Philadelphia University

Faculty of Engineering - Department of Electrical Engineering

Course Details:

Title:	Power Systems (1) (610411)
Prerequisite:	Electric Machines (1) (610314)
Credit Hours:	3 credit hours (16 weeks per semester, approximately 45 contact hours)
Textbook:	"Power System Analysis", J. J. Grainger and W. D. Stevenson, Jr., 1994.
References:	"Power System Analysis", H. Saadat, 2011. "Power System Analysis and Design", J. D. Glover, T. J. Overbye, M. S. Sarma, 2016. "Elements of Power System Analysis", W. D. Stevenson, Jr., 1982.
Course Description:	This course will introduce the students to basic concepts in electric power systems. It will help the student understand how the power system is modeled and how its performance is analyzed under normal as well as various fault conditions.

Course Outlines:

Week	Topic
1	Review of complex power, voltage and current in three-Phase, power triangle
2	Per-unit Quantities, changing the base, Single-line diagram, reactance diagram
3	Series Impedance of Transmission Line: resistance, inductance
4	Geometric Mean Radius, geometric mean distance
5	Capacitance of transmission line
6	Current and voltage relation on transmission line: short, medium
7	Performance of transmission line: efficiency, voltage regulation
8	Long transmission line
9, 10	Reactive compensation of transmission lines: series capacitive compensation, shunt inductive compensation. Power transfer on transmission line
11	Symmetrical fault: Transient in RL series circuit
12, 13	Symmetrical component and sequence networks: positive, negative, and zero sequence networks.
14	Unsymmetrical fault: single-line-to-ground faults
15	Line-to-line faults, double line-to-ground faults
16	Revision

Course Learning Outcomes with reference to ABET Student Outcomes:

Upon successful completion of this course, student should:

1.	Know electrical networks analysis and their components	[a , e , k]
2.	Know fault types of electric systems	[a , e , k]
3.	Calculate the impedances and reactance of short-circuits	[a , k]
4.	Know the sequence of three phase power system	[a , k]

Assessment Guidance:

Evaluation of the student performance during the semester (total final mark) will be conducted according to the following activities:

Sub-Exams: The students will be subjected to two scheduled written exams, first exam and second exam during the semester. Each exam will cover materials given in lectures in the previous 3-4 weeks.

Quizzes: (3-5) quizzes of (10-15) minutes will be conducted during the semester. The materials of the quizzes are set by the lecturer.

Homework Homework should be solved individually and submitted before or on a set agreed date.

Cheating by copying homework from others is strictly forbidden and punishable by awarding the work with zero mark.

Final Exam: The students will undergo a scheduled final exam at the end of the semester covering the whole materials taught in the course.

Grading policy:

First Exam	20%
Second Exam	20%
Quizzes/Homework	20%
Final Exam	40%
Total:	100%

Attendance Regulation:

The semester has in total 45 credit hours. Total absence hours from classes and tutorials must not exceed 15% of the total credit hours. Exceeding this limit without a medical or emergency excuse approved by the deanship will prohibit the student from sitting the final exam and a zero mark will be recorded for the course. If the excuse is approved by the deanship the student will be considered withdrawn from the course.