BOSTON UNIVERSITY
COLLEGE OF ENGINEERING

Department of Electrical and Computer Engineering

EC410 – Introduction to Electronics
Spring 2025

Section	**A1**	**Dis.**	**Lab**
Instructor	Prof. M.C. Lee mclee@bu.edu	GTA: Deming Li deming@bu.edu	GTA/UTAs
Time	M/W 10:10-11:55 AM	B1 Fri 10:10-11:00 AM EPC 206	C1 TR 6:30-8:15 PM
Classroom	CAS B20	B2 Fri 12:20-1:10 PM CAS 204B	C2 Fri 2:30-4:15 PM
Office Hours	TBA (via zoom)		In PHO 105

Course Description:
Discussion of 2-terminal and 3-terminal non-linear and active devices; power supply circuits; simple linear amplifier circuits including biasing, incremental analysis, large-signal analysis, and frequency response; introduction to digital circuits. (4 credits)

Prerequisite: ENG EK307

Text: M. Horenstein, *Microelectronic Circuits and Devices*, 2nd edition, Prentice-Hall, 1996
Lab Manuel: See https://sites.bu.edu/engcourses/ec410/
References:
Sedra/Smith, *Microelectronic Circuits*, Oxford Press, 2014

Course Content:
EC410 includes a coordinated set of lectures, labs, homework, and exams to provide students with an introduction to electronics and circuit design. Lab sessions meet weekly in PHO105 where students will perform a variety of introductory circuit experiments using components and a breadboard (previously purchased in kit form for EK307). Each lab session will be conducted by GTA/UTA assigned to the course. Students will also be assigned weekly discussion times with a GTA to discuss the course material and ask questions on the homework. The course will contain two mid-terms and a final exam.

Grading:	Mid-term Exam I	20%
	Mid-term Exam II	20%
	Labs	15%
	Homework	15%
	Final Exam	30%

(1) Schedule of Lectures and Exams:

Dates	***Topic Description***	***Text Material***
1/22	Course intro, linear ckts review, Thevenin Eq ckts etc.	1.1 – 1.9
1/27	Transformers, Op-Amps ckts., Phasors/AC steady-state	notes
1/29	Non-linear ckts, graphical method, PN junction diode	3.1 – 3.3.2
2/3	PN diode circuits; Zener, tunnel, varactor, & Schottky diodes	3.3.3 – 3.3.9
2/5	Graphical methods, iterative solution, piece-wise linear modeling	3.4 - 3.6
2/10	Diode circuits: clipping, limiting	4.1 – 4.2
2/12	Rectifier circuits: half-wave rectifier, bridge rectifier	4.3 – 4.4.2
2/18	Power supply circuits, voltage regulator, detector circuit	4.4.3 – 4.4.5
2/19	Precision rectifiers, FET Devices, load line, NMOS depletion mode	4.5, 5.1 – 5.2.3
2/24	**Mid-Term Exam I**	
2/26	Bipolar junction transistors	5.3
3/3	Drain and collector resistance, Early Voltage	5.4
3/5	Photonic devices, temperature dependence, power limitations	5.5 – 5.7
3/17	Transistor Circuits - inverters (common emitter, common source)	6.1
3/19	Transistor Circuits – voltage follower (emitter flwr, source flwr)	6.2
3/24	Transistor Circuits – current follower (gnd'ed base, gnd'ed gate)	6.3
3/26	Basic analog amplifier circuits: voltage gain, power gain	7.1 – 7.2
3/31	Biasing MOSFET amplifiers, BJT small-signal models	7.3
4/2	BJT and MOSFET small-signal models, Review	7.4
4/7	**Mid-Term Exam II**	
4/9	Two-port representation, Frequency response, circuit capacitance	7.5, 9.1
4/14	Sinusoidal steady-state response, Bode plot, Review	9.2
4/16	Capacitors affecting high/low freq response, dominant pole	9.3.1 – 9.3.2
4/23	Transverse capacitance, Miller's Theorem	9.3.3 – 9.3.4
4/28	High freq poles with feedback, Freq response with bypass capacitor	9.3.5 – 9.3.6
4/30	Digital circuits: logic levels, noise margin, delay	6.4, 14.1- 14.3
TBA	**Final Exam**	

(2) Lab Manual (http://sites.bu.edu/engcourses/ec410/) **& Schedule**

	Lab Schedule
1/27	Intro to Equipment, Pspice
2/3	Diode V-I Characteristics
2/10	Diode Circuits
2/17	NO Lab (Presidents' Day on 2/17)
2/24	Power Supplies
3/3	I-V Characteristic of MOSFET
3/17	I-V Characteristic of BJT
3/24	MOSFET Amplifier (see Analog Amplifier Design)
3/31	BJT Amplifier (see Analog Amplifier Design)
4/7	Transistor Curve Tracer
4/14	No Lab
4/21	MOSFET Differential Amplifier
4/28	Make Up Sessions

(3) Rules for the SC410 Labs:

A bound 8½ x 11 lab notebook should be used to record all relevant data in it. Do not use loose-leaf data sheets in the lab. Each lab will need to be signed off by a EC410 GTA.

Course Policies:

1. Lectures – Attendance in class is considered essential and required.
2. Exams – Absence from an exam can be excused only for reasons of illness, or unavoidable travel. In each case, permission of the instructor in advance is required, as well as a written authorization by a physician (in the case of illness) or other appropriate authorized signature.
3. Homework – Late homework will not be accepted.
4. Labs – Late lab reports will not be accepted.

(4) Academic Misconduct:

BU takes academic integrity very seriously. Academic misconduct is conduct by which a student misrepresents his or her academic accomplishments, or impedes other students' opportunities of being judged fairly for their academic work. Knowingly allowing others to represent your work as their own is as serious an offense as submitting another's work as your own. More information on BU's Academic Conduct Code, with examples, may be found at

http://www.bu.edu/academics/policies/academic-conduct-code

(5) Collaboration Policy:

In this class you may use any textbooks or web sources when completing your homework, and/or one human collaborator (from class) per homework, subject to the following strictly enforced conditions:

- You must clearly acknowledge all your sources (including your collaborators) on the top of your homework.
- You must write all answers in your own words (although Java code may be shared with your collaborator)
- You must be able to fully explain your answers upon demand.
- You may not use any human resource outside of class (including web-based help services, outside tutors, etc.) in doing your homeworks or project. Obviously, you may not collaborate with anyone on exams.

Failure to meet any of the above conditions could constitute plagiarism and will be considered cheating in this class.