Three Rivers Community College

FUNDAMENTALS OF ELECTRICAL CIRCUITS & MACHINES (EET K144)

Prof G. KENT HARDING

REQUIRED MATERIALS!!!:

- **TEXT (both are required)**
  - **Electric Circuit Fundamentals, 7th Edition,** by Thomas L. Floyd.
    - Published by Prentice Hall
  - **Electrical Machines, Drives, and Power Systems**, 6th **Edition,** by Theodore Wildi.
    - Published by Prentice Hall
- **CALCUALTOR – TI-85, 86, 89, 92 OR EQUIVALENT**
  - **Instructor will use the TI - 89**
- **DIGITAL MULTIMETER – RESISTANCE, FREQUENCY, AC & DC CURRENT, VOLTAGE.**

PREREQUISITE: MATH MAT-K 137
COEREQUISITE: MATH MAT-K 186

COURSE DESCRIPTION:

- **CORE -** An approximately **nine week** study of the basic theory of electricity and electrical circuit analysis and the electrical characteristics of three components – the resistor, capacitor & inductor – in DC, AC and 3-phase AC environments. Emphasis is placed on the AC characteristics of circuits including frequency, period, impedance, phase shift and power concepts and their application to transformers, motors and generators. This analysis makes extensive use of complex numbers.

- **MOTORS –** An approximately three week study of the operating characteristics and capabilities of DC motors, single phase AC motors and 3-phase asynchronous and synchronous AC motors.

- **GENERATORS -** An approximately three week study of the operating characteristics and capabilities of DC generators and 3-phase AC generators.

INSTRUCTIONAL METHODOLOGY: CLASSROOM LECTURE, PROBLEM SOLVING & HOMEWORK.

EDUCATIONAL OBJECTIVES: TO INTRODUCE:

- BASIC ELECTRICAL PRINCIPLES & CONCEPTS;
- THE TERMINOLOGY APPLICABLE TO ELECTRICAL CIRCUITS AND DEVICES;
- THE ELECTRICAL CHARACTERISTICS OF RESISTORS, CAPACITIORS AND INDUCTORS;
- THE OPERATIONAL CHARACTERISTICS OF TRANSFORMERS; AND
- THE ELECTRICAL & OPERATIONAL CHARACTERISTICS OF BASIC MOTORS.

DISABILITY STATEMENT: ***IF YOU ARE A STUDENT WITH A DISABILITY AND BELIEVE YOU WILL NEED ACCOMMODATIONS FOR THIS CLASS, IT IS YOUR REPONSIBILITY TO CONTACT THE DISABILITIES COUNSELING SERVICES AT 383-5240. TO AVOID ANY DELAY IN THE RECEIPT OF ACCOMMODATIONS, YOU SHOULD CONTACT THE COUNSELOR AS SOON AS POSSIBLE. PLEASE NOTE THAT I CANNOT PROVIDE ACCOMMODATIONS BASED UPON YOUR DISABILITY UNTIL I HAVE RECEIVED AN ACCOMMODATION LETTER FROM THE DISABILITIES COUNSELOR. YOUR COOPERATION IS APPRECIATED.***

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GRADING & CLASSROOM POLICIES:

- **GRADING AS STATED IN THE MANUAL OF POLICY & PROCEDURES ON GRADES & QUALITY POINTS;**
- **THREE EXAMS NORMALIZED TO 100 POINTS EACH (LOWEST EXAM DROPPED);**
- **QUIZZES WILL VARY IN GRADE, TOTALED & NORMALIZED TO 100 POINTS (LOWEST QUIZ DROPPED);**
- **FINAL GRADE WILL BE COMPRISED OF THE WEIGHTED AVERAGE OF THE FOLLOWING AS NOTED:**
  - **the two BEST OF THREE EXAMS – 60 %;**
  - **QUIZ AVERAGE – 40%;**
  - **HOMEWORK – 5 %.**
- **numeric to letter grade conversion:**

	B+ 87 TO 89	**C+ 77 TO 79**	**D+ 67 TO 69**
A 93 TO 100	**B 83 TO 86**	**C 73 TO 76**	**D 66 TO 60**
A- 90 TO 92	**B- 80 TO 82**	**C- 70 TO 72**	

THERE IS NO MAKE-UP of ANY MISSED TESTS 0R QUIZZES !!!

One exam and at least one quiz will be dropped to accommodate an unanticipated absence. Absence during an exam or quiz is an automatic zero on that test or quiz.

THE DONUT CLAUSE

ALL ELECTRONIC DEVICES (PAGERS, CELL PHONES, ETC) ARE TO BE TURNED OFF OR SWITCHED TO THE SILENT MODE.

By staying in this class, YOU AGREE to buy the entire class donuts and deliver same to the next scheduled class if any electronic device ACTIVATES during class hours for any occurrence after the first. This agreement will not apply to cases in which the instructor is informed in advance of possible calls because of an emergency situation.

All other policies are as stated in the STUDENT HANDBOOK, the COLLEGE CATALOG both printed and on the WEB-SITE, and other college publications.

COURSE CONTENT by chapter (not in the order of presentation);

FLOYD TEXT

- **Chapter 1 Introduction of components, units & quantities;**
- **Chapter 2 Voltage, current & resistance;**
- **Chapter 3 Ohm's law, energy & power;**
- **Chapter 4 Series circuits, Kirchhoff's law & voltage dividers;**
- **Chapter 5 Parallel circuits, Kirchhoff's law & current dividers;**
- **Chapter 6 Series-parallel circuits, Thevenin's theorem;**
- **Chapter 7 Magnetism & electromagnetism;**
- **Chapter 8 Introduction to AC voltage & current;**
- **Chapter 9 Capacitors;**
- **Chapter 10 Resistive – Capacitive circuits;**

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- **Chapter 11 Inductors;**
- **Chapter 12 Resistive – Inductive circuits;**
- **Chapter 13 Resistive – Inductive – Capacitive circuits; and**
- **Chapter 14 Transformers;**

COURSE CONTENT by chapter *continued* (not in the order of presentation);

WILDI TEXT – BASICS

- **Chapter 1 Units;**
- **Chapter 2 Fundamentals of Electricity, Magnetism & Circuits**
- **Chapter 3 Fundamentals of Mechanics & Heat**
- **Chapter 6 Efficiency & Heating of Electrical Machines**
- **Chapter 7 Active, Reactive & Apparent Power**
- **Chapter 8 Three – Phase Circuits**
- **Chapter 9 The Ideal Transformer**

WILDI TEXT – MOTORS

- **Chapter 5 Direct Current Motors**
- **Chapter 13 Three Phase Induction Motors**
- **Chapter 14 Selection & Application of Three Phase Induction Motors**
- **Chapter 17 Synchronous Motors**
- **Chapter 18 Single Phase Motors**

WILDI TEXT – GENERATORS

- **Chapter 4 Direct Current Generators**
- **Chapter 16 Synchronous Generators**
- **Chapter 24 Generation of Electrical Energy**
- **Chapter 25 Transmission of Electrical Energy**
- **Chapter 26 Distribution of Electrical Energy**

The Course reading and homework assignments are on the attached page and are revised as needed to accommodate the class's progression.