No	Course Information (2019-2020)	
1.	Unit name	Microelectronics I
2.	Code	EcE-21011
3.	Classification	Engineering Subject
4.	Credit value	3 (2-1-1)
5.	Semester/ Year Offered	1/2
6.	Pre-requisites	EcE-11011& 12011 Fundamental of Electronic Circuit
7.	Mode of delivery	Lecture, Demonstration
8.	Assessment System and breakdown of marks	Tutorial, Lab report, Exam
	Practical	20%
	Tutorial	10%
	Mid-term and Final Examination	70%
9.	Academic staff teaching unit	Electronic Engineering
10.	Course outcome of unit: After the completion of this course, students will be able: ▪ To recognize the concept of semiconductor and how a p-n junction is formed. ▪ To explain the types, operations and application of diode, bipolar-junction transistor (BJT) and field-effect transistor (FET). ▪ To calculate the voltage, current and voltage gain of BJT amplifier, power amplifier, FET amplifier and diode. ▪ To simulate and construct the rectifier circuit (full-wave & half-wave), DC power supply (by using voltage regulator & zener diode) and amplifier circuit.	
11.	Synopsis of unit: The analog circuit will teach the fundamentals of diodes and transistors. With the assumed knowledge on physical characteristics and operation of major semiconductor devices, this course introduces basic circuits employing semiconductor devices and its utilization in switching and amplification applications.	
1	**Introduction to Electronics** 1.1 The Atom	

5.1 The DC Operating Point

5.2 Voltage – Divider Bias

5.3 Other Bias Methods

Main References:

Electronic Devices (Electron Flow Version) Handbook: Microelectronics, Seven Edition, Thomas L. Floyd, 2012 Prentice Hall. Cloth, 976 pp, IBSN-10: 0132549859, ISBN-13: 9780132549851.

Additional References:

http://www.pearsonhighered.com/electronics

http//www.learnabout-electronics.org/bipolar

http//www.seas.upenn.edu/lec_9_....

Information on Lab Practical (EcE-21011, Microelectronics I)

Lab	Activities
1.	**Experiment I: Half-wave Rectifier** **Objectives:** ▪ To construct the half-wave rectifiers. ▪ To describe the output voltage waveform. ▪ To measure voltage and current by using software. **Required equipment:** ▪ Multisim Software, Computer
2.	**Experiment II: Full-wave Rectifier** **Objectives:** ▪ To construct a full-wave bridge rectifier. ▪ To describe the output voltage waveform with capacitor and without capacitor. ▪ To measure voltage and current by using software. **Required equipment:** ▪ Multisim Software
3.	**Experiment III: Regulated DC Power Supply** **Objectives:** ▪ To observe waveform at the output voltage of (bridge) rectifier with and without filter capacitor. ▪ To measure output voltage from the rectifier and regulator. **Required equipment:** ▪ Step-down transformer, Diode, Capacitor, Resistor, Voltage Regulator Breadboard, Connecting wire, Oscilloscope, Meter
4.	**Experiment IV: Testing the operation of Zener diode** **Objectives:** ▪ To measure output voltage from the rectifier and regulator. ▪ To determine the type number and output voltage. **Required equipment:** ▪ DC power supply, Zener diode, Multimeter, Connecting wires, Breadboard, Resistor.

5.	**Experiment V: Flip-flop circuit and two state transistor amplifier circuit** **Objectives:** ▪ To construct the flip-flop circuit and two state transistor amplifier circuit. **Required equipment:** ▪ Transistor, Resistor, 9V battery, LED, LDR, Connecting wires, Bread board

6.	**Experiment VI: Common-Emitter Amplifier** **Objectives:** ▪ To construct the common-emitter amplifier. ▪ To generate the input and output waveform by using oscilloscope. **Required equipment:** ▪ Transistor, Resistor, Capacitor, Multimeter, Function generator, Oscilloscope, Breadboard, Power supply
7.	**Experiment VII: Common-Collector Amplifier** **Objectives:** ▪ To construct the common-collector amplifier. ▪ To generate the input and output waveform by using oscilloscope. **Required equipment:** ▪ Transistor, Resistor, Capacitor, Multimeter, Function generator, Oscilloscope, Breadboard, Power supply
8.	**Experiment VIII: Common-Base amplifier** **Objectives:** ▪ To construct the common-base amplifier. ▪ To generate the input and output waveform by using oscilloscope. ▪ To compare the voltages between measuring values and calculation values. **Required equipment:** ▪ Transistor, Capacitors, Resistor, Multimeter, Voltmeter, Connecting wire, Bread board, Oscilloscope, Function Generator, Power Supply
9.	**Experiment IX: Class-AB Push-Pull amplifier** **Objectives:** ▪ To construct the class-AB push-pull amplifier. ▪ To generate the input and output waveform by using oscilloscope. ▪ To compare the voltage difference between measuring values and calculation values of each transistor. **Required equipment:** ▪ Transistor, Capacitors, Resistors, diodes, Multimeter, Voltmeter, Connecting wire, Bread board, Oscilloscope, Function Generator, Power Supply

10.	**Experiment X: Testing the transistor type of NOT, NAND and NOR gate** **Objectives:** ▪ To test the NOT, NAND and NOR gate by using transistor. **Required equipment:** ▪ Transistors, Resistors, LED, Bread board, 9V battery, Connecting Wire