City University
Department of Computer Science and Engineering
Faculty of Electrical and Electronic Engineering

Course Outline

Course Code and Title: EEE 301, Electronics-I
Credit Hours: 3 **Class Time & Day: 2:00-3:20, ST** **Room: 315**
Prerequisites: EEE 301

Program: B. Sc. in Computer Science & Engineering (CSE)
Semester: Summer 2016
Total weeks: 13 **Hours/week:** 3 **Total Hours:** 39+

Instructor: Md. Ashraful Haque
Office: Room 303
Email: limon_786@yahoo.com

Course Goals:

This course has been designed for the Computer Science & Engineering students to give a solid background of electronics. In this course students will learn the fundamental terms of electronics such as semiconductor, diode, transistor and their applications. Based on this course students will also perform lab classes so that they can apply their knowledge from theory class to lab class.

Course Description:
Semiconductor: Bonds in semiconductor, energy band diagram, Conductors, Insulators, Semiconductors, Intrinsic and Extrinsic Semiconductors, P-type and N-type semiconductors. **Semiconductor diodes:** Theory of p-n junction as a diode, Ideal p-n junction, p-n junction and diagram, Current component of p-n diode; V-I characteristics, electrical properties, junction breakdown,: Transition and diffusion capacitance, Dynamic resistance, reverse breakdown, Avalanche and Zener breakdown; Zener diode, Rectifier diode: controlled and uncontrolled rectification; Special-purpose diodes: Tunnel diode, varactor diode and break down diode; Metal oxide semiconductor diode, optical diode, PIN diode, Schottky diode, current regulator diode. **Bipolar Junction Transistor:** Construction, principle of operation, biasing and use of PNP and NPN transistor; Characteristics of CB, CC and CE configurations; Transistor circuit analyses: Transistor h-parameter, Transistor amplifier circuits and their cascading, effect of input-output impedances, Darlington pair, Emitter follower. **Transistor Equivalent Circuits:** Generalized small signal hybrid model of BJT, Hybrid model of CE, CB, and CC amplifiers. **Transistor h-parameter Equivalent Circuits**: Generalized small signal hybrid model of BJT. Hybrid model of CE. CB & CC Amplifies. **Operational amplifier:** Basic block diagram, characteristics, ideal op-amp. Parameters, open loop & close loop operation, comparator, Common-mode rejection, Ratio; Feedback concepts, characteristics, effects, advantages.

Basis of Evaluation of Participants:

Class Attendance	:	05%
Behavior	:	05%
Class Performance including Class Test	:	10%
Individual Presentation	:	10%
Midterm Examination	:	30%
Final Examination	:	40%
	Total =	**100%**

Course Outcomes:

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At the end of this course students will be able to explain basic concepts of electronics and the analysis of the fundamentals terms of electronics. Students will be able to apply their knowledge from theory class to lab class to see the different characteristics of electronics elements.

Text Book:

- R L Boylestad and L Nashelsky: Electronic Devices and Circuit Theory
- Principles of Electronics – V. K Mehta / Rohit Mehta.

Reference Book:

- Sedra and Smith: Microelectronic Circuits
- B. Grob: Basic Electronics
- A P Malvino: Electronics Principles

Course Policies and Procedures:

General policies are as described in the University Bulletin.

All classes will be in a participatory mode.

To be eligible to sit for the final exam a student has to have minimum 70% attendance. Attendance of anyone who will enter the class after the attendance register is closed may not be recorded. Any special consideration / provision for a student will be tied up absolute with regularity in class attendance over the entire semester.

As and when needed extra classes will be arranged to make up (possible) slow progress of the course. These classes will be considered as regular attendance will be counted for these classes. Decisions regarding the schedules for these classes will be made in the class room when most of the students remain present in the class. No separate formal notice will be served for this purpose.

Student must have separate books and separate note book exclusively meant for this course.

Random Quizzes:

All quizzes will be conducted on random basis. Random quizzes will not be made up other than for a student who is evaluated to be regular (100%) before the day of the quiz in question and who can produce evidence that he/she had the reason(s) for missing the quiz.

Assignments:

The details of the assignment will be mentioned in the class as and when appropriate. No late assignment will be accepted. No erroneous or incomplete home assignments will be received.

Every assignment must have the following information at the top of the first page of assignment.

ID#: Assignment#:
Name: Date assigned:
Due Date:

Any assignment not conforming this format will be subjected to random penalty. Assignments are to be submitted in' letter size' or 'A4' size papers.

CLASS SCHEDULE

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Week	Topic	Reference Readings	Assignments	Due Date
1-3	**Semiconductor:** Bonds in semiconductor, energy band diagram, Conductors, Insulators, Semiconductors, Intrinsic and Extrinsic Semiconductors, P-type and N-type semiconductors. **Semiconductor diodes:** Theory of p-n junction as a diode, Ideal p-n junction, p-n junction and diagram, Current component of p-n diode;			
4-6	V-I characteristics, electrical properties, junction breakdown,: Transition and diffusion capacitance, Dynamic resistance, reverse breakdown, Avalanche and Zener breakdown; Zener diode, Rectifier diode: controlled and uncontrolled rectification; Special-purpose diodes: Tunnel diode, varactor diode and break down diode; Metal oxide semiconductor diode, optical diode, PIN diode, Schottky diode, current regulator diode.			
7	Midterm Examination			
8-10	**Bipolar Junction Transistor:** Construction, principle of operation, biasing and use of PNP and NPN transistor; Characteristics of CB, CC and CE configurations; Transistor circuit analyses: Transistor h-parameter, Transistor amplifier circuits and their cascading, effect of input-output impedances, Darlington pair, Emitter follower. **Transistor Equivalent Circuits:** Generalized small signal hybrid model of BJT, Hybrid model of CE, CB, and CC amplifiers.			
11-12	**Transistor h-parameter Equivalent Circuits**: Generalized small signal hybrid model of BJT. Hybrid model of CE. CB & CC Amplifies. **Operational amplifier:** Basic block diagram, characteristics, ideal op-amp. Parameters, open loop & close loop operation, comparator, Common-mode rejection, Ratio; Feedback concepts, characteristics, effects, advantages.			
13	Final Examination			