

EE420 Fall 2010 Syllabus

Date	Lec	Topic	Reading	Homework Assigned	Solution
WEEK 1					
T 8/24 (M Sched)	R	Course Introduction; Review: AC Analysis, Mesh Analysis, Per-Phase Analysis, Power Calculations, Matlab			
W 8/25	1	Magnetic Equivalent Circuit Concepts: flux, flux density, field intensity, Ampere's law, mmf, permeability, reluctance			
R 8/26		Lab 1: Simulink Permanent Magnet DC Motor Simulation			
F 8/27	2	Flux Linkage, Inductance, Faraday's Law, and Energy		PS1 Due 9/3	Solution
WEEK 2					
M 8/30	3	Properties of Ferromagnetic Materials: Domain Wall Motion, Hysteresis, Eddy-Currents, Magnetization			
W 9/1	4	Permanent Magnet Materials: Stabilization, Demagnetization, Shear Line, and Sizing			
R 9/2		Lab 2: Magnetic Equivalent Circuit Modeling			
F 9/3	5	Transformers: Core and Shell Type, Magnetic Equivalent Circuit Analysis, Change of Variables		PS2 Due 9/10	Solution
WEEK 3					
M 9/6		HOLIDAY: Labor Day			
T 9/7		Add Course Deadline			
W 9/8	6	Transformers: T-equivalent Circuit, Design Equation, Parameter Determination			
R 9/9		Lab 3: Power Transformer			
F 9/10	7	Transformers: Coupling to Secondary-side Circuits, per unit; transformer design		PS3 Due 9/17	Solution
WEEK 4					
M 9/13	8	Transformer Design (continued)			
W 9/15	9	Energy Conversion and the Electromagnet			
R 9/16		Lab 4: Power Transformer Design			
F 9/17	10	Electromagnet Analysis		PS4 Due 9/24	Solution
WEEK 5					
M 9/20	10+	Electromagnet Design MMF of Distributed Windings: pitch and distribution factors			
W 9/22	11	Rotating Machine Concepts and Overview			
R 9/23		Lab 5: Electromagnet Design			
F 9/24	12	MMF of Distributed Windings: pitch and distribution factors			

WEEK 6					
M 9/27		Exam 1: Coverage Lectures 1-10+			
W 9/29	14	Rotating MMF in AC Machines (single and three phase)			
R 9/30		Lab 6: Single-Phase Induction Motor			
F 10/1	15	P-Pole Machine MMFs and Generated Voltages			
WEEK 7					
M 10/4	16	Torque in Round Rotor AC Machines; Sizing Equation			
T 10/5		Grades Due			
W 10/6	17	Synchronous Machine Per-Phase Equivalent Circuit, Torque Angle Characteristic (MAPRs Due)		PS5 Due 10/13	Solution
R 10/7	18	HR1: Measuring Synchronous Generator Parameters HR2: Lab 7: Synchronous Machine Characterization			
F 10/8		Lab 7: Synchronous Machine Characterization (cont.)			
WEEK 8					
M 10/11		HOLIDAY: Columbus Day			
W 10/13	19	Synchronous Machines Operating in Systems			
R 10/14		Lab 8: Synchronous Machine Torque and Terminal Characteristics			
F 10/15	20	Synchronous Machine Finite Inertia Systems: House Curves and Paralleling Procedure			
WEEK 9					
M 10/18	21	Synchronous Machine Design			
W 10/20	22	Induction Machine Principles			
R 10/21		Lab 9: Synchronous Machine Design			
F 10/22	23	Induction Machine Equivalent Circuit			
WEEK 10					
M 10/25	24	Induction Machine Torque versus Speed Characteristic			
W 10/27	25	Impact of Rotor Design on Torque Versus Speed Characteristics			
R 10/28		Lab 10: Induction Machine Parameter Determination			
F 10/29	26	Induction Machine Nameplate Information; Induction Machine Parameter Determination			
WEEK 11					
M 11/1		Exam Review			
W 11/3	27	Induction Machine Variable Frequency Control			
R 11/4		Lab 11: Induction Machine Torque versus Speed Characteristics			
F 11/5		Exam 2: Coverage Lectures 12-26 Practice problems solutions			

WEEK 12					
M 11/8	28	Three-Phase Voltage Inverters: 6-step and STPWM			
T 11/9		12-Week Grades Due			
W 11/10	29	Induction Machine Speed Control (MAPRs Due)			
R 11/11		HOLIDAY: Veteran's Day			
F 11/12	30	Synchronous Machine Variable Speed Control (Drop Course Deadline)		PS6 Due 11/19	Solution
WEEK 13					
M 11/15	31	DC Machine Equivalent Circuit and Winding Schemes			
W 11/17	32	DC Machine Commutation			
R 11/18		Lab 12: Three-Phase Inverter Induction Motor Drive			
F 11/19	33	Shunt-Connected DC Machines			
WEEK 14					
M 11/22	34	Series-Connected DC Machines and Permanent Magnet DC Machines			
W 11/24	35	Self-Excited Shunt-Connected DC Generators; PM DC Machine Chopper Control			
R 11/25- F11/26		HOLIDAY: Thanksgiving			
WEEK 15					
M 11/29	36	PM DC Machine Chopper Control			
W 12/1	37	DC Machine Problem Solving			
R 12/2		Lab 13: Shunt-Connected DC Machine Lab 14: Series-Connected DC Machine and Shunt-Connected DC Generator			
F 12/3		Lab 14: Series-Connected DC Machine and Shunt-Connected DC Generator (cont.)			
WEEK 16					
M 12/6		Exam 3: Coverage Lectures 27-37 Solutions			
W 12/8		Lab 15: Simulink H-Bridge DC Motor Control Simulation			
R 12/9		Lab 15: Simulink H-Bridge DC Motor Control Simulation (cont.)			
F 12/10		Course Review (Semester Ends)			
WEEK 17+					
M 12/13		Review & Study Day			
T 12/14 – T 12/21		Final Exam Coverage Comprehensive TBD			
R 12/23		Grades due			
T 12/28		MAPRs due			