Philadelphia University

Faculty of Engineering and Technology
Department of Alternative Energy Technology
First Semester 2021/2022

Course Details:

Title:	Elec. Power Systems (0615314)
Prerequisite:	Electrical machines (0615313)
Credit Hours:	2-credit hours (16 weeks per semester, approximately 30 contact hours).
Class Time:	11:15 – 12.15 Sun, Wed.
Text Book:	Power Systems Analysis, J. J. Grainger, McGraw-Hill.
Description:	In this course, students will understand the concepts of the electrical power systems and their elements. The course will cover the principles and objectives of electrical power systems and gives a good background for other electrical power courses.
Website:	http://www.philadelphia.edu.jo/academics/jghaeb/
Instructor:	Prof. Jasim Ghaeb, Email: jghaeb@philadelphia.edu.jo Office: Mechatronic building, Room 6407, ext. 2590. Office hours: Sun, Tues, Thurs., and Wed: 9:10-10:00

Course Outlines:

Week	Basic and support material to be covered	Notes
(1)	Introduction, Power in a.c circuits, Complex power.	
(3)	Power in 3-phase circuits, per-unit quantities, single line diagram.	
(2)	Transformer, Magnetically coupled circuits.	
(4)	Equivalent circuit, Per-unit impedance.	
(5)	Three-ph transformers, Autotransformer, Regulating transformer.	
(6)	Series impedance of transmission lines,	
(7)	Resistance, Conductance, Inductance of transmission line.	
(8)	Flux linkage, Two-wire line, Conductor in-group, Three-ph line inductance, Bundled conductors.	
(9)	Capacitance of transmission line, Electric field, Capacitance of two-wire line.	
(10)	Capacitance of three-phase line, Symmetrical and unsymmetrical spacing,	
(11)	Current and voltage relations on transmission line, Short transmission line.	
(12)		

(13)	Medium transmission line, Long transmission line.	
(14)	.Reactive compensation.	
(15)	Admittance model and impedance mode, Bus admittance matrix, Ybus, Branch node matrix, Ybus in mutually coupled branches.	
(16)	Bus impedance matrix, Zbus, Bus Thevenin impedance, Two buses, Thevenin impedance.	

Course Learning Outcomes with reference to ABET Student Outcomes:

Upon successful completion of this course, student should:

1.	understand the concepts of the electrical power systems	[1]
2.	Study the different equipment of electric power system	[1]
4.	Investigate of different components of electric power system applying Matrix Laboratory (MATLAB).	[6]

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.

Quizzes: They will conduct during the semester. The materials of the quizzes are set by the lecturer.

Homework and projects: Homework and MATLAB simulation should be solved individually and submitted before or on a set agreed date. Student may be assigned to present project(s).

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, projects and homework	20%
Final Exam	40%
Total:	100%

Attendance policy:

The semester has in total 45 credit hours. Total absence hours from classes 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 record for the course.

Student Outcomes
1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics. 2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors. 3. an ability to communicate effectively with a range of audiences. 4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts. 5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives. 6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions 7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.