

King Fahd University of Petroleum and Minerals

Electrical Engineering Department

EE463: Power System Analysis

Dr. Mahmoud Kassas

Fall Semester 2006-2007 (062)

A. Course Information

Text Book:	POWER SYSTEM ANALYSIS, by Hadi Saadat, second edition, McGraw-Hill, 2004.				
	Name, Email address	Office	Phone	Office Hours	Sections
Instructors:	Dr. Mahmoud Kassas <i>mkassas@kfupm.edu.sa</i>	59/1081	2271	Su-Tu 12:10-13:00PM & M 13:10-14:00	1
Grading:	Attendance, Assignments and Quizzes	Project	Two Majors		Final
	21% (3%, 3%, 15%)	10%	34%		35%
	First Major	Second Major	Projects Due Dates		Final Exam
Exams Dates:	Mon. Mar. 26, 2007	Mon. May 7, 2007	Sunday May 27, 2007 At 4:00PM		Tuesday June 5 At 12:30PM
Exams Times:	6:30-8:00 pm	6:30-8:00 pm			
Exams Places:	TBA	TBA			
Important Dates:	Last day to drop the course without a permanent record	Last day to drop the course with "W" grade		Last day to drop all courses with "W" Thru Registrar's office.	
	Feb. 27, 2007	April 29, 2007		May 27, 2007	
Field Trip	Tentative date April 17, 2007				

Note #1: Final Exam is comprehensive (i.e. covers all chapters as described in the syllabus). It is common to all sections.

Note #2: According to the rules and regulations of KFUPM, attendance is **MANDATORY**. More than **5** unexcused absences will be reported to the registrar office and result in a **GRADE of DN** regardless of the student's grade.

Note #3: It is your responsibility to solve the homework as soon as the material is covered in the class. Homework solution will be published on WebCT. Quizzes will be given regularly based on the homework problems.

Note #4: You are urged to use **your instructor's** office hours whenever is possible. To help you further I will arrange for some problem solving sessions. Date and time will be announced in class.

Note #5: You can access the homework solutions and any other supplement material, communication items, and any **course information** at your instructor's WebCT course page.

B. Course Goals Related to Program Education Objectives:

- Develop understanding of the basic concepts of loadflow, economic dispatch, fault analysis, and transient stability
- Apply this knowledge to model and predict system behavior
- Apply this knowledge to design power transmission and distribution systems to meet needs.

The *successful student* will:

- 1) know how to build the bus-impedance and the bus-admittance matrices for power system networks and use Matlab to solve basic power system problems.
- 2) know how to perform a power flow analysis for a small network, compute the elements of the Jacobian matrix, and find the bus voltages and angles.
- 3) know how to perform a fault analysis for a small network, use symmetrical components to solve fault problems, and calculate the short-circuit currents for a three-phase fault, line-to-line fault, double-line-to-ground fault, and single-line-to-ground fault.
- 4) understand the dynamics of a 3-phase synchronous machine during disturbances, compute the stability of a machine using the equal area criteria, and perform numerical integration to solve for the dynamic solution of a perturbed system.

C. Tentative Course Outline and Schedule

Week	Date	Topics	Text Section	Homework Problems
1	Feb. 17-21	The basic concepts: representation, equivalent circuits, Per Unit System	Notes + 3.13, 3.14	2.7, 3.11, 3.12,
2	Feb. 24-28			3.13, 3.15
3	Mar. 3-7	Power Flow Analysis	6.1 – 6.10	6.3, 6.6, 6.8(a,b),
4	Mar. 10-14			6.11, 6.12(a,b),
5	Mar. 17-21			6.13(a,b)
6	Mar. 24-28	Power Flow Analysis, Synchronous Machine Transient Analysis	8.1 & 8.2	8.1
Major I Mon. Mar. 26, 2007				
7	Mar. 31-Apr 4	Balanced Fault	9.1 – 9.6	9.1, 9.3, 9.4, 9.6,
8	Apr. 7-11			9.7, 9.9, 9.10
9	Apr. 16-18	Symmetrical Components and Unbalanced Faults	10.1 – 10.9	10.3, 10.8, 10.9,
10	Apr. 21-25			10.14, 10.15
11	Apr. 28-May 2			
Major II Mon. May 7, 2007				
12	May 5-9	Optimal Dispatch of Generation	7.1 – 7.4	7.5, 7.7, 7.8, 7.11
13	May 12-16			
14	May 19-25	Stability	11.1 – 11.3	TBA
15	May 26-June 3	Stability/Review		

* Notes can be downloaded from your WebCT course pages.

D. Term Project:

The term project is supposed to simulate analysis and planning cases for a practical power system. The details of the project are to be elaborated by the instructor at a subsequent stage during the semester. Each student must submit his written individual report at the end of the semester. Each student's performance is evaluated based on the submitted report; on his case analysis results and based on his oral presentation at the end of the semester. Each student will be asked to defend his work individually.