



University of Tehran
School of Electrical and Computer Engineering

Course:	Advanced Special Electrical Machines									
Course type:	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"/>	
Level:	Undergraduate <input type="checkbox"/> Graduate <input checked="" type="checkbox"/>									
Co-requisite(s):	None.									
Prerequisite(s):	Special Electrical Machines (8101326)									
Prerequisite by topic:										
Textbook(s):	1. Paul Acarnley, Stepping Motors, IET Publisher, UK, 4 Ed. 2007. 2. T. J. Miller, Switched reluctance motors and their control, Oxford Publisher, UK, 1993.									
Coordinator:	Jawad Faiz, Professor, School of ECE.									
Goals:	Teaching stepping motors and its applications and switched reluctance motors.									
Outcome:	Upon successful completion of the course, students will: <ol style="list-style-type: none"> 1. Learn the fundamentals of operation of stepping motors. 2. Be able to analyze performance of different types of stepping motors. 3. Be familiar with structure, control and operational modes of these motors. 4. Be able to control open-loop and closed-loop of stepping motors. 5. Be able to apply microprocessor-based methods for motor control. 6. Be familiar with switched reluctance motor as a family of stepping motor for high power applications. 									
Topics:	<ol style="list-style-type: none"> 1) Stepping motors. 2) Drive circuit. 3) Static torque characteristics. 4) Torque/speed characteristics. 5) High-speed operation. 6) Open-loop control. 7) Closed-loop control. 8) Microprocessor-based stepping motor systems. 9) Introduction to switched reluctance motors (SRM). 10) Energy conversion principles. 11) SRM design. 									

	12) SRM dynamic operation.
Computer usage:	Using professional computer software for more efficient learning is necessary.
Assignments:	Homework.
Projects:	Working on one aspect of stepping motor or SRM operation.
Grading:	Assignments: 10 % Projects: 30 % Final exam: 60 %
Further readings:	[1] Takashi Kenjo, Stepping motor and their microprocessor control, Oxford, UK, 1984 [2] R. Krishnan, Switched reluctance motor drives, CRC Press, USA, 2001.
Prepared by:	Prof. Jawad Faiz
Date:	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		