

ELECTRICAL FUNDAMENTALS
COURSE NAME

ELR 104-4
CODE NO.

TOTAL CREDIT HOURS: 80

PREREQUISITE(S):

I. PHILOSOPHY/GOALS:

An introduction to electrical quantities and units; Ohm's and Kirchhoff's laws; simple DC series, parallel, series parallel, and voltage divider circuits; simple DC network analysis; magnetism and electromagnetism; inductance and capacitance; sine wave characteristics and phasors; basic series and parallel RLC circuit analysis and transformers.

II. STUDENT PERFORMANCE OBJECTIVES:

Upon successful completion of this course the student will:

- 1) Have a fundamental knowledge of AC and DC circuit theory;
- 2) Be able to simplify and analyze basic AC and DC circuits comprised of resistors, capacitors and inductors;
- 3) Understand basic magnetism and electromagnetism;
- 4) Use phasors and complex numbers to assist in analysis of AC circuits.

III. TOPICS TO BE COVERED:

- 1) Electrical Units
- 2) Conductors and Insulators
- 3) Series Circuits
- 4) Parallel Circuits
- 5) Series-Parallel Circuits
- 6) Network Theorems
- 7) Magnetism
- 8) Magnetic Circuits
- 9) Inductance
- 10) Capacitance
- 11) Alternating Current Fundamentals
- 12) AC Circuit Analysis

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IV.	<u>LEARNING ACTIVITIES</u>	<u>REQUIRED RESOURCES</u>
		BELL TEXT
1	<u>System of Units</u> Fundamental Units, Scientific Notation, Electric Current, Resistance, Conductance, Potential Difference, Voltage (EMF), Ohm's Law, Electrical Power and Energy, Electrical Measurement	CH. 1 & 3
2	<u>Conductors, Insulators, Resistors</u> Construction, Temperature Effect, Resistor Colour Code, Dry Cells	CH. 4
3	<u>Series Circuits</u> Voltage & Current in a Series Circuit, Voltage Drops in a Series Circuit, Voltage Divider, Power, Open & Short Circuit, Problem	CH. 5
4	<u>Parallel Circuits</u> Voltage, Current and Resistance in a Parallel Circuit, Parallel equivalent Circuits, Open & Short Circuits, Problems	CH. 6
5	<u>Series-Parallel Circuits</u> Voltage & Current in a Series-Parallel Circuit, Equivalent Circuits of a Series-Parallel Circuit, Open and Short Circuits of a Series-Parallel Circuit, Analysis and problems on Series-Parallel Circuits	CH. 7

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LEARNING ACTIVITIES

REQUIRED RESOURCES

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| 6 | Capacitance & Inductance
Electrical Charge & Field,
Definition of Capacitance,
Capacitance in Series & Parallel
Time Constant, Types of
induction, Inductors in Series
and Parallel Inductive and
Capacitive Circuits, Problems | CH. 14, 15 & 16 |
| 7 | Introduction to Magnetism
Permanent Magnets,
Electro-magnetic theory,
Reluctance and Permeability,
Hysteresis, Eddy Currents | CH. 11 & 12 |
| 8 | A.C. Fundamentals
Generation of A.C. Voltage,
Analysis of Sine Wave, A.C.
Loads, Phasors, and complex
algebra | CH. 17 |
| 9 | Power in A.C. Circuits
RL, RC, RLC Series & Parallel
Circuits, Power, Power Factor | CH. 18, 19, 20
& 21 |
| 10 | Transformers
Principles of Transformers, Type
of Transformers, Transformer on
Load and no Load, Open & Short
Circuit Analysis | CH. 24 |

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V. **EVALUATION METHODS: (INCLUDES ASSIGNMENTS,
ATTENDANCE REQUIREMENTS, ETC.)**

TESTS	60%
QUIZZES	40%
TOTAL	100%

The grading system used will be as follows:

A+ = 90 - 100% A = 80 - 89% B = 66 - 79% C = 55 - 65%
R REPEAT

NOTES: If a student misses a test he/she must have a valid reason (ie. medical or family emergency). In addition the school must be notified before the scheduled test sitting. The student should contact the instructor involved. If the instructor cannot be reached leave a message with the Dean's office or the College switchboard. If this procedure is not followed the student will receive a mark of zero on the test with no rewrite option.

The students will be given advance notice of test dates (1 week minimum). Quizzes (worth a maximum of 10%) may be given without notice. There will be no rewrites for students missing quizzes without prior notice and valid reasons.

VI. **REQUIRED STUDENT RESOURCES**

Text Books: Fundamentals of Electric Circuits, Fourth Edition by D.A. Bell. Prentice Hall, 1988.

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VII. ADDITIONAL RESOURCE MATERIALS AVAILABLE IN THE COLLEGE LIBRARY:

Book Section (TITLE, PUBLISHER, EDITION, DATE, LIBRARY CALL NUMBER IF APPLICABLE - SEE ATTACHED EXAMPLE)

Periodical Section (MAGAZINES, ARTICLES)

Audiovisual Section (FILMS, FILMSTRIPS, TRANSPARENCIES)

VIII. SPECIAL NOTES

Students with special needs (eg. physical limitations, visual impairments, hearing impairments, learning disabilities) are encouraged to discuss required accommodations confidentially with the instructor.

Your instructor reserves the right to modify the course as he/she deems necessary to meet the needs of students.