



**University of Tehran**  
**School of Electrical and Computer Engineering**

<b>Course:</b>	<b>8101862 – Power System Dynamics I</b>		
<b>Course type:</b>	compulsive	EE*	Credit: 3
<b>Level:</b>	Graduate		
<b>Co-requisite(s):</b>			
<b>Prerequisite(s):</b>	Power System Analysis II Electrical Machines III		
<b>Prerequisite by topic:</b>			
<b>Textbook(s):</b>	<p>[1] P. Kundur, Power System Stability and Control, McGraw-Hill, 1994.</p> <p>[2] K. R. Padiyar, Power System Dynamics: Stability and Control, Anshan, 2004.</p> <p>[3] J. Machowski, J. Bialek and J. Bumby, Power System Dynamics: Stability and Control, 2nd ed., Wiley, 2008.</p> <p>[4] P. W. Sauer and M. A. Pai, Power System Dynamics and Stability, Prentice Hall, 1998.</p> <p>[5] Yu, Yao-Nan, Electric Power System Dynamics, Academic Press, 1983.</p>		
<b>Coordinator:</b>	Hamid Lesani		
<b>Goals:</b>	To be familiar with modeling of power system elements, different kind of stability and stabilizing.		
<b>Outcome:</b>	Be able to <ol style="list-style-type: none"> <li>1. Analyze Dynamic models of power system elements</li> <li>2. Design of power system stabilizers in model of connecting single machine to infinite bus</li> </ol>		
<b>Topics:</b>	<ol style="list-style-type: none"> <li>1- Features of power systems</li> <li>2- Methods of analyzing stability in SISO*</li> <li>3- Methods of analyzing stability in MIMO*</li> <li>4- Method of state space model</li> <li>5- Method of MODAL analysis and sensitivity of eigen values</li> <li>6- Modeling of turbines and governors</li> <li>7- Modeling different kinds of exciting systems</li> <li>8- Modeling of synchronous machine</li> <li>9- Modeling of transformer, transmission lines and FACTS*</li> <li>10- Modeling of loads</li> <li>11- Different kinds of power system stability</li> <li>12- Low frequency oscillations and dynamic stability</li> <li>13- Analyzing stability of synchronous machine in linearized model</li> <li>14- Power system stabilizer and designing</li> <li>15- Harmonic stabilizing in power systems</li> </ol>		

	16- Subsynchronous resonance and torsional oscillations 17- Modeling of systems with SSR* and stabilizing systems against SSR
<b>Computer usage:</b>	MATLAB GAMS
<b>Assignments:</b>	3 HWs
<b>Projects:</b>	1 Project
<b>Grading:</b>	<ul style="list-style-type: none"> <li>• Final exam    60%</li> <li>• Homeworks and Project    40%</li> </ul>
<b>Further readings:</b>	
<b>Prepared by:</b>	Hamid Lesani
<b>Date:</b>	Sept. 14, 2017

\*EE: Electrical Engineering    SISO: single input-single output    MIMO: multi input-multi output    FACTS: flexible alternating current transmission system    SSR: Subsynchronous resonance