ELEC 5760/6760 Exam 2 Study Guide

I. Topics covered on this exam

a. Voltage, Current, and Optical sensing techniques
b. MEMS Actuators
c. MEMS Pressure Sensors, Accelerometers, and Gyroscopes
d. Temperature and Chemical Sensors

II. Background Material to Know:

a. Voltage and current sensing examples
b. Optical sensing terms: interferometer, spectrometer, transmissibility, etc.
c. Types of MEMS actuators
   (1) Electrostatic: PPA, CDA, GCA
   (2) Other: piezoelectric, thermal, SMA, magnetic, flowFET
d. Types of MEMS pressure sensors, accelerometers, and gyroscopes
e. Mechanical shock event
f. Components/architecture of these devices (ex: membrane & diaphragm in P sensors)
g. Error sources in MEMS gyroscopes
h. Terminology associated with these topics (ex: hillocks, force feedback, accelerometer sensitivity)
i. Sound levels for hearing loss
j. Types of temperature and chemical sensors

III. Analysis Material to Know

a. Problems from Homework #6 – #9
b. How to convert SI units (g to Kg, etc…)
c. Using Laplace / Inverse Laplace Transforms
d. Calculation of a transfer function from a block diagram

V. Equations I will provide

a. Constants: π, ε_o, G
b. Lapace Transform table as needed
c. Equations for PE, KE, static pressure, Bernoulli's equation, actuators, accel/gyro as needed

IV. You need to know equations for:

a. Relationships between m, c, k, f_n and ς, Q, ω_n
b. Unit conversions
c. Units for: m, k, c, S, ω_n, Ω

V. Things to watch out for:

a. Units on ALL answers in the correct units
b. Use constants I give you
c. Answer all parts of questions
d. Show calculations
e. Convert parameters to a common unit before calculating the answer

VI. **Test Is Closed Book, Closed Notes, No Laptop/Notebook PC's**