



EEET 100-Applied Electricity and Electronics
Second Semester 2008/2009 (082)

Catalog Description (233): EEET 100 Applied Electricity and Electronics is an introductory course covering the fundamental principles of electric and electronic circuits. This is an important course designed for the students majoring in Mechanical Engineering Technology program. It focuses on basic concepts of voltage and current, resistance, conductance, power and energy, series and parallel circuits, circuit theorems, AC circuit fundamentals, diodes and transistors.

Prerequisite: PHYS 161, MATH 161.

Textbook: Robert Boylestad & Louis Nashelsky, Introduction to Electricity, Electronics & Electromagnetics, Prentice Hall, 5th edition, 2002. (TB)

Laboratory manuals: HBCC, Introduction to Electricity and Electronics, manual. (LM)

Faculty: Mr Khalid Mahmood.

Objective: The aim of this course is to introduce the mechanical engineering technology students with the basic electrical and electronic circuit components, their theory and applications. Special emphasis will be placed on the principles and hands-on laboratory practical to enhance students learning experience on variety of electronic circuits. Students are required to submit lab reports in English.

- Topics:**
1. Introduction to voltage and current (3 classes)
 2. Resistance and Ohm's law (2 classes)
 3. Series and Parallel Circuits and Kirchhoff's Laws (4 classes)
 4. Current and Voltage Divider Rules (2 classes)
 5. Mesh Analysis and Nodal Analysis Techniques (4 classes)
 3. Network Analysis Theorems (3 classes)
 4. Inductors and Capacitors (1 class)
 5. AC fundamentals, Sine wave, Average and RMS values (3 classes)
 6. PN Junction Diodes (2 classes)
 7. Diode Clippers and Clampers and Rectifiers (2 classes)
 8. Introduction to Basic Transistor structure and operation, its biasing & amplification (3 classes)

Weekly schedule: attached.

Assessment Policy:

| | Weighting: | Letter Grading Scale: |
|--------------------|-------------------|------------------------------|
| Lab Reports | 5% | 0% < 60% F |
| Homework | 5% | 60% < 65% D |
| Quizzes | 15% | 65% < 70% D+ |
| Mid-term lab exam. | 10% | 70% < 75% C |
| First Major exam. | 10% | 75% < 80% C+ |
| Second Major exam. | 15% | 80% < 85% B |
| Final lab exam. | 10% | 85% < 90% B+ |
| Final examination | <u>30%</u> | 90% < 95% A |
| | 100% | 95% to 100% A+ |

Some clustering and adjustment of threshold values may be Applied depending on final results statistics of discreet groups

HBCC Rules and Regulations:

1. **Attendance:** students are expected to attend all meeting of their courses. In the case of any absence, students are responsible for course content during their absence.
2. **Absenteeism:** a record is consistently compiled and updated. If the student has been absent too many times without a valid excuse, he will be excluded from the college.
3. **Smoke free college:** smoking is prohibited in all college facilities.
4. **Behavior:** students who engage in behavior that disrupts the learning environment for others may be subjected to disciplinary action under the KFUPM code.
5. **Exam cheating:** it is not permitted to speak during the exam. Failure to abide by this rule will result in their exam marks being cancelled.

Prepared by: MR. KHALID MAHMOOD

Date: 28/02/2009

Dr. Hamza Maghraby, Dean HBCC

Approved by: _____

Date: _____

WEEKLY SCHEDULE

| Week No. | Contents | Text Reference | Practical / support activities | Assessment |
|---------------------|--|------------------------|--|--------------------|
| 1 | Introduction to Electricity & Electronics Basics of current and voltage | TB: 5-9 TB: 12-14 | | No lab |
| 2 | Basics of current and voltage (cont.), conversion of units Resistance and Ohm's Law | TB: 12-14 TB: 18-25 | Experiment 1 Introduction to Electric measuring meters. Measuring resistance, current and voltage. | Quiz # 1 HW # 1 |
| 3 | Numerical problems related to Ohm's Law, Power, Energy & Efficiency. Power, Energy & Efficiency Series DC Networks: KVL, Voltage divider rule and numerical problems. | TB: 28-32 TB: 35-39 | Experiment 2 Introduction and use of Function generator and Oscilloscope | Quiz # 2 |
| 4 | Series DC Networks (cont.) Parallel DC Networks: KCL, Current Divider rule and numerical problems. | TB: 35-39 TB: 41-47 | Experiment 3 Resistors: Color code, characteristics and power rating | HW # 2 |
| 5 | Parallel DC Networks (cont.) Numerical Problems | TB: 41-47 | Experiment 4 Kirchhoff's Law | Quiz # 3 |
| Major exam 1 | | | | |
| 6 | Series-Parallel DC Networks Mesh analysis | TB: 73-91 | Experiment 5 Series and Parallel Circuits | HW # 3 |
| 7 | Mesh analysis (cont.) Nodal Analysis | TB: 73-91 | Experiment 6 The open and Short circuits: Application to Bridge circuit. | Quiz # 4 |
| 8 | Nodal analysis (cont.) Network Theorems: Superposition theorem and numerical problems. | TB: 73-91 | Mid term Lab Exam | HW # 4 |
| 9 | Network Theorems: Thevenin's Theorem, analysis and numerical problems. Network Theorems: Maximum Power Transfer Theorem and numerical problems | TB: 93-95 | Experiment 7 Network Theorems: Superposition, Thevenin, Norton and Maximum power transfer | Quiz # 5 |

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|---------------------|--|--|---|--------------------|
| 10 | <p style="text-align: center;">Inductors and Capacitors</p> <p style="text-align: center;">AC Networks: Sinusoidal ac waveform</p> | <p>TB: 102-113 TB: 131-143</p> | <p style="text-align: center;">Experiment 8 Average and RMS values</p> | HW # 5 |
| 11 | <p style="text-align: center;">AC Networks: Average and RMS value of sine waveform and numerical problems.</p> <p style="text-align: center;">AC Networks: R, L and C elements, Series ac networks, impedance, Parallel ac networks, admittance.</p> | <p>TB: 143-148 TB: 150-154 TB: 154-180</p> | <p style="text-align: center;">Experiment 9 The Diode</p> | Quiz # 6 |
| Major Exam 2 | | | | |
| 12 | <p style="text-align: center;">Two-Terminal Electronic Devices: Semiconductor Diode Characteristics</p> <p style="text-align: center;">PN junction Diodes: Diode and biasing of the diode, V-I Characteristics</p> | <p>TB: 339-341 TB: 349-354</p> | <p style="text-align: center;">Experiment 10 Diode Clipper</p> | HW # 6 |
| 13 | <p style="text-align: center;">Rectifiers: Half-wave & Full-wave rectification.</p> <p style="text-align: center;">Diode Clippers and Clampers</p> | <p>TB: 356-361 TB: 364-373</p> | <p style="text-align: center;">Experiment 11 BJT Biasing circuits</p> | Quiz # 7 HW # 7 |
| 14 | <p style="text-align: center;">Bipolar Junction Transistor (BJT): Basic structure and operation.</p> <p style="text-align: center;">Bipolar Junction Transistor (BJT): Introduction to transistor biasing.</p> | <p>TB: 399-422</p> | Revision | Quiz # 8 |
| 15 | <p style="text-align: center;">Bipolar Junction Transistor (BJT): Introduction to transistor biasing & amplification.</p> <p style="text-align: center;">Revision</p> | <p>TB: 399-422</p> | Final Lab Exam | Quiz # 9 |

Contact Details:

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Office Hours: For office hours, see my weekly schedule posted outside my office