The University of Texas at Tyler
Department of Electrical Engineering

EENG 1301 – Engineering the Future  (Required)

Syllabus

Catalog Description:
An introduction to the Electrical Engineering profession, sub-disciplines and careers; Basic principles of
electric circuits, power systems; electronics, communications, and computer engineering;
Familiarization with electrical engineering tools, software packages and equipment; Team Design
Project; Integrated Weekly Lab.

Prerequisites: None

Credits: 3 ( 2 hours lecture, 3 hours laboratory per week )

Text(s):
2. NI myDAQ Student with NI LabVIEW, NI Multisim and NI Ultiboard (Part No. 781327-01 ),

Additional Material:
1.  NI Basic Parts Kit for myDAQ (Part No. NI-BPK500), Carrying Case (Part No.
9NICASE1), Jumper Wire Kit (Elenco Part No. JW-350)

Course Coordinator: Mukul Shirvaikar, Professor and Chair of Electrical Engineering

Topics Covered:
1. The Electrical Engineering Profession: History of Electrical Engineering, Electrical Engineering
Careers, Engineering your Career, Professional Society Meetings, Talks by Practising Engineers
2. Electrical Concepts and Components: Dimensions and Units – Greek Alphabet, Direct and Alternating
Voltage and Current, Resistance, Capacitance and Inductance, Complex Variables
Circuits, Parallel Circuits and Series-parallel Circuits
and Logic Families
5. Electric Power Systems Engineering National Electric Code (NEC®), Generation, Transmission, and
Distribution of Electric Power, Electric Wiring and Design
6. Electronics: Components Basic Pulse and Switching Circuits – LM555 Timer
Communication
8. Computer Engineering: (History, Computer Organization, Basic Networking
9. Electrical and Computer Engineering Tools: Laboratory Instrumentation – Voltmeters, Ammeters,
Soldering, MATLAB® and Simulink for Engineers, Circuit Analysis Software (Multisim, pSpice),
Printed Circuit Board (PCB) Fabrication
10. Analysis Methodology: Data Analysis – Graphing and Statistics, Report Writing
12. Team Design Project and Demonstration

Evaluation Methods: (only items in dark print apply):
1. Examinations / Quizzes
2. Homework
3. Reports / Paper
4. Computer Programming
5. Project / Model
6. Presentation
7. Course Participation
Course Learning Outcomes (formerly Objectives)^1: By the end of this course students will be able to:

1. List and describe contributions of the electrical engineering profession to society. [1, 7]
2. List and describe electrical engineering careers paths and professional societies encouraging IEEE membership. [1, 7]
3. List and describe basic electrical concepts, components, dimensions and units and Greek alphabet. [1]
5. Compute resistance for series and parallel combination of resistors with real life examples. [1]
6. Perform computations with complex variables and basic phasor operations. [1]
7. Describe basic logic gates and truth tables in digital systems. [1]
8. List major components of the electric power system - generation, transmission and distribution. [1]
9. List the basic types of electrical machines. [1]
10. Describe the role of the NEC code in electric systems design. [1]
11. Describe basic electronic components and basic pulse and switching circuits. [1]
12. List and describe basic concepts of communication systems including modulation techniques. [1]
13. List and describe the basic structure of a computer and a networking system. [1]
14. Make measurements of voltage, current, frequency and resistance with laboratory equipment. [3]
15. Perform basic analysis and computations with software analysis tools (e.g. Matlab, Multsim). [4]
16. Demonstrate knowledge of data analysis including graphing and statistics. [3, 5]
17. Write a laboratory report in a simple memorandum format. [3]
18. Create a printed circuit board utilizing software, milling machine and soldering iron. [5]
19. Design a solution at the freshman level for an electrical engineering problem as a part of a team. [3, 5]
20. Participate in an engineering team project with a final presentation. [5, 6, 7]

^1Numbers in brackets refer to method(s) used to evaluate the course objective.

Relationship to Program Outcomes (only items in dark print apply)^2: This course supports the following Electrical Engineering Program Outcomes, which state that our students will:

1. have the ability to apply knowledge of the fundamentals of mathematics, science, and engineering. [3, 4, 6, 7]
2. have the ability to use modern engineering tools and techniques in the practice of electrical engineering. [15, 18]
3. have the ability to analyze electrical circuits, devices, and systems [8, 9, 11-13, 16]
4. have the ability to design electrical circuits, devices, and systems to meet application requirements. [19]
5. have the ability to design and conduct experiments, and analyze and interpret experimental results. [14]
6. have the ability to identify, formulate, and solve problems in the practice of electrical engineering using appropriate theoretical and experimental methods. [5]
7. have effective written, visual, and oral communication skills. [17]
8. possess an educational background to understand the global context in which engineering is practiced, including
   a. knowledge of contemporary issues related to science and engineering. [10]
   b. the impact of engineering on society. [1]
   c. the role of ethics in the practice of engineering.[21]
9. have the ability to contribute effectively as members of multi-disciplinary engineering teams.[20]
10. have a recognition of the need for and ability to pursue continued learning throughout their professional careers. [2]

^2Numbers in brackets refer to course learning outcomes/objective(s) that address the Program Outcome.

Contribution to Meeting Professional Component: (in semester hours)

<table>
<thead>
<tr>
<th>Mathematics and Basic Sciences:</th>
<th>0 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering Sciences and Design:</td>
<td>3.0 hours</td>
</tr>
<tr>
<td>General Education Component:</td>
<td>0 hours</td>
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</tbody>
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Prepared By: Hassan El-Kishky
Modified: Mukul Shirvaikar, Hassan El-Kishky
Date: 01/15/2009
Date: 07/18/2012, 08/15/2011