



University of Tehran
School of Electrical and Computer Engineering

Course:	8101? – Reactive Power Control		
Course type:	Elective	EE*	Credit: 3
Level:	Graduate		
Co-requisite(s):	-		
Prerequisite(s):	Power System Analysis II		
Prerequisite by topic:	Knowledge of fundamentals of Power Systems		
Textbook(s):	[1] T. J. E. Miller, Reactive Power Control in Electric Systems, John Wiley, 1982. [2] T. Van Cutsem, C. Vournas, Voltage Stability of Electric Power Systems, Springer, 2005.		
Coordinator:	Afsharnia, Saeed		
Goals:	The aim of the course is to provide a theoretical background to correctly approach the problem of reactive and unbalance compensation, to introduce the students to fundamental concepts of Power transmission capability and voltage regulation and stability and to acquire a good understanding of the capabilities of power electronic technology for reactive power compensation		
Outcome:	After completing the course, the student shall have: <ul style="list-style-type: none"> - a solid theoretical understanding of the main power theories - an understanding of the need for compensation in the context of power quality and stability of the modern power network. - a solid knowledge of the compensation capabilities and limitations of the following compensation technologies: passive elements (C, L), line commutated compensators (SVC) - an understanding about the power system controls. - a knowledge of analyzing system dynamic performance and reactive power requirements. 		
Topics:	1- Fundamental concepts and introduction to reactive power control. 2- Load compensation: power factor correction, voltage regulation		

	<p>and load balancing.</p> <p>3- Theory of reactive power control in transmission networks: behavior of uncompensated lines, objectives and methods of compensation.</p> <p>4- Improving stability with reactive power control.</p> <p>5- Static VAR compensators: principles, modeling, control and stability of SVC</p> <p>6- Series capacitors application, protection issues and dynamic problems.</p> <p>7- Introduction to Flexible AC Transmission Systems (FACTS). Construction and operation of other series and shunt static compensators.</p> <p>8- Voltage stability in electric networks: definitions, analysis and correction methods.</p>
Computer usage:	Matlab Simulink Digsilent
Assignments:	-
Projects:	One research project
Grading:	final examination 60% research project 40%
Further readings:	[1] P. Kundur, Power System Stability and Control, McGraw Hill, 1994
Prepared by:	Afsharnia, Saeed
Date:	November 2017

*EE: Electrical Engineering CE: Computer Engineering IT: Information Technology