Office: V627**

**Prepared by: Prof.** Mohammed Islam