Course Objectives	Course Competencies
Upon completion of this course the student will be able to: 1) Describe the structure of a silicon crystal	a. Recognize the characteristics of good conductors and semiconductors b. List two types of carriers and name the type of impurity that causes each to be a major carrier
2) Explain the conditions that exist at the pn junction of an unbiased diode, a forward-biased diode, and a reverse-biased diode	a. Explain the conditions that exist at the pn junction of the unbiased diode, and a reverse-biased diode. b. Describe the types of breakdown current caused by excessive reverse voltage across a diode.
3) Describe the fundamental operation of a bipolar junction transistor BJT	a. Draw a diode symbol and label the anode and cathode. b. Draw a diode curve and label all significant points and areas. c. Describe the ideal diode d. Describe the second approximation e. List the basic characteristics of diodes f. Draw a diagram of a half-wave rectifier and explain how it works g. Draw a diagram of a full-wave rectifier and explain how it works.
4) Explain and Solve BJT biasing circuits	a. Describe the relationships among the base, emitter, and collector currents of a bipolar junction transistor. b. Draw a diagram of the CE circuit and label each terminal, voltage, and resistance. c. Label the three regions of operation on a bipolar junction transistor collector curve d. Calculate the respective CE transistor current and voltage values using the ideal transistor and the second transistor approximation.
5) Solve a Basic BJT Amplifiers with negative feedback	a. Draw an emitter bias circuit and explain why it works well in amplifying circuits b. Calculate the divider current, base voltage, emitter voltage, emitter current, and collector-emitter voltage for an npn VDB circuit. c. Determine how to draw the load line and calculate the Q point.

6) Explain and solve a basic JFET and explain why JFET might be more temperature stable than BJT	a. Describe the basic construction of a JFET. b. Identify and describe the significant region of JFET drain curves and transconductance curves. c. Calculate the proportional pinchoff voltage and determine which region a JFET is operating in. d. Describe several JFET applications, including switches, variable resistances, and choppers.
7) Explain and solve a MOSFET circuit.	a. Explain the characteristics and operation of both depletion-mode and enhanced-mode MOSFETs. b. Describe how E-MOSFETs are used in digital switches c. Sketch the characteristics curves for D-MOSFETs and E-MOSFETs. d. Draw a schematic of a typical CMOS digital switching circuit and explain its operation.