



University of Tehran
School of Electrical and Computer Engineering

Course:	8101200 – Relaying & Protection									
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 checked="" type="checkbox"/> Graduate <input type="checkbox"/>									
Co-requisite(s):	Power System Analysis 2 (8101111)									
Prerequisite(s):	None									
Prerequisite by topic:	Basic knowledge of power systems									
Textbook(s):	<p>[1] M. Soltani, "Relays and Power Systems Protection", University of Tehran, 1995.</p> <p>[2] S. H. Horowitz, A. G. Phadke and J. K. Niemira, "Power System Relaying", John Wiley and Sons Inc., 2014.</p>									
Coordinator:	Sanaye-Pasand , Professor, School of ECE									
Goals:	<p>Become familiar with the following topics:</p> <ol style="list-style-type: none"> 1) Power system abnormal conditions and faults 2) Discrimination of faults from normal conditions 3) Designing reliable relays for different system elements 4) Relays' input sources 5) Applying different relays, including OC, distance and directional relays for protecting power system elements 6) Protection of power system lines, generators, motors, transformers and busbars 									
Outcome:	<p>Upon successful completion of the course, students will be able to:</p> <ol style="list-style-type: none"> 1. Analyze power system faults 2. Learn features of a reliable protection system 3. Become familiar with instrument transformers and their effects on protective relays' errors and mal-functions 4. Learn overcurrent, directional, distance and differential relays' characteristics, their capabilities and features 5. Apply different relays for protecting power system elements 6. Learn how to protect power system transmission and distribution lines 7. Learn how to protect generators and motors 8. Learn how to protect transformers and reactors 									

	9. Learn how to protect busbars
Topics:	<ol style="list-style-type: none"> 1) Analyzing power system faults and short circuits 2) Features of a reliable protection system 3) Instrument transformers, CT, PT and CVT 4) Overcurrent, directional, distance and differential relays and their capabilities and features 5) Protection of power system transmission and distribution lines 6) Protection of generators and motors 7) Protection of transformers and reactors 8) Protection of busbars
Computer usage:	Running simulations by EMTDC/PSCAD, DigSilent and Matlab
Assignments:	Two optional homework assignments
Projects:	Two optional projects
Grading:	Assignments: 10 % Projects: 10 % Final exam: 100 %
Further readings:	<i>[1] H. Ungrad, W. Winkler and A. Wiszniewski, "Protection Techniques in Electrical Energy Systems", Marcel Dekker Inc., 1995.</i>
Prepared by:	Majid Sanaye-Pasand
Date:	December, 1, 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		