



POWER SYSTEMS CERTIFICATE

Program Description:

This Certificate will educate engineers to meet the challenges of the future grid. The three-course program will cover the communication, computing, and control technology that is essential for understanding the evolving power grid. It will also cover the fundamentals of power system devices and power-flow to enable practicing engineers to integrate the new renewable energy resources to form a reliable grid. The certificate is designed for engineers with different backgrounds. It is ideal for power industry engineers who want to move up within their organization or other engineers who want to enter the power industry.

For more information, please contact:

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UCLA Engineering Online Program

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Course 1
MAE C237
Design and Analysis of
Smart Grids

Instructor
Professor Rajit Gadh
UCLA

Fall 2015

The course will provide a systems perspective to the design and analysis of smart grids. Smart grid technologies such as Demand Response, Transactive/Price-based load control, Home-area networks, Advanced Metering Systems, and Smart appliances will be introduced. Renewable energy generation sources such as solar and wind will be studied in the context of their intermittency and integration into the grid. Micro-grids and their role in the grid stability will be studied. Integration and stability of grid by way of energy storage will be discussed. The impact of electric vehicles on the grid and advances in power systems to incorporate such vehicles will be studied. Simulation techniques, monitoring and control of the distribution grid network and grid efficiency topics will be covered. The role of advanced sensors, communications and computing will be investigated in the context of monitoring and control of the grid. Existing grid models will be studied and analyzed.

Course 2
EE 112
Power Systems Fundamentals

Instructors
Mr. Juan Casteneda
Dr. F. Habibi-Ashrafi
Southern California Edison

Winter 2016

Complete overview of organization and operation of interconnected power systems. Development of appropriate models for interconnected power systems and learning how to perform power flow, economic dispatch, and short circuit analysis. Introduction to power system transient dynamics.

Course 3
Dynamics and Control of
Power Systems

Instructors
Professor Hemanshu Pota, University of New South Wales, Canberra, Australia
Professor Paulo Tabuada, UCLA

Spring 2016

This course will provide an understanding of:

- (a) the small oscillations in power grids due to an ever present small mismatch between the supply and demand;
- (b) the resynchronisation of the grid after large disturbances; and
- (c) simple control techniques to damp oscillations and to keep the grid synchronised.

The analysis and control design will be based on the mathematical models of the power system components and the grid. Numerical simulation will be used to get an in depth understanding of the analysis and control of the interconnected power system.