King Saud University
College of Engineering
Electrical Engineering Department

Instructor: Dr. Usama Khaled **Office**: 2C-108 / 4 **Phone**: 467-3797
E-mail: ukhaled@ksu.edu.sa
1st Semester 1435-1436 H (2014-2015)

EE441 Power System Analysis

Course Objectives:

1- Understanding the fundamentals of both normal and abnormal operations of power systems.
2- Analyzing the normal operation through power flow calculations.
3- Analyzing the abnormal operation through symmetrical fault, symmetrical components and stability calculations.

Course Topics:

1- Power system incidence matrices 2- Power flow 3- Symmetrical faults
4- Symmetrical components 5- Power system Stability

Course Schedule:

Week	Topics	Text Book
1	Bus admittance and bus impedance matrices	6.4
2	Power flow problem	6.4
3	Gauss-Seidel power-flow solution	6.2 & 6.5
4	Newton-Raphson power-flow solution	6.3 & 6.6
5	Fast decoupled solution, Sparsity techniques	6.9 & 6.8
6	System modeling under fault conditions	7.1, 7.2 & 7.3
7	Fault calculation using Z_{bus}. Circuit breaker selection	7.4 & 7.5
8	Definition of symmetrical components, Sequence networks of loads	8.1, 8.2
9	Sequence networks of series impedances, Sequence networks of machines	8.3, 8.5
10	Sequence networks of transformers	8.6
11	Transient stability. Swing equation. Machine model.	11.1 & 11.2
12	Power angle equation. Equal area criterion.	11.3
13	Step-by-step solution of swing equation.	11.4
14	Stability of multi-machine system	11.5

Text Book : J.D. Glover & M Sarma, "Power system analysis and Design", 5th edition SI, PWS Publishing, 2002.

Grading Policy:

Mid-Term I: **Thursday 06/11/2014**	22.5 %
Mid-Term II: **Thursday 18/12/2014**	22.5 %
Tutorial & Home Works	10 %
Lectures attendance & Computer HW	5 %
Final Exam	40 %
Total	100 %

Attendance:

A student absent for more than 25% of lectures will not be allowed to appear in the final exam. This policy will be strictly enforced without any exception.

Class/Tutorial Schedule:

Class is held three times per week in 50-minute lecture sessions. There is also a 50-minute weekly tutorial associated with this course.

Teaching assistant:

Eng. Ameen Al-Assar, Office: 0B-92; Phone: 467-6913