



Course Blue Print of EE 203

Introduction

This is a sample course blueprint of the online course EE 203. After going through the instructional design process, the course content has been clustered into five units:

1. Unit 1: Diodes
2. Unit 2: Bipolar Junction Transistor (BJT)
3. Unit 3: Field Effect Transistor (FET)
4. Unit 4: Digital Circuits
5. Unit 5: Differential Amplifier's

To illustrate how to develop a course blueprint, only Unit 2 has been demonstrated here. Unit 2 consists of three modules and each module consist of many lessons

1. Module 2.1: Introduction to BJT
2. Module 2.2: Analysis of BJT Circuits
3. Module 2.3: Design of BJT Amplifier Circuits



Course Blue Print

Course Title	EE 203 Electronics I
Course Description	<p>This course is a core course in electronic circuits which is taught to electrical, system, and computer engineering students. It introduces the basic electronics circuit devices (diodes and transistors). Moreover, it develops in students the ability to analyze and design electronic circuits. This course consists of five modules. The first one introduces the most fundamental electronic device, the diode. The second unit studies the bipolar junction transistor (BJT). The field-effect transistor (FET) is presented in the third module. The fourth unit introduces MOS and BJT digital circuits. The Last unit covers an important amplifier topology which is the differential amplifier.</p> <p>A core course in electrical, system, and computer engineering departments. 4 credit hours (3 Lecture & 1 Lab)</p> <p>Learners are third year collage students whose major is electrical, system, or computer engineering.</p>
Course Objectives	<p>By the end of this course, students will be able to</p> <ul style="list-style-type: none">O1. Identify the basic electronics components (diode, transistor).O2. Recognize the basic operation of diode and transistor.O3. Analyze an analog electronic circuit.O4. Design and build an analog electronic circuit.O5. Recognize useful applications of circuits.O6. Design basic digital circuits.
Course Materials	<p>Textbook: Microelectronic Circuits, 4th Ed. 1998, by Sedra and Smith, Oxford University Press, Inc.</p> <p>Laboratory: EE 203 Lab Manual</p>
Course Activities	<ul style="list-style-type: none">• Problem-Base approach will be used lightly in this course to enhance students' understanding of important concepts.



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	<ul style="list-style-type: none">• Online discussion will be established for this course. Its main purpose will be to enrich students' knowledge in the applied direction where students will be asked to search the internet for available basic diode and transistor practical applications.• Bank of Practice Quizzes is prepared for this course which will be available to students. These quizzes will be optional. It will help students to enhance their understanding and discover areas of weakness.• Additional reading resources will be provided through the course site.														
Course Evaluation Scheme	<table><tr><td>1. Eight homework assignments</td><td>(6%)</td></tr><tr><td>2. Six in class quizzes</td><td>(8%)</td></tr><tr><td>3. Design project will be assigned in week 6 and collected in week 13</td><td>(6%)</td></tr><tr><td>4. Discussion</td><td>(5%)</td></tr><tr><td>5. Two Major Exams (Face-to-face)</td><td>(25%)</td></tr><tr><td>6. Laboratory</td><td>(20%)</td></tr><tr><td>7. Final Exam (Face-to-face)</td><td>(30%)</td></tr></table>	1. Eight homework assignments	(6%)	2. Six in class quizzes	(8%)	3. Design project will be assigned in week 6 and collected in week 13	(6%)	4. Discussion	(5%)	5. Two Major Exams (Face-to-face)	(25%)	6. Laboratory	(20%)	7. Final Exam (Face-to-face)	(30%)
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Course Learning Objects	<p>General Description:</p> <p>You may find the following sites useful for this course:</p> <ul style="list-style-type: none">• List of useful simulation applets, on Diode, BJT, and MOSFET (University of New York, Bufffalo) http://jas.eng.buffalo.edu/education/mos/mosfet/mosfet.html• More learning objectives may be found in Merlot repository at www.merlot.org														



We ek	Les son	Lesson Name	Objectives	Readings	Learning Activities	Learning Objects	Assignments / Assessments
Unit 1: Diodes							
Unit 2: Bipolar Junction Transistor (BJT)							
Module 2.1: Introduction to BJT							
4	1	Physical Structure and Modes of Operation	<ol style="list-style-type: none">1. Define Bipolar junction transistors2. Recognize the physical structure of two types of BJTs3. Identify modes of operation of BJTs4. Describe active mode operation of first type of BJTs	Chapter 4 (4.1- 4.2)	1 Practice Quiz This will address objectives 3-4	Java applets from Internet Obj: 1-2	
4	2	Operation of npn BJT in Active Mode	<ol style="list-style-type: none">1. Recognize the concentration profile of minority carriers in the base of npn transistor2. Apply the collector current relationship3. Apply the base current relationship4. Apply relationship between base, collector	Chapter 4 (4.1- 4.2)	2 Examples & 1 Drill Exercise These will address objectives 2, 3 and 4		A quiz covering objective 2-4.



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Week	Lesson	Lesson Name	Objectives	Readings	Learning Activities	Learning Objects	Assignments / Assessments
			and emitter currents				
4	3	Operation of <i>pnp</i> BJT in Active Mode	<ol style="list-style-type: none"> 1. Describe active mode of operation of <i>pnp</i> transistor 2. Recognize BJT circuit symbols and conventions 3. Apply current voltage relationships in the active mode 4. Plot the graphical representation for BJT characteristics 	Chapter 4 (4.1- 4.2)	1 Example & 1 Drill Exercise These will address objectives 2, 3 Discussion based on the application of BJT in Active Mode		Assignment to be submitted online, which includes selected problems covering the objectives of the lessons of this unit.
Module 2.2: Analysis of BJT Circuits							
5	1	DC analysis of BJT	<ul style="list-style-type: none"> • Recognize steps involved for DC analysis • Perform DC analysis of <i>nnp</i> and <i>pnp</i> bipolar transistors 	Chapter 4 (4.2- 4.5)	5 Examples & 3 Exercises Obj: 1,2		
5	2	BJT as an Amplifier	<ul style="list-style-type: none"> • Recognize 'early voltage effect' (dependence of I_c on collector voltage) • Describe the operation of transistor as an amplifier • Define transconductance • Define input resistance 	Chapter 4 (4.2- 4.5)	1 Example & 1 Exercise Obj: 1 2 Exercises Obj: 3-5		



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Week	Lesson	Lesson Name	Objectives	Readings	Learning Activities	Learning Objects	Assignments / Assessments
			<ul style="list-style-type: none">at the baseDefine input resistance at the emitterDefine voltage gain of an amplifier				
5	3	Small Single Analysis of BJT Amplifier	<ul style="list-style-type: none">Identify small signal equivalent circuit models (Hybrid-π model and T-model)Recognize the steps involved in small signal analysisPerform small signal analysis of a BJT amplifier circuit	Chapter 4 (4.2- 4.5)	1 Example & 1 Exercise Obj: 2-3		
Module 2.3: Design of BJT Amplifier Circuits							
6	1	Biasing in BJT Amplifier Circuits	<ul style="list-style-type: none">Define bias current in BJTIdentify the different bias arrangements for BJT discrete circuitDesign bias arrangements for BJT discrete circuit design	Chapter 4 (4.6 - 4.8)	1 Example & 1 Exercise Obj: 1-3		Major Exam 1: covering the diode and BJT. Face-to-Face in class Homework 3 Selected problems on BJT Operation and DC circuit



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Week	Lesson	Lesson Name	Objectives	Readings	Learning Activities	Learning Objects	Assignments / Assessments
							analysis.
6	2	Common Emitter and Common Base Amplifiers	<ul style="list-style-type: none"> Analyze and design following basic single stage BJT amplifier configurations <ul style="list-style-type: none"> Common Emitter Amplifier Common Emitter Amplifier with a resistance in the emitter Common Base Amplifier 	Chapter 4 (4.6 - 4.8)	2 Exercises Obj: 1-3		Discussion: Search the internet and present a real BJT amplifier circuit.
6	3	Common Collector Amplifier	<ul style="list-style-type: none"> Analyze and design following basic single stage BJT amplifier configurations <ul style="list-style-type: none"> Common Collector Amplifier 	Chapter 4 (4.6 - 4.8)	1 Exercise Obj: 1		A comprehensive quiz covering all lessons of this units
Unit 3: Field Effect Transistor (FET)							
Unit 4: Digital Circuits							
Unit 5: Differential Amplifier's							