



Wayne County Community College District

COURSE SYLLABUS

EE 102 Circuit Analysis II

CREDIT HOURS: 4.00

CONTACT HOURS: 90.00

COURSE DESCRIPTION:

This course deals with fundamental concepts of AC waveforms, effective and average values of both current and voltage, series parallel and compound circuits, inductive and capacitive time circuits, time constants, resonance, passive filters bandwidth, Q of a circuit, polyphase systems and transformers.

PREREQUISITES: EE 101

COREQUISITES: EE 115

EXPECTED COMPETENCIES:

Upon completion, students will be able to:

- Write the equation for the general form of a sinusoidal waveform.
- Define the amplitude, period, frequency, and phase angle.
- Define phase relations, average voltage, and effective voltage for periodic waveforms.
- Convert angles from degrees to radian and vice versa.
- State the response of basic R, L, and C elements to a sinusoidal voltage or current.
- State complex numbers and mathematical operation of complex numbers.
- State the complex numbers conversion from one form to other forms.
- Show the correspondence between the phasor domain, time domain, and complex numbers.
- State the formulas for inductors and capacitors impedance.
- State the admittance and susceptance of inductors and capacitors.
- Solve a RL, RC, AND RLC circuits for voltages, currents, and powers using complex number, phasor, and trigonometry methods.
- Define current divider and voltage divider rules for ac circuits.
- State the frequency response for RL, RC and RLC circuits.
- State and solve the ladder networks.
- State the formula for sources conversion.
- Define mesh analysis and nodal analysis for an arbitrary circuit.
- Solve any networks using mesh and nodal analysis methods.
- State bridge networks and its applications.
- State Delta to Y and Y to Delta for currents and voltages conversions.
- Find the Thevenin and Norton equivalent for an arbitrary circuit.
- State the maximum power transfer theorem, subtraction, reciprocity, and Millman's theorem and their application to electrical circuits.
- Define and calculate the active power, reactive power, apparent power, and power triangle.
- State the power factor, power factor correction in ac circuits.
- State the resonance in series, parallel circuits, calculate resonant frequency, and calculate the voltage across R, L, and C.
- Define Q in ac circuits.
- Define and calculate decibels, RC low-pass and high-pass, band-pass, band-stop, and double tuned filters.
- State; sketch the Bode plots and its applications to electrical circuits.
- State the initial value for the capacitors and inductor.
- State and calculate the response of RC circuits to square wave input.
- Describe the three phase generators.
- In three phase systems, calculate currents and voltages for Y, Delta, and mixed balanced and unbalanced load circuits.
- Describe the two and three-wattmeter methods.



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LAB OBJECTIVES:

- Apply safety procedures needed in the lab.
- Assemble and test series, parallel, and compound AC circuits using signal generators, multimeters, and oscilloscope.
- Measure period, V_{pp} , and calculate f and V_{rms} for given sine wave.
- Test the frequency response of filter circuits (RL, RC, and RLC).
- Test integrator and differentiator circuits.
- Mastering in using dual trace oscilloscope to measure voltage, current, frequency and phase shift.
- Test the primary and secondary of a transformer for voltage, current, resistance, and phase relations.
- Apply resonant circuits into practice experimentally and analytically.
- Test the frequency response of filter circuits (RL, RC, and RLC).

ASSESSMENT METHODS:

Student performance may be assessed by examination, quizzes, case studies, oral conversation, group discussion, oral presentations. The instructor reserves the option to employ one or more of these assessment methods during the course.

GRADING SCALE:

90%-100% = A
80%-89.9% = B
70%-79.9% = C
60%-69.9% = D
<60% = E