The University of Texas at Tyler
Department of Electrical Engineering

Course: EENG 3306 – Electronic Circuit Analysis I (Required)

Syllabus

Catalog Description:

Generalized amplifier models; two-port networks applications of operational amplifiers; non-ideal characteristics of operational amplifiers; electrical characteristics, small-signal models and applications of diodes; bipolar junction transistors, and FETS; amplifier analysis and design; limitations of small-signal models.

Prerequisites: EENG 3304 (Linear Circuits Analysis I); EENG 3104 (Linear Circuits Analysis I Laboratory), CHEM 1311 (General Chemistry I) and CHEM 1111 (General Chemistry I Laboratory)

Credits: (3 hours lecture, 0 hours laboratory per week)

Text(s): Microelectronics, Circuit Analysis and Design 4th edition, Donald Neamen ISBN 978-0-07-338064-3

Additional Material: Access to Multisim, Excel, and MATLAB

Course Coordinator: Ron J. Pieper, PhD, PE

Topics Covered: (paragraph of topics separated by semicolons)

Generalized amplifier models; applications of operational amplifiers; non-ideal characteristics of operational amplifiers; electrical characteristics, small-signal models and applications of diodes; small-signal models and applications of bipolar junction transistors; small-signal models and applications of FETS; amplifier analysis and design; *h*-parameter representations of amplifiers; distortion and limitation of small-signal models.

Evaluation Methods: (only items in dark print apply):

1. Examinations / Quizzes
2. Homework
3. Report/paper
4. Computer Programming
5. Project
6. Presentation
7. Course Participation
8. Peer Review

Course Learning Outcomes : By the end of this course students will be able to:

1. Analyze dc electronic circuits (including resistance, independent sources, and dependent sources) using basic circuit-analysis techniques (Kirchhoff's Laws, Ohm's Law, Thevenin- and Norton-equivalent circuits).
2. Analyze ac electronic circuits (including resistance, capacitance, self- and mutual inductance, independent sources, and dependent sources) using basic circuit-analysis techniques. (Kirchhoff's Laws, Ohm's Law, Thevenin- and Norton-equivalent circuits, phasor transform).
3. Compute the time-domain response of a linear network to a periodic, non-sinusoidal signal using superposition and the Fourier series.
4. Analyze linear electronic circuits using the four basic amplifier models (voltage, current, transconductance, and transimpedance).
5. Analyze electrical circuits represented by two-port parameters.
6. Analyze circuits using operational amplifiers including the limitations imposed by non-ideal electrical characteristics.

7. Design diode-application circuits—e.g., rectifiers, clipping circuits, and Zener-diode voltage regulators.
8. Use the operational principles and electrical characteristics of bipolar junction transistors (BJTs) to determine the quiescent operating point of a BJT.
9. Use the operational principles and electrical characteristics of bipolar junction transistors to derive appropriate small-signal models.
10. Use the operational principles and electrical characteristics of MOSFETs to determine the quiescent operating point of an enhancement-mode MOSFET.
11. Use the operational principles and electrical characteristics of MOSFETs to derive the appropriate small-signal model.
12. Analyze transistor amplifiers using midband small-signal models.
13. Calculate the limits of small-signal operation of diodes, bipolar transistors, and MOSFETs from their V-I characteristics.

Relationship to Program Outcomes (only items in dark print apply)[1]: This course supports the following Electrical Engineering Program Outcomes, which state that our students will:

1. have the ability to apply mathematics, science, and engineering principles in the practice of electrical engineering;
2. have the ability to use modern engineering tools and techniques in the practice of electrical engineering [13];
3. have the ability to analyze electrical circuits, devices, and systems [1,2,4,5,6,9,12];
4. have the ability to design electrical circuits, devices, and systems to meet application requirements [7];
5. have the ability to design and conduct experiments, and analyze and draw conclusions from experimental results;
6. have the ability to identify, formulate, and solve problems in the practice of electrical engineering using appropriate theoretical and experimental methods [3,9,11];
7. have effective written, visual, and oral communication skills
8. possess an educational background to understand the broader context in which engineering is practiced, including:
   a. knowledge of contemporary issues related to science and engineering;
   b. the impact of engineering on society;
   c. the role of ethics in the practice of engineering;
9. have the ability to contribute effectively to multi-disciplinary engineering teams;
10. have a recognition of the need for and ability to pursue continued learning throughout their professional careers [8,10].

[1] Numbers in brackets [ ] indicate the appropriate Course Learning Outcome(s) supporting the Program Outcome.

Contribution to Meeting Professional Component: (in semester hours)

Mathematics and Basic Sciences:	0	Hours
Engineering Sciences and Design:	3	Hours
General Education Component:	0	Hours

Prepared By:	David M. Beams Ron J. PIeper	Date:	Aug. 8, 2016 Aug 20, 2018

The University of Texas at Tyler
Department of Electrical Engineering

EENG 3306: Electronic Circuit Analysis
2018 Fall Semester

COURSE OUTLINE

Course Coordinator:	Dr. Ron J. Pieper, Electrical Engineering Office: RBN 1011 Phone: 903-565-7383 E-mail rpieper@uttyler.edu
Class Location/Time:	RBN 2012 11:15AM to 12:-10: MWF
Office Hours	To be arranged then posted
Text	Microelectronics, Circuit Analysis and Design 4th edition, Donald Neamen ISBN 978-0-07-338064-3
Prerequisites	EENG 3304, EENG 3104,, CHEM 1311, CHEM1111
Related subjects	

(Tentative pending assignment -grader) Grading rubric

Exam 1-55min	20%
Exam 2-55 min	25%
Turn in problem /HW (possibly also matlab/multi sim	10%
Final exam-120 min	**45%**

IMPORTANT: Recommendation maintain a class folder with all your work including class notes, homework quizzes, and mid-term exams..

Tentative Semester Schedule:

Chapter 1 sec 1,1 , 1.2 1.5	1 week	Physics of PN junction diodes , other diode types
Chapter 1 sec 1.3, 1.4	1 week	Diode circuits, AC circuits
Chapter 2	1.5 week	Diode circuits
End material for	55minute	Midterm 1
Chapter 3	1.0 week	FET physical model
Chapter 3	2.0 weeks	FET circuit models
Chapter 4	2.0 weeks	MOSFET Amplifiers
End of material for	Midterm 2 55 minutes	Midterm 2
Chapter 5 Bipolar Junction transistor	1.5 week	Phsical description BJT
Chapter 6	1.5 week	Basic BJT amplifier
Chapter 7,	1.5 week	Frequency Response
Additional	Time	Permitting
Final Exam 120 minutes	Final Exam 120 minutes	Final exam 120 minutes

ClassRoom Etiquette

Please remember to turn off cell phones before coming to class. Working on class assignments or surfing the web while class is going on is not acceptable. If these activities are important for you on a particular day it would be better you did them outside the class environment. That being said attendance is important and will taken periodically during the semester. If you know you have an emergency schedule conflict that comes up please inform me (email OK). Although I do not plan to integrate attendance data in with student evaluation it can and will provide additional information if a student is experiencing problems keeping up.

Background on grading and study habits

Typical ranges for grades in this class run as follows, 91-100% A, 80-90% B, 69% to 79% C. The class examples and HW problems provide a basis for gauging you comfort level with the material. The amount of time a student should study can not always be easily quantified due to differences between students. If after reviewing notes, book and HWs if you are having trouble digesting the concept or procedure involved you are highly encouraged to come to an office hour or make an appointment with me.

Advance Information on exams, quizzes

Not open book, limited equation reference allowed and provided. General policy is: you should get your questions answered before the day of exams. On exam day I will typically be involved with steps getting your exam ready. “needs of many outweigh needs of one ”

Homework, MATLAB and HW Policy:

Regular homework assignments will be handed out and posted on Blackboard. Students will take quizzes at regular intervals corresponding to assignments. Solutions to the homework assignments will be made available through Blackboard. Students are encouraged to keep their own problem solving notebook and compare with the solutions after making as serious effort at solving the problem without review of the solution,

Academic Integrity:

Students should be aware that absolute academic integrity is expected of every student in all undertakings at The University of Texas at Tyler. Failure to comply can result in strong university-imposed penalties.

Note:

If you have a disability, including a learning disability, for which you request disability support services/accommodation(s), please contact Ida MacDonald in the Disability Support Services office so that the appropriate arrangements may be made. In accordance with federal law, a student requesting disability support services/accommodation(s) must provide appropriate documentation of his/her disability to the Disability Support Services counselor. For more information, call or visit the Student Services Center located in the University Center, Room 282. The telephone number is 566-7079 (TDD 565-5579)." Additional information may also be obtained at the following UT Tyler Web address: http://www.uttyler.edu/disabilityservices.

Grade Replacement Policy:

If you are repeating this course for a grade replacement, you must file an intent to receive grade forgiveness with the registrar by the 12th day of class. Failure to file an intent to use grade forgiveness will result in both the original and repeated grade being used to calculate your overall grape point average. A student will receive grade forgiveness (grade replacement) for only three (undergraduate student) or two (graduate student) course repeats during his/her career at UT Tyler. (2006-08 Catalog, p. 35)