Master Course Syllabus

For additional course information, including prerequisites, corequisites, and course fees, please refer to the Catalog: https://catalog.uvu.edu/

Semester: Spring
Year: 2025
Course Prefix: AET
Course and Section #: 1140-601
Course Title: Applied AC Theory
Credits: 1

Course Description

Reviews basic AC theory involving voltage, current, resistance, reactance, impedance, magnetism, power and the use of digital meters. Discusses operation of inductors, capacitors, diodes, and transformers. Discusses troubleshooting techniques and applications of AC circuits.

Course Attributes

This course has the following attributes:
☐ General Education Requirements
☐ Global/Intercultural Graduation Requirements
☐ Writing Enriched Graduation Requirements
☒ Discipline Core Requirements in Program
☐ Elective Core Requirements in Program
☐ Open Elective
Other: *Click here to enter text.*

Instructor Information

Instructor Name: Travis Fraughton - Lecturer

Student Learning Outcomes

1	Calculate voltages, currents, reactance, impedance, and power in AC electrical circuits.
2	Describe applications of AC electrical circuits.
3	Describe electrical safety fundamentals.
4	Describe operation of single phase transformers.
5	Apply resistors, capacitors, inductors, and diodes to industrial circuits.
6	Calculate transformer current and voltage on primary and secondary sides of transformer.

Course Materials and Texts

Calculator
AC/DC Principles and Applications, Paul T. Shultz 2nd Edition
AC/DC Principles and Applications Workbook, Paul T. Shultz 2nd Edition

Course Requirements

Course Assignments, Assessments, and Grading Policy
Homework, Quizzes, Assignments: Weekly practice problems related to topics being discussed, along with random quizzes and/or assignments. (25% of overall grade)
Exams: Exams will be taken for each chapter discussed. (30% of overall grade)
Attendance: (20% of overall grade)
Final Exam: The final exam will cover all course topics discussed. (25% of grade)

A = 100 to 94	B- = < 84 to 80	D+ = <70 to 67
A-= < 94 to 90	C+ = < 80 to 77	D = < 67 to 64
B+= < 90 to 87	C = < 77 to 74	D- = < 64 to 61
B = < 87 to 84	C- = < 74 to 70	F = < 61 to 0

Required or Recommended Reading Assignments
All required readings use chapters from course text that align with lectures.

General Description of the Subject Matter of Each Lecture or Discussion
Chapters 13: AC Fundamentals

Distinguish between AC and DC current. Describe the operation of an AC generator. Explain AC power generation transmission distribution and conversion.

Chapter 15: Resistive AC Circuits

List instantaneous values of AC. Explain resistance in AC circuits. Describe the differences between series, parallel and series/parallel resistive AC circuits.

Chapter 16: Inductive AC Circuits

Describe inductive AC circuits and the factors that affect inductive reactance. Explain current and voltage phase relationships in inductive circuits. Explain the difference between series and parallel inductive-resistive circuits. Explain how impedance, reactive power, apparent power, power factor, frequency and inductance affect series inductive-resistive circuits.

Chapter 17: Capacitive AC Circuits

Describe pure capacitive circuits and the relationships between voltage, current, capacitive reactance and power. Develop an understanding of series and parallel resistive-capacitive circuits and how such circuits are affected by current, impedance, frequency and capacitance.

Chapter 18: Inductive – Resistive – Capacitive Circuits

Perform series inductive-resistive-capacitive circuit analysis. Perform parallel inductive-resistive-capacitive circuit analysis.

Chapter 19: Resonance

Describe how frequency, impedance, current, voltage, power, quality factor and bandwidth affect series resonant circuits. Describe how frequency, impedance, current, voltage, power, quality factor and bandwidth affect parallel resonant circuits. Explain low and high pass filters.

Chapter 21: Transformers

Describe transformer theory and rating. Describe how loads affect transformers. List different types of transformer ratios.

Required Course Syllabus Statements

Generative AI

AI - Use ChatGPT as a learning assistant, not as a crutch. If you use it, cite it at the top of your homework or assignment. Don't accept anything it generates at face value without checking it critically. If it helps you learn some things faster, GREAT!. Just remember: If you REALLY want to be good, work for it.

You may not use AI on tests or quizzes.

Using Remote Testing Software

☒ This course does not use remote testing software.

☐ This course uses remote testing software. Remote test-takers may choose their remote testing locations. Please note, however, that the testing software used for this may conduct a brief scan of remote test-takers' immediate surroundings, may require use of a webcam while taking an exam, may require the microphone be on while taking an exam, or may require other practices to confirm academic honesty. Test-takers therefore shall have no expectation of privacy in their test-taking location during, or immediately preceding, remote testing. If a student strongly objects to using test-taking software, the student should contact the instructor at the beginning of the semester to determine whether alternative testing arrangements are feasible. Alternatives are not guaranteed.

Required University Syllabus Statements

Accommodations/Students with Disabilities

Students needing accommodations due to a permanent or temporary disability, pregnancy or pregnancy-related conditions may contact UVU Accessibility Services at accessibilityservices@uvu.edu or 801-863-8747.

Accessibility Services is located on the Orem Campus in BA 110.

Deaf/Hard of Hearing students requesting ASL interpreters or transcribers can contact Accessibility Services to set up accommodations. Deaf/Hard of Hearing services can be contacted at DHHservices@uvu.edu

DHH is located on the Orem Campus in BA 112.

Academic Integrity
At Utah Valley University, faculty and students operate in an atmosphere of mutual trust. Maintaining an atmosphere of academic integrity allows for free exchange of ideas and enables all members of the community to achieve their highest potential. Our goal is to foster an intellectual atmosphere that produces scholars of integrity and imaginative thought. In all academic work, the ideas and contributions of others must be appropriately acknowledged and UVU students are expected to produce their own original academic work.

Faculty and students share the responsibility of ensuring the honesty and fairness of the intellectual environment at UVU. Students have a responsibility to promote academic integrity at the university by not participating in or facilitating others' participation in any act of academic dishonesty. As members of the academic community, students must become familiar with their rights and responsibilities. In each course, they are responsible for knowing the requirements and restrictions regarding research and writing, assessments, collaborative work, the use of study aids, the appropriateness of assistance, and other issues. Likewise, instructors are responsible to clearly state expectations and model best practices.

Further information on what constitutes academic dishonesty is detailed in UVU Policy 541: *Student Code of Conduct*.

Equity and Title IX
Utah Valley University does not discriminate on the basis of race, color, religion, national origin, sex, sexual orientation, gender identity, gender expression, age (40 and over), disability, veteran status, pregnancy, childbirth, or pregnancy-related conditions, citizenship, genetic information, or other basis protected by applicable law, including Title IX and 34 C.F.R. Part 106, in employment, treatment, admission, access to educational programs and activities, or other University benefits or services. Inquiries about nondiscrimination at UVU may be directed to the U.S. Department of Education's Office for Civil Rights or UVU's Title IX Coordinator at 801-863-7999 – TitleIX@uvu.edu – 800 W University Pkwy, Orem, 84058, Suite BA 203.

Religious Accommodation
UVU values and acknowledges the array of worldviews, faiths, and religions represented in our student body, and as such provides supportive accommodations for students. Religious belief or conscience broadly includes religious, non-religious, theistic, or non-theistic moral or ethical beliefs as well as participation in religious holidays, observances, or activities. Accommodations may include scheduling or due-date modifications or make-up assignments for missed class work.
To seek a religious accommodation, a student must provide written notice to the instructor and the Director of Accessibility Services at accessibilityservices@uvu.edu. If the accommodation relates to a scheduling conflict, the notice should include the date, time, and brief description of the difficulty posed by the conflict. Such requests should be made as soon as the student is aware of the prospective scheduling conflict.

While religious expression is welcome throughout campus, UVU also has a specially dedicated space for meditation, prayer, reflection, or other forms of religious expression.