Course Title: Fundamentals of Electrical Engineering
Course Prefix: ELEG Course #: 2053 Section # : P01

Department of Electrical & Computer Engineering

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Office Hours: T R 12:00pm – 3:00pm, W 12:00pm – 2:00pm Virtual Office Hours:

Course Location: NE 139 TR 09:30 am-10:50, NE 139 T 05:30-6:20 pm

Class Meeting Days & Times: TR: 09:30am-10:50am; T: 05:30-06:20 pm

Catalog Description: RLC circuits, Steady state analysis; transformers; dc machine and inductors motors; diodes ; circuit operations amplifiers; numbering systems, logic gates and combinational circuits,

Prerequisites: Phys 2023.
Co-requisites: Math 2043.

Required Text: **ISBN 9781305292024** Electrical Engineering in Context First Edition by Roman KUC, Cengage Learning,

Recommended Text/Readings:

Access to Learning Resources: PVAMU Library:
phone: (936) 261-1500;
web: http://www.tamu.edu/pvamu/library/
University Bookstore:
phone: (936) 261-1990;
web: https://www.bkstr.com/Home/10001-10734-1?demoKey=d

Course Goals or Overview:

The goal of this course is to provide students with a working knowledge required for analysis of DC and AC Components and Circuits real hand knowledge required for the analysis and operation.

Course Outcomes/Objectives

Introduce to the basic fundamental of electrical engineering. Students will gain knowledge and understanding of basic DC and AC circuit theory, electronics devices and components and digital and analog electronics. IN additions, students will gain experience concerning the electrical engineering section of the Fundamental of Engineering Exam

1 Be able to understand and apply Ohm's law. and Kirchhoff's laws in resistive networks.
2 Be able to understand and apply mesh and nodal analysis methods in networks..
3 Be able to understand and apply Thevenin and Norton theorems in network simplify via source transformation techniques.
4 Be able to understand and apply the maximum power transfer in network analysis..
5 Be able to characterize the behavior of resistors, capacitors, and inductors

Course Requirements & Evaluation Methods

This course will utilize the following instruments to determine student grades and proficiency of the learning outcomes for the course.

Exams – written tests designed to measure knowledge of presented course material
Homework –Assignment from text designed to supplement and reinforce course material
Special Assignment – assignments designed to measure ability to apply presented course material

Grading Matrix

Instrument	**Value (percentages)**
Exams (3 exams)	45%
Homework, Quizzes, And Special Assignment	25%
Final Exam (Comprehensive)	30%
Total:	**100%**

Grade Determination:
A = 90% or better
B = 80 – 89 %
C = 70 – 79 %
D = 60 – 69 %
F = Less than 60%

Course Procedures

Submission of Assignments:
All assignments should be submitted by the due date. Late assignments will not be accepted.
Formatting Documents:
Microsoft Word is the standard word processing tool used at PVAMU. If you're using other word

processors, be sure to use the “save as” tool and save the document in either the Microsoft Word, Rich-Text, or plain text format. **Exam Policy**
Exams should be taken as scheduled. No makeup examinations will be allowed except under documented emergencies (See Student Handbook).

16 WEEK CALENDAR

Problems

Week One: Motivation and Chapter 1 — **Required** **Suggested**
Introduction to Electrical Engineering

Week One-Two: Chapter 2

- **Definition of Circuits**
- **Charge, Current, and Kirchhoff's Current Law.**
- **Voltage and Kirchhoff's voltage Law.**
- **Electric Power and Sign Conversion.**
- **Circuit Elements and Their i-v Characteristics**
- **Resistance and Ohm's**
- **Practical Voltage and Current Sources.**
- **Special Problems** — **Special**

Week Three-Four: Chapter 3 Electric Circuits

3.1 Introduction
3.2 Electrical Quantities
3.3 Electrical Components
3.3.1 Batteries as power Sources
3.3.2 Capacitor as a Battery Alternative
3.4 Circuit Analysis Laws
3.4.1 Ohm’s Law
3.4.2 Nodes and Loops
3.4.3 Kirchoff’s Current and Voltage Laws
3.5 Resistor Circuits
3.5.1 Series Resistor Circuits
3.5.2 Parallel Resistor Circuits
3.5.3 Thevenin Equivalent Circuit
3.6 Frequency-Dependent Impedances
3.6.1 Complex Impedance
3.6.2 Frequency Transfer Function
3.7 RC Circuits
3.7.1 Series RC Circuits
3.7.2 Parallel RC Circuit
3.8 LC Circuits
3.8.1 Series LC Circuits
3.8.2 Parallel LC Circuit
3.9 Summary
3.10 Special problems (Required:3.1,3,5,7,9,11,25,19; Suggested: 3.2,6,10,12,16,18,26)

Exam - 1

Week Five Chapter 4. Electronics

4.1 Introduction

- 4.2 Operational Amplifier
  - 4.2.1 Comparator
  - 4.2.2 Feedback Amplifier
  - 4.2.3 Summing Amplifier
  - 4.2.4 Filters
- 4.3 Field-Effect Transistor (FET)
- 4.4 Diodes
- 4.5 Summary
- 4.6 Special Problems (Required: 4.1,3,5,7,9; Suggested: 4.2,4,6,8,10)

Week Six Chapter 5 Combinational Logic Circuits

- 5.1 Introduction
- 5.2 Logic Variables and Logic Equations
- 5.3 Elementary Logic Gates
  - 5.3.1 NOT Gate
  - 5.3.2 AND Gate
  - 5.3.3 OR Gate
- 5.4 Building-Block Gates
  - 5.4.1 NAND Gate
  - 5.4.2 NOR Gate
  - 5.4.3 ExOR Gate
- 5.5 From Logic Gates to Logic Circuits
  - 5.5.1 Constructing a Truth Table
  - 5.5.2 Binary Pattern Recognition
- 5.6 Summary
- 5.7 Special Problems (Required: 5.1,3,5; Suggested: 5.2,4,6)

Mid-Term Exam

Week Seven Chapter 6 Sequential Logic Circuits

- 6.1 Introduction
- 6.2 Sequential Circuits
- 6.3 Set-Reset Flip-Flop
  - 6.3.1 Addressable Memory
- 6.4 Toggle Flip-Flop
- 6.5 Summary
- 6.6 Special Problems (Required: 6.1; Suggested: 6.2,6)

Week Eight-Nine Chapter 7 Converting Between Analog and Digital Signals

- 7.1 Introduction
- 7.2 Analog-to-Digital Conversion
  - 7.2.1 Sampling Analog Waveforms
  - 7.2.2 Nyquist Sampling Criterion
  - 7.2.3 Aliasing
- 7.3 Spatial Frequencies
- 7.4 Quantization
  - 7.4.1 Sample-and-Hold Operation
  - 7.4.2 Staircase Method for Quantization
  - 7.4.3 Successive Approximation Method
  - 7.4.4 Setting Number of Quantizer Bits

- 7.5 Digital-to-Analog Conversion
  - 7.5.1 Boxcar Reconstruction
  - 7.5.2 Pulse-Width Modulation
- 7.6 Summary
- 7.7 Special Problems (Required: 7.1,3; Required: 7.2)

Week Ten Chapter 9 Spectral Analysis

- 9.1 Introduction
- 9.2 Frequency Domain Analysis
- 9.3 Discrete Fourier Transform
  - 9.3.1 Magnitude and Phase
  - 9.3.2 Fast Fourier Transform
- 9.4 Signal Spectrum
- 9.5 Frequency Transfer Function
- 9.6 Processing Signals in the Frequency Domain
- 9.7 Summary
- 9.8 Special Problems (Required:9.1,3,5; Required: 9.2,4)

Exam- 2

Week Eleven Chapter 12 Source Coding

- 12.1 Introduction
- 12.2 Data Compression
  - 12.2.1 Modeling Information
  - 12.2.2 Source Entropy
  - 12.2.3 Effective Probabilities
  - 12.2.4 Effective Source Entropy
  - 12.2.5 Effective File Entropy
  - 12.2.6 Huffman Code
- 12.3 Summary
- 12.4 Special Problems

Week Twelve- Thirteen Chapter 13 Channel Coding

- 13.1 Introduction
- 13.2 Data Structures
- 13.3 Coding for Error Correction
  - 13.3.1 Redundancy and Data Increase Factor
  - 13.3.2 Bit-Level Error Detection
  - 13.3.3 Bit-Level Error Correction
  - 13.3.4 Data Packet Error Correction
- 13.4 Data Rate
- 13.5 Summary
- 13.6 Special Problems (Required: 13.1,7; Suggested: 13.2,6)

Week Fourteen Chapter 15 Data Networks

- 15.1 Introduction
- 15.2 Evolution of Data Networks
  - 15.2.1 Packet Switching and Circuit Switching
  - 15.2.2 Internet Transmission Protocols
- 15.3 Asynchronous Data Transmission

15.4 Internet Data Packets
15.4.1 Probing the Internet
15.5 Detecting Packet Collision
15.5.1 Packet Collision in Wired Systems
15.5.2 Packet Collision in Wireless Networks
15.6 Summary
15.7 Special Problems (Required:15.1; Suggested:15.2)

Week Fifteen Review

Week Sixteen Final Exam

University Rules and Procedures

Disability statement (See Student Handbook):
Students with disabilities, including learning disabilities, who wish to request accommodations in class should register with the Services for Students with Disabilities (SSD) early in the semester so that appropriate arrangements may be made. In accordance with federal laws, a student requesting special accommodations must provide documentation of their disability to the SSD coordinator.

Academic misconduct (See Student Handbook):
You are expected to practice academic honesty in every aspect of this course and all other courses. Make sure you are familiar with your Student Handbook, especially the section on academic misconduct. Students who engage in academic misconduct are subject to university disciplinary procedures.

Forms of academic dishonesty:

- Cheating: deception in which a student misrepresents that he/she has mastered information on an academic exercise that he/she has not mastered; giving or receiving aid unauthorized by the instructor on assignments or examinations.

- Academic misconduct: tampering with grades or taking part in obtaining or distributing any part of a scheduled test.

- Fabrication: use of invented information or falsified research.

- Plagiarism: unacknowledged quotation and/or paraphrase of someone else's words, ideas, or data as one's own in work submitted for credit. Failure to identify information or essays from the Internet and submitting them as one's own work also constitutes plagiarism.

Nonacademic misconduct (See Student Handbook)
The university respects the rights of instructors to teach and students to learn. Maintenance of these rights requires campus conditions that do not impede their exercise. Campus behavior that interferes with either (1) the instructor's ability to conduct the class, (2) the inability of other students to profit from the instructional program, or (3) campus behavior that interferes with the rights of others will not be tolerated. An individual engaging in such disruptive behavior may be subject to disciplinary action. Such incidents will be adjudicated by the Dean of Students under nonacademic procedures.

Sexual misconduct (See Student Handbook):
Sexual harassment of students and employers at Prairie View A&M University is unacceptable and will not be tolerated. Any member of the university community violating this policy will be subject to

disciplinary action.

Attendance Policy:
Prairie View A&M University requires regular class attendance. Excessive absences will result in lowered grades. Excessive absenteeism, whether excused or unexcused, may result in a student's course grade being reduced or in assignment of a grade of "F". Absences are accumulated beginning with the first day of class.

Student Academic Appeals Process
Authority and responsibility for assigning grades to students rests with the faculty. However, in those instances where students believe that miscommunication, errors, or unfairness of any kind may have adversely affected the instructor's assessment of their academic performance, the student has a right to appeal by the procedure listed in the Undergraduate Catalog and by doing so within thirty days of receiving the grade or experiencing any other problematic academic event that prompted the complaint.

Technical Considerations for Online and Web-Assist Courses

Minimum Hardware and Software Requirements:

-Pentium with Windows XP or PowerMac with OS 9
-56K modem or network access
-Internet provider with SLIP or PPP
-8X or greater CD-ROM
-64MB RAM
-Hard drive with 40MB available space
-15" monitor, 800x600, color or 16 bit
-Sound card w/speakers
-Microphone and recording software
-Keyboard & mouse
-Netscape Communicator ver. 4.61 or Microsoft Internet Explorer ver. 5.0 /plug-ins
-Participants should have a basic proficiency of the following computer skills:

- Sending and receiving email
- A working knowledge of the Internet
- Proficiency in Microsoft Word
- Proficiency in the Acrobat PDF Reader
- Basic knowledge of Windows or Mac O.S.

Netiquette (online etiquette): students are expected to participate in all discussions and virtual classroom chats when directed to do so. Students are to be respectful and courteous to others in the discussions. Foul or abusive language will not be tolerated. When referring to information from books, websites or articles, please use APA standards to reference sources.

Technical Support: Students should call the Prairie View A&M University Helpdesk at 936-261-2525 for technical issues with accessing your online course. The helpdesk is available 24 hours a day/7 days a week. For other technical questions regarding your online course, call the Office of Distance Learning at 936-261-3290 or 936-2613282

Communication Expectations and Standards:
All emails or discussion postings will receive a response from the instructor within 48 hours.

You can send email anytime that is convenient to you, but I check my email messages continuously during the day throughout the work-week (Monday through Friday). I will respond to email messages during the work-week by the close of business (5:00 pm) on the day following ***my receipt*** of them. Emails that I receive on Friday will be responded to by the close of business on the following Monday.

Submission of Assignments:

Assignments, Papers, Exercises, and Projects will distributed and submitted through your online course. Directions for accessing your online course will be provided. Additional assistance can be obtained from the Office of Distance Learning.

Discussion Requirement:
Because this is an online course, there will be no required face to face meetings on campus. However, we will participate in conversations about the readings, lectures, materials, and other aspects of the course in a true seminar fashion. We will accomplish this by use of the discussion board.

Students are required to log-on to the course website often to participate in discussion. It is strongly advised that you check the discussion area daily to keep abreast of discussions. When a topic is posted, everyone is required to participate. The exact use of discussion will be determined by the instructor.

It is strongly suggested that students type their discussion postings in a word processing application and save it to their PC or a removable drive before posting to the discussion board. This is important for two reasons: 1) If for some reason your discussion responses are lost in your online course, you will have another copy; 2) Grammatical errors can be greatly minimized by the use of the spell-and-grammar check functions in word processing applications. Once the post(s) have been typed and corrected in the word processing application, it should be copied and pasted to the discussion board.