



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

<b>Course:</b>	<b>Generalized Theory and Analysis of Electrical Machines</b>									
<b>Course type:</b>	EE*						CE*			Credit: 3
	Com	E	P	B	Con	D	SW	HW	IT	
	Required	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Elective	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
<b>Level:</b>	Undergraduate <input type="checkbox"/> Graduate <input checked="" type="checkbox"/>									
<b>Co-requisite(s):</b>	None.									
<b>Prerequisite(s):</b>	Electrical Machines III (8101326)									
<b>Prerequisite by topic:</b>	DC and AC Electrical Machines courses must be already passed.									
<b>Textbook(s):</b>	<ol style="list-style-type: none"> <li>1. P. S. Bimbhra, Generalized Theory of Electrical Machines, Khanna Publishers, India, 2007.</li> <li>2. P. C. Krause, O. Wasynczuk and S. D. Sudhoff, Analysis of Electric Machinery and Drive Systems, IEEE Press &amp; Wiley Interscience, USA, 2002.</li> </ol>									
<b>Coordinator:</b>	Jawad Faiz, Professor, School of ECE.									
<b>Goals:</b>	Teaching generalized approach in conventional electrical machines in order to study their dynamic and transient operations.									
<b>Outcome:</b>	Upon successful completion of the course, students will: <ol style="list-style-type: none"> <li>1. Understand different reference frames for analysis of electrical machines.</li> <li>2. Learn art of reducing a practical problem to accurate mathematical model.</li> <li>3. Study operational impedances and time constants of synchronous machines. .</li> </ol>									
<b>Topics:</b>	<ol style="list-style-type: none"> <li>1. Elements of generalized theory.</li> <li>2. Linear transformation in machines.</li> <li>3. Direct current machines.</li> <li>4. Reference frame theory.</li> <li>5. Symmetrical induction machines.</li> <li>6. Synchronous machines.</li> <li>7. Theory of brushless dc machines.</li> <li>8. Machine equations in operational impedances and time constants.</li> </ol>									
<b>Computer usage:</b>	Using professional computer software for more efficient learning.									
<b>Assignments:</b>	Homework									
<b>Projects:</b>	Using dq model for investigation of different characteristics of electrical									

	machines.
<b>Grading:</b>	Assignments: 10 % Projects: 30 % Final exam: 60 %
<b>Further readings:</b>	[1] Selected papers. [2] C. M. Ong, Dynamic Simulation of Electric Machinery, Prentice-Hall, USA, 1998.
<b>Prepared by:</b>	Prof. Jawad Faiz
<b>Date:</b>	Nov. 20, 2017

*EE: Electrical Engineering		CE: Computer Engineering	
Com	Communications	SW	Software
E	Electronics	HW	Hardware
P	Power	IT	Information Technology
B	Bioelectronics		
Con	Control		
D	Digital System		