ECE 3600   Final Exam Study Guide

Review: Friday 12/9/11 in WEB L110

Final Exam: Monday 12/12 in regular classroom

Alternate Final: Wednesday 12/14 at 1:00 pm in WEB 2250 (you must sign up)

The first part will be a **closed book, no calculator** questions, ~ 40 - 60 points.

The second part will be a **open book, open notes, with calculator** problems. 5 or 6 problems, 100 - 120 points

The exam will cover	(closed book) Possible questions
1. Material from Exam 1 and Exam 2	Study the questions from exam 1 and 2
2. HW 1 AC steady-state review, used extensively throughout class	
3. **HW 2 RMS & Single-phase AC power.** $\quad$ P $\quad$ Q $\quad$ **S** $\quad$ $\lvert$**S**$\rvert$ $\quad$ pf $\quad$ correction of pf	Basic relationships and units
4. HW 3 Energy sources, plant efficiencies	Lots possible
5. HW 4 & 5 3-phase AC power.	Basic magnitude and phase relationships

$$\mathbf{V_L} \qquad \mathbf{V_{LL}} \qquad \mathbf{V_{LN}} \qquad\qquad \mathbf{I_L} \qquad \mathbf{I_{LL}} \qquad \mathbf{I_Y} \qquad\qquad \mathbf{S_{3\phi}} \qquad \mathbf{S_{1\phi}}$$

$$\mathbf{Z_Y} = \frac{\mathbf{Z_\Delta}}{3} \qquad\qquad \mathbf{Z_\Delta} = 3 \cdot \mathbf{Z_y} \qquad\qquad \text{pf} \quad \text{correction of pf}$$

6. HW 6 Magnetic circuits $\quad$ $B = \mu \cdot H \qquad H = \frac{N \cdot i}{l_m}$	Flux density, Field intensity, Permeability, B-H curve. effects of nonlinearity on some currents (3rd harmonic).
7. HW 7 - 9 Transformers	losses, ideal/non
$\quad$ Calculations	construction, ratings,
$\quad$ Impedance transformation	magnetization reactance,
$\quad$ OC & SC Tests --> model	core losses, winding losses,
$\quad$ η & VR	leakage reactance.
$\quad$ Autotransformers	Autotransformers
$\quad$ 3ϕ Transformers Δ & 3rd harmonic	
8. HW 9 - 10 One-Line Diagrams, variations pu system	Why? $\qquad$ basics
$\quad$ Per-phase and pu analysis	common symbols
$\quad$ Calculations	
$\quad$ Base Values $\qquad$ S_{base} $\qquad$ V_{base} $\qquad$ I_{base} $\qquad$ Z_{base}	
$\quad$ Base transformation	

9. **HW SG1 & SG2** Synchronous generators and motors   losses, construction, limits, operation

   Know the phasor diagram!

10. **HW Ind1 - Ind3 Induction motors**   Poles, slip, why, how

   Know the model!   Question 7-11   HW17, p3

   Powers P_{AG} P_{conv} P_{out} etc. η

   Torque & speeds

   Types & effect of R_2

   Single phase motors   Typ torque-speed curves

   Single phase motors   Single phase starting

11. **HW 18 - 19 DC motors**

   Know the model!   Torque-speed curve

   Powers P_{conv} P_{out} etc. η

   Torque & speeds

   Series-wound & universal motors   Torque-speed curve

12. **HW 20 Transmission Lines**

   Short, Med, Long Z_C SIL   Short, Med, Long   mi, km

   Surge impedance

   Series impedance $\mathbf{Z_{series}}$ Shunt admittance & $\dfrac{\mathbf{Y_{shunt}}}{2}$ Surge impedance loading

   Shunt impedance & $2 \cdot \mathbf{Z_{shunt}}$

   Models and calculations

Bolded items are more likely