EE 251
Basic Electrical Engineering for Non Majors
Dr. Nazeeh Alothmany

Electrical and Computer Engineering
King Abdulaziz University
This Course …

• Applications of Electrical Engineering in Different Systems..

• Concepts and Basics of Electricity and Electronics..

• Practical Engineering Applications..
Course Content

• History of Electricity
• Basic Concepts
  – electrons, battery, DC&AC, freq, closed loop, current, RMS
• Components
  – R, C, L, fuse, breaker, relay, solenoid, diode, transistor, IC
• Circuit Analysis
  – ohms law, dividers, KCL, KVL, complex impedance, current source, power
• Measurements
  – volt, current, ohm, scope, simulators
Class Format

• Active Learning
  – Teams of 5 students
  – Weekly Activity, Journal
  – In-Class Readings
  – Daily Quiz (no makeup's)

• Term Projects
• Lab Experiments
• Simulation Sessions
<table>
<thead>
<tr>
<th>Grades</th>
<th>Value</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quizzes</td>
<td>20</td>
<td>15%</td>
</tr>
<tr>
<td>Journals</td>
<td>10</td>
<td>5%</td>
</tr>
<tr>
<td>Activities</td>
<td>10</td>
<td>10%</td>
</tr>
<tr>
<td>Labs</td>
<td>5</td>
<td>15%</td>
</tr>
<tr>
<td>Exams</td>
<td>2</td>
<td>20%</td>
</tr>
<tr>
<td>Project</td>
<td>2</td>
<td>15%</td>
</tr>
<tr>
<td>Final</td>
<td>1</td>
<td>20%</td>
</tr>
<tr>
<td>Bonus</td>
<td>0-3</td>
<td>100%+</td>
</tr>
</tbody>
</table>
Rules

• Quizzes 0 or 10
• Be ON-TIME
• Journals due every Saturday
• Absence in Quizzes & Activity = -2
• Cheating = -50% (BLACK LIST!!)
• Project workload = 100%
  – More work = more grades
• Teamwork
  – Any conflict should be stated from the beginning
Course Website

- Visit the course website

  http://kau.edu.sa/nothmany

  Or:

  http://enggkau.110mb.com/ee251
Students ID’s

- **EE251 Sections**
  - A: S.M. 11:00-12:20
  - B: S.M. 01:00-02:20
  - C: S.T. 08:00-09:20
  - D: S.T. 09:30-10:50

- **IDs in Teams**
  - TC0: C01 – C05
  - TC1: C11 – C15
  - TC9: C91 – C95
EE251
Lectures
Introduction
Section 01
History of Electricity

• Ancient Egyptian 2750 BC
  – shocks from electric fish

• Romans 1500 BC
  – shocks can travel in metals

• Thales 600 BC
  – rubbing amber makes magnet

• Arabs 1400
  – Identity of lightening

• William Gilbert 1600
  – wrong: it was Static Electricity
History of Electricity

- Otto von Guericke 1700’s
  - more work

- Benjamin Franklin 1752
  - lightening key experiment

- Luigi Galvani 1791
  - nerve cells passed signals to the muscles

- Alexander Volta 1800
  - Zinc and Copper Battery

- André-Marie Ampère 1820
  - electromagnetism
History of Electricity

• Michael Faraday 1821
  – electric motor in 1821

• George Ohm 1827
  – ohm's law

• Tesla, Edison, Westinghouse, Siemens, 1900’s
• Graham Bell and Kelvin
  – Second Industrial Revolution
CNC Machines Control
Machines Monitoring
Fully Programmed Machines
Automation

"It does the work of a hundred people—unfortunately they all call in sick on the same day."
Robots
Accuracy
ExoMars Mission

Life in other planets!
ExoMars Mission

- landing of a large payload on Mars
- navigation and operation of a mobile scientific platform
- a novel drill to obtain subsurface samples
- sample processing and distribution system
- protection and cleanliness levels
ExoMars Mission
Printed Circuit Board (PCB)
Process Check

• Ask yourself..

  – What do I need to know about EE?