**Course Title: AC Circuits and Systems (Hybrid)**
**Course #: EE 201 - 1**

**Credit Hours: 3**
**Semester: Spring**
**Cap: Spring 2022**

**Faculty**: Dr. SundaramArumugam          **E-mail**: sarumugam@navajotech.edu
**Office: Tech 325**                                 **Office Phone**:
**Office Hours**: M-F 9:00 am – 5:00 pm
**Preferred Communication** (email and/or text; will respond within 24 hours)
**Class Location**: Mod 16 A
**Class Meeting Times**: M & W 8:00 AM t0 9.20 AM

**Required Materials:**
**Textbooks**: Fundamentals of Electric Circuits Charles K. Alexander Department of Electrical and
Computer Engineering Cleveland State University Matthew N. O. Sadiku. Published by McGraw-Hill
Education, 2 Penn Plaza, New York, NY 10121. Copyright © 2017 by McGraw-Hill Education.
ISBN 978-0-07-802822-9, MHID 0-07-802822-1
**Lab Fee (if applicable):**

**Mission Statement**
Navajo Technical University's mission is to provide University readiness programs, certificates,
associate, baccalaureate, and graduate degrees. Students, faculty, and staff will provide value to the Diné
community through research, community engagement, service learning, and activities designed to foster
cultural and environmental preservation and sustainable economic development. The University is
committed to a high quality, student-oriented, hands-on-learning environment based on the Diné cultural
principles: *Nitsáhákees, Nahátá, Íína, Siihasin.*

**Course Description**

A study of the fundamentals of alternating current including series and parallel AC circuits,
phasors, capacitive and inductive networks, transformers, and resonance.

| Course Outcomes | Course Measurements |
|---|---|
| A strong understanding of AC fundamentals | Homework, Class work and assignments |
| A strong understanding of Sinusoidal Alternating Waveforms | |
| A strong understanding of Effective value, RMS and Average value | |
| A strong understanding of AC through pure R, L,C, | |

| | |
|---|---|
| Impedance | |
| A strong ability to construct Resonance circuits in Series and parallel RLC circuit | |
| A strong ability to construct and demonstrate AC circuits | |
| A strong ability to examine the type of connection | Homework, Class work and assignments |
| A strong ability to understand the three phase connections of the transformers | |
| A strong knowledge of Sinusoidal Phasors | |
| An ability to communicate, Draw circuits, define and do calculations on AC system | Tests |

**Connections to Program Assessment (course-embedded measures)**
**List program outcomes to be measured**

**1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics**
**2. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions**
**3. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies.**
**General Education Assessment**
**List general education Outcomes to be measured**

**Course Activities**

| Week | Date | Chapters/Reading | Assignments | Assessments |
|---|---|---|---|---|
| 1 | 01/19/2022 | Introduction Sinusoids Phasors, Phasor Relationships for Circuit Elements Impedance. | | ✓ |
| 2 | 01/24/2022 01/26/2022 | Admittance Kirchhoff's Laws in the Frequency Domain Impedance Combination | ✓ | |
| 3 | 01/31/2022 02/02/2022 | Introduction - Nodal Analysis Mesh Analysis | ✓ | |
| | | Superposition Theorem, Source Transformation | | ✓ |
| 4 | 02/07/2022 02/09/2022 | Thevenin and Norton Equivalent Circuits | | ✓ |
| | | Model calculations on the above Circuits | | ✓ |
| 5 | 02/14/2022 02/16/2022 | Introduction , Instantaneous and Average Power, Maximum | | |
| 6 | 02/22/2022 02/24/2022 | Average Power Transfer, Effective or RMS Value | ✓ | ✓ |

| | | | | |
|---|---|---|---|---|
| 7 | 02/28/2022 03/02/2022 | Apparent Power and Power Factor, Complex Power, Conservation of AC Power, Power Factor Correction | ✓ | ✓ |
| 8 | 03/07/2022 03/09/2022 | Mid Term Test | MID TERM | ✓ |
| 9 | 03/21/2022 03/23/2022 | Introduction Balanced Three-Phase Voltages. Balanced Wye-Wye Connection, Balanced Wye-Delta connection | | ✓ |
| 10 | 03/28/2022 03/30/2022 | Balanced Delta-Delta Connection Balanced Delta-Wye Connection Power in a balanced System Unbalanced Three-Phase Systems | | |
| 11 | 04/04/2022 04/06/2022 | Introduction, Mutual Inductance, Energy in a Coupled Circuit | | ✓ |
| 12 | 04/11/2022 04/13/2022 | Linear Transformers, Ideal Transformers, Ideal Autotransformers Three-Phase Transformers | ✓ | ✓ |
| 13 | 04/18/2022 04/20/2022 | Introduction , Transfer Function, The Decibel Scale ,Bode Plots , Series Resonance ,Parallel Resonance, Passive Filters , Low-Pass Filter, High-Pass Filter, Band-Pass Filter, Band-Stop Filter. | ✓ | ✓ |
| 14 | 04/25/2022 04/27/2022 | Active Filters, First-Order Low-Pass Filter, First-Order High-Pass Filter Band-Pass Filter Band-Reject (or Notch) Filter Scaling Magnitude Scaling, Frequency Scaling, Magnitude and Frequency Scaling | | ✓ |
| 15 | 05/02/2022 05/04/2022 | Revision | | |
| 16 | 05/09/2022 05/11/2022 | **Project Presentation** | **Finals** | |
| **17** | | **Grades are due to the Registrar** | | |
| | | **Graduation** | | |

**Grading Plan**

| | | | |
|---|---|---|---|
| Assignment | 20% | A = 100 - 90% | |
| Mid-term | 25% | B = 89 - 80% | |
| Final Exam | 25% | C = 79 - 70% | |
| Home Work | 10% | D = 69 - 60% | |
| Quizzes | 20% | F < 60% | |

**Grading Policy**

Each student must do his or her own homework and case studies. Discussion among students on homework and cases is encouraged for clarification of assignments, technical details of using software, and structuring major steps of solutions - especially on the course's Web site. Students must do their own work on the homework and exam. Cheating and Plagiarism are strictly forbidden. Cheating includes but is not limited to: plagiarism, submission of work that is not the student's own, submission or use of falsified data, unauthorized access to exam or assignment, use of unauthorized material during an exam, supplying or communicating unauthorized information for an assignment or exam.

**Participation**

Students are expected to attend and participate in all class activities- as listed above, as it **is 3% of the grade**. Points will be given to students who actively participate in class activities including field trips, laboratories, and ask questions of guest speakers and other presenters.

**Cell phone and headphone use**

Please turn cell phones off or place them on silence or vibrate mode **before** coming to class. Also, answer cell phones **outside of class**(not in the classroom). Exercising cell phone use courtesy is appreciated by both the instructor and classmates. Headphones are to be removed before coming to class.

**Attendance Policy**

Students are expected to regularly attend all classes for which they are registered. A percentage of the student's grade will be based on class attendance and participation. Absence from class, regardless of the reason, does not relieve the student of his/her responsibility to complete all course work by the required deadlines. Furthermore, it is the student's responsibility to obtain notes, handouts, and any other information covered when absent from class and to arrange to make up any in-class assignments or tests if permitted by the instructor. Incomplete or missing assignments will necessarily affect the student's grades. Instructors will report excessive and/or unexplained absences to the Counseling Department for investigation and potential intervention. **Instructors may drop students from the class after three (3) absences unless prior arrangements are made with the instructor to make up work and the instructor deems any excuse acceptable.**

**Study Time Outside of Classfor Face-to-Face Courses**
**For every credit hour spent in a class, a student is expected to spend two hours (2) outside of class studying the course materials**.

**Study Time for Hybrid or Blended Courses**
**For a hybrid or blended course of one (1) credit hour, a student is expected to spend three (3) hours per week studying the course materials.**

**Study Time for Online Courses**
**For an online course of one (1) credit hour, a student is expected to spend four hours (4) per week studying the course materials.**

**Academic Integrity**

Integrity (honesty) is expected of every student in all academic work. The guiding principle of academic integrity is that a student's submitted work must be the student's own. Students who engage in academic dishonesty diminish their education and bring discredit to the University community. Avoid situations likely to compromise academic integrity such as: cheating, facilitating academic dishonesty, and plagiarism; modifying academic work to obtain additional credit in the same class unless approved in advance by the instructor, failure to observe rules of academic integrity established by the instructor.**The use of another person's ideas or work claimed as your own without acknowledging the original source is known as plagiarism and is prohibited**.

**Diné Philosophy of Education**

The Diné Philosophy of Education (DPE) is incorporated into every class for students to become aware of and to understand the significance of the four Diné philosophical elements, including its affiliation with the four directions, four sacred mountains, the four set of thought processes and so forth: Nitsáhákees, Nahát'á, Íína and SiihHasin which are essential and relevant to self-identity, respect and wisdom to achieve career goals successfully.

**Students with Disabilities**

The Navajo Technical University and the (insert the name of your department or school) are committed to serving all enrolled students in a non-discriminatory and accommodating manner. Any student who feels he/she may need an accommodation based on the impact of disability or needs special accommodations should inform NTU in accordance with the procedures of the subsection entitled "Students with Disabilities" under Section 7: Student Support Programs, NTU Student Handbook.

**Email Address**

Students are required to use NTU's email address as a formal mode of communication.

**Final Exam Date: 16/May/2022**