

Syllabus
for
Fundamentals of Power Systems
EE 3302 Section 001
Fall 2013

1:00 p.m. - 1:50 p.m., Monday, Wednesday and Friday Room NH 108

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Required Text: Electrical Energy Conversion and Transport
By: George G. Karady and Keith E. Holbert
ISBN: 0-471-47652-8

Reference Text: Electric Energy An Introduction
By: Mohammed A. El-Sharkawi
ISBN:13-978-1-4200-6219-9

CATALOG COURSE DESCRIPTION

FUNDAMENTALS OF POWER SYSTEMS, 3 hours credit (3 hours lecture and 2 hours lab). Introduction to power systems, three-phase circuit analysis, symmetrical components, transformer, polyphase induction motors, synchronous generators, synchronous motors, diode and diode circuits, thyristor and thyristor circuits, DC-DC switching converters, and DC-AC switching converters. Prerequisite: EE 2446.

COURSE LEARNING GOALS/OBJECTIVES

The course objectives for EE3302 Fundamentals of Power Systems are the following:

- ◆ Demonstrate knowledge of the theory, methods, techniques and applications of conversion of electrical energy to mechanical energy and vice-versa.
- ◆ Develop good understanding of electric power systems, particularly electric power generation, transmission, and distribution systems.
- ◆ Develop a basic understanding of devices are used in the operation of the electric power systems.
- ◆ Develop a professional attitude and approach to the solution of practical problems encountered in the industry.

ATTENDANCE AND DROP POLICY

- Attendance at each class is fully expected in order to achieve satisfactory and timely progress.
- Excessive absences will be noted and the student contacted for an explanation.
- The drop policy for this course is in accordance with University and Department rules and regulations. It is the student's responsibility to be familiar with these policies.

Topics:

The following topics will be covered by lecture.

1. Electrical Power System
2. Application of Single-Phase Circuit Analysis (Load, transmission line operation, power factor correction)
3. Three-Phase Circuits (Per Unit System, Analysis of motor operation in Delta Wye configurations)
4. Transmission Lines and Cables
5. Transformers
6. Synchronous Machines
7. Induction Motors
8. DC Machines
9. Introduction to Motor Control and Power Electronics
10. Solar
11. Wind
12. Electromechanical Energy Conversion

Specific Procedures:Homework

There will be ten homework assignments. Homework assigned on Monday will be due the following Monday at the beginning of class. Late homework will be accepted, but 10% will be deducted for each class period the assignment is late.

Exams

There will be three (3) major midterm exams and a final for this course. Each midterm exam will be worth fifteen (15) points and will cover the most recent material. The final exam will be comprehensive and will worth fifteen points (15). All exams are closed book and closed notes. The formula sheet will be provided. You must work alone on all exams. Calculators may be used during exams, but all programmable calculators must be cleared of all programs and/or data before entering the examination room. Discussion and/or communication with anyone, except the instructor, during an exam is forbidden. Any student who willingly provides information to another student during a quiz or exam is as guilty as the student that receives the information.

Quizzes

There will be about fourteen (14) quizzes and they will worth 15 pints. Generally there will be a quiz each week from most recent lectures and materials. The quiz

will take 10 minutes to 15 minutes of the class time and it can be given at the beginning or the end of the class.

Course Grading:

Homework (ten)	10 Points
Exam I	15 Points
Exam II	15 Points
Exam III	15 Points
Quizzes	15 Points
Lab (activity, report and test)	15 Points
Final	15 Points
Course Total	<u>100 Points</u>

Grade Basis:

<u>Student Course Average</u>	<u>Final Letter Grade</u>
90 - 100	A
80 - 90	B
70 - 80	C
60 - 70	D
< 60	F

Course Policies:

Missed examinations

There will be no makeup of missed examinations. In emergency situations (death in family, etc.), if the instructor has been petitioned in writing, and if the instructor agrees another exam may be given.

Academic Integrity: Students enrolled in this course are expected to adhere to the UT Arlington Honor Code:

I pledge, on my honor, to uphold UT Arlington's tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.

I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.

Evidence of academic dishonesty will be dealt with severely. Copying homework or examinations will result in administrative dismissal from the course. The grade recorded will be F.

Lab Safety Training: Students registered for this course must complete all required lab safety training prior to entering the lab and undertaking any activities. Once completed, Lab Safety Training is valid for the remainder of the same academic year. In order to complete the Radiation Awareness Final click on the following link:

<https://www.uta.edu/ra/real/loginscreen.php?view=7>

Over on the right hand side of the screen you should see the login area (Faculty/Staff Login).

Enter your UTA Net ID and your password. Once the next page has loaded click on the second to last tab labeled “Training”. From there you should be able to access all the trainings available. Just click on the one you need (Radiation Awareness Final) to begin. There are no exceptions to this University policy. Failure to complete the required training will preclude participation in any lab activities, including those for which a grade is assigned. Should you have any questions or require any additional information please do not hesitate to contact.

Maura Warren

Safety Specialist (Radiation

Environmental Health & Safety

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Emergency Exit Procedures: Should we experience an emergency event that requires us to vacate the building, students should exit the room and move toward the nearest exit, which are located at the front on the right and left hand side of the room. When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist handicapped individuals.

**Tentative Schedule
EE 3302 Sec 001 Fall 2013**

Class No.	Date	Day	Lecture, Exams, Etc.*
1	23-Aug13	Fri	Course and Syllabus description
2	26-Aug13	Mon	Chapter 1 ELECTRIC POWER SYSTEMS
3	28-Aug 13	Wed	Chapter 1– ELECTRIC POWER SYSTEMS
4			Lab 1 Safety and Introduction
5	30-Augt 13	Fri	Quiz 1

			Chapter 1– ELECTRIC POWER SYSTEMS
6	2-Sept13	Mon	Labor Day Holiday
7	04-Sept13	Wed	Chapter 2– ELECTRIC GENERATING STATIONS
8			Lab 2
9	06-Sept13	Fri	Quiz 2 Chapter 2 ELECTRIC GENERATING STATIONS
10	09-Sept13	Mon	Chapter 3 SINGLE-PHASE CIRCUITS
11	11-Sept13	Wed	Chapter 3 SINGLE-PHASE CIRCUITS
12			Lab 3
13	13-Sept13	Fri	Quiz 3 Chapter 4 Three Phase Circuits
14	16-Sept13	Mon	Chapter 4 Three Phase Circuits
15	18-Sept13	Wed	Chapter 4 Three Phase Circuits
16			Lab 4
17	20-Sept13	Fri	Quiz 4 Chapter 4 Three Phase Circuits
18	23-Sept13	Mon	Exam I Chapter 1 to 4
19	25-Sept13	Wed	Chapter 4 Transmission Lines and Cables
21			Lab 5
22	27-Sept13	Fri	Quiz 5 Chapter 5 Transmission Lines and Cables
23	30-Sept13	Mon	Chapter 5 Transmission Lines and Cables
24	02-Oct13	Wed	Chapter 6 ELECTROMECHANICAL ENERGY CONVERSION
25			Lab 6
26	04-Oct13	Fri	Quiz 6 Chapter 6 ELECTROMECHANICAL ENERGY CONVERSION
27	07-Oct13	Mon	Chapter 6 ELECTROMECHANICAL ENERGY CONVERSION
28	09-Oct13	Wed	Chapter 6 ELECTROMECHANICAL ENERGY CONVERSION
29			Lab 7
30	11-Oct13	Fri	Quiz 7 Chapter 7 TRANSFORMERS
31	14-Oct13	Mon	Exam 2 Chapter 5 and 6
32	16-Oct13	Wed	Chapter 7 TRANSFORMERS
33			Lab 7
34	18-Oct13	Fri	Quiz 8

			Chapter 7 TRANSFORMERS
35	21-Oct13	Mon	Chapter 7 TRANSFORMERS
36	23-Oct13	Wed	Chapter 7 TRANSFORMERS
37			Lab 8
38	25-Oct13	Fri	Quiz 9 Chapter 7 TRANSFORMERS
39	28-Oct13	Mon	Chapter 8 Synchronous Machines
41	30-Oct13	Wed	Chapter 8 Synchronous Machines
41	01-Nov13	Fri	Quiz 10
42	04-Nov13	Mon	Chapter 8 Synchronous Machines
43	06-Nov13	Wed	Chapter 9 INDUCTION MACHINES
44			Lab 9
45	08-Nov13	Fri	Quiz 11 Chapter 9 INDUCTION MACHINES
46	11-Nov13	Mon	Exam 3 Chapter 7 and 8
47	13-Nov13	Wed	Chapter 9 INDUCTION MACHINES
48			Lab 10
49	15-Nov13	Fri	Quiz 12 Chapter 9 INDUCTION MACHINES
50	18-Nov13	Mon	Chapter 9 INDUCTION MACHINES
51	20-Nov13	Wed	9 INDUCTION MACHINES
52			Lab 11
53	22-Nov12	Fri	Thanks Giving Holiday
54	25-Nov13	Mon	10 DC MACHINES
55	27-Nov13	Wed	10 DC MACHINES
56			Lab 12
57	29-Nov13	Fri	Quiz 13 11 INTRODUCTION TO POWER ELECTRONICS AND MOTOR CONTROL
58	02-Dec13	Mon	11 INTRODUCTION TO POWER ELECTRONICS AND MOTOR CONTROL
59	04-Dec13	Wed	11 INTRODUCTION TO POWER ELECTRONICS AND MOTOR CONTROL
60	09/Dec-13	Mon	Final Exam As scheduled by the University

* Revised 08/21/2013