EE 531: Power System Network Modeling and Analysis -(3 credits)

College of Engineering
Klipsch School of Electrical and Computer Engineering
New Mexico State University

Date and Time:	Fall 2008	Class M W 1:10PM-2:25PM
Room:	Hernandez Hall(CE)110	
Instructor:	Satish J. Ranade	
Office Hours:	T&B112 MW 2:30PM-4PM or by appointment	
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Course Description from the Graduate Course Catalog

"Power System Network Modeling and Analysis" Development and efficient solution of large-scale computational problems relevant to power systems. Recommended Preparation: EE 493

Co-requisite: EE 493

Textbook and other Required Materials:

Mariesa Crow " Computational Methods for Electric Power Systems", CRC Press, Boca Raton, FL, 2002 ISBN 0-8493-1352-x 9000

Access to software such as Matlab, Mathcad, or Visual Basic

Course Objective:

This is the first graduate course in power systems sequence. In this course we will bring together a lot of the theoretical material needed for advanced power system modeling, computation and analysis. We will develop more general models for system components and networks. Anticipating that the application domain is a *large* power network, we will introduce computational methods suitable for large-scale systems. We will tie the theoretical material back to power system analysis by applying the techniques to standard problems, namely, power flow, short circuit, stability and network transients. Although major software development will not be undertaken, projects will be assigned to illustrate how the techniques are applied in practice. Access to Matlab, Mathcad, or Excel/Visual Basic will be needed to complete these projects. Subsequent classes in the graduate power system sequence will build upon the knowledge gained here in both theoretical and applied settings.

Course Outline:

No.	Week	Topic	Chapter	Homework
1	1-3 (8/25)	ac power network problems – power flow and short circuit analyses, stability analysis, network transients – Definition and characterization of the nodal problems: formation of Y_{bus}, Z_{bus} and physical interpretation	Notes,1	
2	4-7 (9/10)	Phase domain modeling --transmission-line modeling using Carson's equations; three-phase transformer modeling; synchronous and induction machines. Relationship to symmetrical-component based methods.	Notes	
3	8-9 (10/8)	Solution of large sets of linear and nonlinear network equations for power network studies. Applications in power-flow and short-circuit studies.	2-3	
4	10-11 (10/22)	Overview of sparse matrix methods.	4	
5	12-13 (11/5)	Numerical Integration. Application to stability analysis and network transients.	5	
6	14-15 (11/26)	Optimization problems	6	

Students with Disabilities:

If you have or believe you have a disability, you may wish to self-identify. You can do so by providing documentation to the Office for Services for Students with Disabilities, located at Garcia annex (phone 646-6840). Appropriate accommodations may then be provided for you. If you have a condition which may affect your ability to exit safely from the premises in an emergency or which may cause an emergency during class, you are encouraged to discuss this in confidence with the instructor and/or the director of Disabled Student Programs. If you have general questions about the Americans with Disabilities Act (ADA), call 646-3635.

Prepared by: Satish J. Ranade, August 1, 2007

Notes:

0. Collaboration on Homework Assignments/Projects/Summaries is permitted.
1. Do not provide or seek help from others on Tests.

Violation of rule 4 will result in an automatic "F" grade and a recommendation for suspension.

GRADING POLICY

Homework	Assigned each Monday, due following Monday	20%
Tests	3	60%
Projects		20%

The grading scale is absolute 90 - 100 = A, 80 - 89 = B, 70 - 79 = C, 60 - 69 = D , < 60 = F

Late homework Policy: Unless prior arrangements are made, *Late Homework Will Not Be Graded*. However you will be given 50 % of the credit if you turn homework in prior to the next scheduled test.
