



College of Engineering and Computer Science
ELEE 3301 – Electronics I
Syllabus Fall 2017

Course Name: Electronics I

Course Number: ELEE 3301

PREREQUISITE: ENGR 3320 or ELETU 2402, and MATH 2413 and CHEM 1311.

Instructor: Dr. Nazmul Islam, Electrical Engineering,

Office: EENGR 3.277

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CLASS TIMES: T R: 1:40 am - 2:55 pm; room EENGR 1.268

Office Hour: T R: 10:00am – 12:30pm.

Also open to other times by appointment

COURSE TOPICS:

The electrical characteristic of silicon, fabrication of silicon devices, operational amplifiers, and operation of diodes, bipolar junction transistors and MOSFET transistors are the main topics of this course. Diode circuits and applications are described, built, and investigated. Transistor biasing is the third topic of this course.

Introduce students to the basic principles of electronics devices and circuits. ENGR 3321 at a glance

- (1) Learn the operation of amplifier, switch, Op Amp
- (2) Learn the operation of diode and its application
- (3) Learn the physical operation and characteristics of MOSFET
- (4) Learn the physical operation and characteristics of BJT
- (5) Learn the small signal models and use them to analyze the performance of single transistor circuits

TEXT: Adel S. Sedra and Kenneth C. Smith, Microelectronic Circuits, **Sixth** Ed., Oxford University Press. ISBN: 0195323033

Other notes to be handed out, and/or be posted to Blackboard (myutbtsc).

Reference Text: Microelectronics Circuits, McGrawHill, C. Jaeger, Travis N. Blalock, ISBN: 0073380458

EVALUATION

Homework:

There will be multiple homeworks. Homework is intended to be a learning tool and is due on the day announced in the class. Due date for homework is firm. Late assignments will be accepted but 50% grade is deducted for your late assignments. Every assignment should be finished in time and by yourself.

Quizzes

Short 10-15 minutes quizzes that test aspects of current work to make sure that student are keeping up with course work, homework. Topics can include anything covered from the beginning of the semester, but usually cover current topics, including homework, class work, and laboratory work. Quizzes may be given at the beginning of class, at the end of class, or as breaks between topics. There are **no make-up quizzes**.

Midterm Exam

Two midterm exams will cover the course content upto the topics covered in the class.

Final Exam

The final exam is comprehensive, and a two hour examination with problems selected from all topics covered, both from the text and from the labs, presented in the course.

GRADING CRITERIA:

Homework/Class	
Participation	10
Quizzes	25
Midterm1	20
Midterm2	20
Final Exam	25

Letter grade for this course will be assigned according to the following scale:

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>F</i>
>= 90	80 - 89	70 - 79	60 - 69	< 60

STUDENT LEARNING OUTCOMES

At the end of the semester, it is expected that students should be able to:

- 1) understand the use of diode, FET or BJT transistor, including analysis of circuits containing single stage amplifier
- 2) perform DC analysis of any diode, BJT or FET transistor circuit, and identify the operating region for each device,
- 3) understand the difference between DC and small signal analysis

4) draw small signal models and use them to analyze the performance of single transistor circuits,

COURSE TOPICS:

<u>Class</u>	<u>Topic</u>
Week 1	Course Introduction, Introduction to Amplifiers;
Week 2-3	Operational Amplifier Inverting and non-Inverting Configuration, Difference Amplifier Open loop gain, Bandwidth Large Signal Operation Integrators and Differentiators Introduction to Semiconductor devices, intro to Diodes.
Week 4-6	Diode Circuit Analysis; Diode Circuits, Rectifier, wave-shaping circuits, Half-Wave Rectifiers, Full-Wave Rectifier Design; Design Tradeoffs, DC-DC Converters Wave-Shaping Circuits; Dynamic Switching Photodiodes, Solar Cells, LED
	<i>Midterm 1</i>
Week 7-11	MOSFET Physical Operation and MOSFET Characteristics Transfer Characteristics, MOSFET Circuits at DC MOSFET Models, MOSFET Amplifiers, MOSFET Biasing Analysis, Small Signal Operation
	<i>Midterm 2</i>
Week 12-14	Bipolar Junction Transistor Physical Operation I-V Characteristics, BJT Circuit Models MOSFET Circuits at DC
	BJT Biasing, BJT Amplifiers, BJT Biasing Analysis, Small Signal Operation
Week 15	Review
<i>Final Examination</i>	

Course Rules:

To help you gain the most knowledge from this course, the following rules will be imposed for this course:

1. You are suggested to study every day and come to class with preparation.
2. It is your responsibility to keep all course-related materials which have been graded and returned. You are responsible for organizing and maintaining these materials.
3. There will be quizzes and two midterm exams for this course. No make up opportunities will be given for the quizzes. The absence to any of these quizzes will imply a zero grade.
4. All cell phones should be turned OFF during class and lab meetings. No "silent mode" operation.