Wharton County Junior College

Administrative Master Syllabus

Course Information

Course Title	DC-AC Circuits
Course Prefix, Num. and Title	CETT 1409 DC-AC Circuits
Division	Technology and Business
Department	Electronics Engineering Technology
Course Type	WECM Course
Course Catalog Description	Fundamentals of DC circuits and AC circuits operation including Ohm's law, Kirchhoff's laws, networks, transformers, resonance, phasors, capacitive and inductive and circuit analysis techniques.
Pre-Requisites	Credit for or concurrent enrollment in ENER 1350 or PTAC 1302 or INMT 1305
Co-Requisites	None

Semester Credit Hours

Total Semester Credit Hours (SCH): Lecture Hours: Lab/Other Hours	4:3:3
Equated Pay Hours	4.5
Lab/Other Hours Breakdown: Lab Hours	3
Lab/Other Hours Breakdown: Clinical Hours	0
Lab/Other Hours Breakdown: Practicum Hours	0
Other Hours Breakdown	0

Approval Signatures

Title	Signature	Date
Division Chair:	David Kucera, Technology & Business Division Chair	03-30-2023

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Additional Course Information

Topical Outline: Each offering of this course must include the following topics (be sure to include information regarding lab, practicum, and clinical or other non-lecture instruction).

The following performance will be expected of any student completing this course with a passing grade. There is no absolute time limit on the performance of these objectives, unless noted, but the grade received by the student will depend, in part, on the relative speed and precision of the student's performance in these tasks. Where subjective evaluations are indicated, the instructor will make these judgments based on his or her knowledge of the skills required to place a graduate with the expectation of successful on-job performance.

- Clearly define work, force, energy, charge, voltage, current
- Write and use the basic formulae relating work, force, distance, charge, voltage, and time
- Correctly convert between all commonly used SI prefixed multipliers
- Demonstrate the ability to use a calculator to solve problems involving scientific and engineering units and metric prefixes
- Determine/read correct meter scale for measurement of voltage, resistance, and current.
- Draw a basic circuit and correctly label the components of the circuit
- Draw the correct symbols for resistors, batteries, capacitors, inductors, connected and non-connected conductors.
- Write and demonstrate correct use of Ohm's Law
- Calculate the equivalent resistance of series-connected resistors
- Calculate the current, voltage, and power for each resistor in a series circuit given the voltage source and the value of each resistor
- Calculate the equivalent resistance of parallel-connected resistors
- Calculate the voltage, current, and power for each resistor in a parallel circuit given the voltage source and the value of each resistor
- Discuss meter loading as a function of the input resistance of a meter
- Given no more than 8 resistors in a series-parallel circuit with no delta or wye connections, and given the source voltage or current, solve for the voltage across and the current through each resistor
- Recall the names and units associated with a sine wave.
- Compute the inductive and capacitive reactance of various inductors and capacitors operating at various frequencies.
- Explain the process of electromagnetic induction.
- Explain the process of generating an A.C. current.
- Demonstrate use of the oscilloscope and A.C. meters to analyze alternating waveforms
- Examine the response of R.C. and R.L. circuits

Course Learning Outcomes:

Learning Outcomes – Upon successful completion of this course, students will:

1. Construct and analyze DC and AC circuits from simple to complex.
2. Perform test measurements for DC and AC circuits.
3. Utilize a multimeter and oscilloscope to differentiate between two AC signals with respect to voltage, current, and power

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Methods of Assessment:

- Exams
- Labs
- Homework
- Quizzes

Required text(s), optional text(s) and/or materials to be supplied by the student:

An appropriate electronics text covering DC/AC Circuits. Example: Electricity and Electronics by Gerrish, Dugger, and Roberts.

Calculator – scientific with Sine, Cosine, Tangent capabilities.

Suggested Course Maximum:

30 Lecture /15 Laboratory

List any specific or physical requirements beyond a typical classroom required to teach the course.

Lecture facilities for 30 students. Laboratory facilities for 15 students must include 9 bench positions each with a digital meter, logic probe, 20 MHz oscilloscope and probes, bread boarding facility with power supply and signal generator, and a stock of basic DC and AC circuit components.

Course Requirements/Grading System: Describe any course specific requirements such as research papers or reading assignments and the generalized grading format for the course.

- 25% Quizzes, homework assignments, and class participation
- 25% Cross Disciplinary Skills (Lab, project, attendance, cooperation, work ethic, safety, teamwork, housekeeping, attitude, etc.)
- 25% Mid-term Exam
- 25% Final Examination

Grade Scale:
90 to 100: A
80 to 89: B
70 to 79: C
60 to 69: D
0 to 59: F
Note: For the additional NUCP certificate, the student must complete the course with a minimum of 80%.

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Curriculum Checklist:

☐**Administrative General Education Course** (from ACGM, but not in WCJC Core) – No additional documents needed.

☐**Administrative WCJC Core Course** – Attach the Core Curriculum Review Forms

- ☐Critical Thinking
- ☐Communication
- ☐Empirical & Quantitative Skills
- ☐Teamwork
- ☐Social Responsibility
- ☐Personal Responsibility

☒**WECM Course** – If needed, revise the Program SCANS Matrix and Competencies Checklist