

Rutgers University, Department of Electrical and Computer Engineering
ABET COURSE SYLLABUS
COURSE: 14:332:373

Course Catalog Description:	14:332:373 - Elements of Electrical Engineering (3) Survey course in Electrical Engineering and circuit solving
Pre-Requisite Courses:	01:640:152 or 02:750:227
Co-Requisite Courses:	none
Pre-Requisite by Topic:	1. Electrical concepts from physics 2. Calculus 3. Complex numbers
Textbook & Materials:	Rizzoni, <i>Principles and Applications of Electrical Engineering</i> , 5th Ed, McGraw-Hill, 2007.
References:	None
Overall Educational Objective:	To provide exposure to basic electrical engineering concepts to non-major students.
Course Learning Outcomes:	A student who successfully fulfills the course requirements will have demonstrated: <ol style="list-style-type: none">1. an ability to define and explain the meaning/function of charge, current, voltage, power, energy, R, L, C, and the fundamental principles of Ohm's law, KVL and KCL including an understanding of electrical safety.2. an ability to write the equilibrium equations for a given network and solve them analytically for the steady state (DC and AC/phasor) solutions.3. an ability to analyze resistive op amp circuits and design inverting, non-inverting, summing, and differential amplifier circuits using op amps.4. an understanding of the behavior of inductances and capacitances.5. an ability to qualitatively and quantitatively predict and compute the steady state AC responses of basic circuits using the phasor method.6. an ability to understand the principles of electric filters.7. an ability to determine the conditions for maximum power transfer to any circuit element.

How Course Outcomes are Assessed:

Attendance (5 %)

HW Problems (5 %)

Mid-Term Exams (44 %)

Final Exam (46 %)

N = none S = Supportive H = highly related

Outcome	Level	Proficiency assessed by
(a) an ability to apply knowledge of Mathematics, science, and engineering	H	HW Problems, Exams
(b) an ability to design and conduct experiments and interpret data	N	
(c) an ability to design a system, component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	N	
(d) an ability to function as part of a multi-disciplinary team	N	
(e) an ability to identify, formulate, and solve ECE problems	S	HW Problems, Exams
(f) an understanding of professional and ethical responsibility	N	
(g) an ability to communicate in written and oral form	N	
(h) the broad education necessary to understand the impact of electrical and computer engineering solutions in a global, economic, environmental, and societal context	N	
(i) a recognition of the need for, and an ability to engage in life-long learning	S	Home-work
(j) a knowledge of contemporary issues	N	
(k) an ability to use the techniques, skills, and modern engineering tools necessary for electrical and computer engineering practice	S	HW Problems, Exams
Basic disciplines in Electrical Engineering	S	HW Problems, Exams
Depth in Electrical Engineering	S	HW Problems, Exams
Basic disciplines in Computer Engineering	N	
Depth in Computer Engineering	N	
Laboratory equipment and software tools	S	HW Problems, Mid-Term Exams
Variety of instruction formats	S	Lecture, office hour discussions

Topics Covered week by week:**Week 1:** Introduction; Current; Voltage**Week 2:** Ohm's and Kirchoff's laws; Power; Series/parallel connections**Week 3:** Voltage/current divider; Practical sources; Measuring current/voltage**Week 4:** Maximum power transfer; Source transformation; Node voltage method**Week 5:** Mesh current method; Inductors**Week 6:** Capacitors; Series/parallel L & C Connections; RC, RL circuits**Week 7:** Midterm Examination; Alternating current**Week 8:** Phasors; Circuits in the phasor domain**Week 9:** Circuit solving in the phasor domain**Week 10:** Average, effective value of a waveform; AC Power; Power factor correction**Week 11:** Transformers**Week 12:** Three phase circuits; wye-delta connections; Three phase power**Week 13:** Inverting/noninverting/differential operational amplifiers**Week 14:** Feedback; Differential operational amplifiers; Analog computers; Frequency response; Active filters**Week 15:** Review**Week 16:** Final Examination**Computer Usage:** None**Laboratory Experiences:** It is a separate course 14:332:375 associated with this course.**Design Experiences:** None**Independent Learning Experiences:** Home-Work problems are assigned weekly**Contribution to the Professional Component:**

(a) College-level mathematics and basic sciences: 0.25 credit hours

(b) Engineering Topics (Science and/or Design): 2.75 credit hours

(c) General Education: 0 credit hours

Total credits: 3

Prepared by: P. Sannuti and G. Shoane**Date:** October 2007