

# **COURSE: EE 4633    Power System Analysis    Technical Elective**

## **Project Based Learning (PBL)**

Course Credit Hours = 4 ch  
WINTER 2008

Course

Instructor: Dr. Adel Sharaf, Office Room GC117

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Tel: 447-3134

Time: MWF 9:30 - 10:20 am in H110

Labs: 2 tutored labs

Description: An elective course. Project based learning (PBL) format.  
Introduces power system basic components, models, interactions and equivalent circuit representation with an overview of transmission line components, generators, transformers, loads, steady state and transient studies, control strategies and operating limits.

Format: Lecture / group seminars (two plus bonus) assigned projects for groups (2 students). Plus a final full take home project per each individual student.

Basic

- Concepts:
1. Basic definitions and concepts
  2. Transformers - Models
  3. Synchronous Machines - Models
  4. Transmission Line Models (L, C) Components
  5. V - I relationships and load classifications
  6. AC Network calculations and models
  7. Power flow problem and solutions
  8. Fault Calculation / Short circuit studies
  9. Economic Operation Principles
  10. Other related topics of power systems / load models, power quality, HVDC, Renewable Green Energy Systems, Dispersed Generation (Wind / PV/ Small Hydro)

Text

- References
1. "Electric Power Systems Design and Analysis", book, M. El-Hawary, Wiley Publishers.
  2. "Computer Modelling of Electrical Power Systems", Book, Arrillaga & Watson, Wiley Publishers.
  3. "Electrical Systems Design", Book by Bosela, Pearson Publishers.
  4. IEEE Publications, IEEE Standards Book.
  5. "Electric Power Quality" Book by Dugan, McGraw Hill Publishers.
  6. "Power System Analysis", Book by John Grainger, W.D. Stevenson.
  7. "Electric Power Systems" Schaum Series, McGraw Hill Publishers.
  8. "Power System Analysis" Hadi Sadaat Book, McGraw Hill Publishers.
  9. Other books titled with "Power System Analysis".
  10. "Electrical Power Systems", 4<sup>th</sup> Edition, Weedy & Cory, Wiley Publishers.
  11. "Power System Analysis & Design, 3<sup>rd</sup> Edition", J. Duncan Glover & M.S. Sarma, Brooks Cole Publishers.
  12. "Electrical Power Systems 4<sup>th</sup> Revised Edition", Ashfaq Husain, CBS, India.
  - 13.\* Course Notes, PB Presentations - Invited Lectures, papers (Dr. Sharaf) - Refer to Dr. Sharaf's web page: <http://www.ece.unb.ca/sharaf>

NOTE: The course is structured in the PBL - Project Based Learning format. All projects require the use of Matlab/Simulink and other Power System Simulation packages.

ATTENDANCE IS REQUIRED AT ALL LECTURES !

**MARKS:**

Lab Tutorials (2)	20	Numerical-Letter Grade Conversion			
Group Seminar (2 @ 10 each)	20				
Project 1 - group	10	A+	85-100	B-	60-64
Project 2 - group	10	A	80-84	C+	55-59
Final Take Home Project					
(per student)	40	A-	75-79	C	50-54
TOTAL	<u>100%</u>	B+	70-74	D	40-49
		B	65-69	F	<40

**DEFERRED EXAMS**

**University regulations on deferred exams are described in Section B-V Examination, Standing and Promotion; C. Deferred Examinations of the current Undergraduate Calendar. All deferred exams in courses offered by the Department of Electrical and Computer Engineering are scheduled to be written on the fourth or fifth day of classes in the following term. There are no exceptions.**

**Add / Drop Dates:**

The last day to add/drop this course is: January 18, 2008 (a "W" will show on your transcript after this date for those withdrawing).

The last day to drop this course with a pro-rated refund is: January 22, 2008.