Navajo Technical University	http://www.navajotech.edu
PO Box 849, Crownpoint, NM 87313	Tel: (505) 387-7401

Course Title: Signals and systems (Hybrid)
Course #: EE 301

Credit Hours: 3
Semester: SP 2022
Cap:

Faculty: Sundaram Arumugam   **E-mail**: sarumugam@navajotech.edu
Office: MOD 16   **Office Phone**: 505 979 1959
Office Hours (face-to-face or online): MW 11.00 to 12.20
Preferred Communication (email and/or text; will respond within 24 hours):

Modality (face-to-face, hybrid, or online): Hybrid
Class Location and Meeting Times (if face-to-face): MOD 16 MW 11.00 am to 12.20 AM
Meeting Hours and Online Hours (if hybrid): MW 11.00 am to 12.20 AM
Required Materials: All students may have a laptop
Textbooks: Allan V. Oppenheim et al, "Signals and Systems", 2nd edition, Prentice Hall of India Pvt.
                Ltd, 2004
Reference Books
1. Ashok Ambardar, "Analog and Digital Signal Processing", Thomson Learning Inc., 1999.
2. Douglas K.Lindner, "Signals and Systems", McGraw-Hill International, 1999.
3. Simon Haykin and Barry Van Veen, "Signals and Systems", John Willey & Sons, Inc, second edition 2013

Tools:
Lab Fee (if applicable):

Mission, Vision, and Philosophy
Mission: Navajo Technical University honors Diné culture and language, while educating for the future.
Vision: Navajo Technical University provides an excellent educational experience in a supportive, culturally diverse environment, enabling all community members to grow intellectually, culturally, and economically.
Philosophy: Through the teachings of Nitsáhákees (thinking), Nahátá (planning), Íína (implementing), and Siihasin (reflection), students acquire quality education in diverse fields, while preserving cultural values and gaining economic opportunities.

Course Description

Analytical techniques for continuous-time and discrete time signal, system, and circuit analysis.

Course Outcomes	Course Assessments
An ability to identify, formulate and solve complex engineering problems by applying principles of engineering, science and mathematics	Homework, Class work and assignments
An ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety and welfare as well as global, cultural, social, environmental and economic factors	Quiz, Assignment, Test
An ability to communicate effectively with a range of audiences	Quiz, Assignment, Test
An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgements, which must consider the impact of engineering solutions in global, economic, environmental and societal contexts	
An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks and meet objectives	
An ability to develop and conduct appropriate experimentation, analyze and interpret data and use engineering judgement to draw conclusions	
An ability to acquire and apply new knowledge as needed, using appropriate learning strategies	

Connections to Program Assessment (Course-Embedded Measures)

Upon completion of the course students should be able to:

1. Classify the continuous and discrete time signals and systems.
2. Apply Fourier concepts to analyze the continuous time Systems
3. Apply DTFT and Z transform for the analysis of discrete time signals
4. Determine the discrete time system response using DTFT and Z transform
5. Explain the use of discrete time systems in communication applications

Course Activities

Week	Date	Class Topics/Reading Due	Assignments Due	Assessments
1	01/19/2022	Continuous Time signals (CT signals) – Discrete Time signals (DT signals).	✔	
		Last day to add/drop		

2	01/24/2022 01/26/2022	Elementary CT signals and DT signals – Classification of CT and DT signals – Basic properties of systems	✔	
3	01/31/2022 02/02/2022	Classification CT systems and DT systems – Linear time invariant systems and properties	✔	
4	02/07/2022 02/09/2022	Fourier series analysis: Spectrum of Continuous Time signals		✔
5	02/14/2022 02/16/2022	Physical meaning of Fourier series. Fourier Transform in signal analysis		✔
6	02/22/2022 02/24/2022	Fourier transforms in system analysis: Differential equation – block diagram representation – convolution integral and impulse response.		✔
7	02/28/2022 03/02/2022	Revision		
		Last day to withdraw with "W"		
8	03/07/2022 03/09/2022	**Graduation Petition due**		
			Midterm	
		Midterm grades due		
9	03/21/2022 03/23/2022	Sampling of Continuous Time signals and aliasing – DTFT and properties – z-transform –		
10	03/28/2022 03/30/2022	Properties of z- transform and physical meaning of DTFT	✔	✔
11	04/04/2022 04/06/2022	z transform in Discrete Time signal analysis – DFT basics.	✔	
12	04/11/2022 04/13/2022	Difference equations – Block diagram representation –		✔
13	04/18/2022 04/20/2022	Convolution sum and impulse response – LTI systems analysis using DTFT and z-transforms.		✔
14	04/25/2022 04/27/2022	Applications in communication system: Discrete time sinusoidal amplitude modulation system	✔	
15	05/02/2022 05/04/2022	Amplitude modulation with pulse train carrier system – Pulse amplitude modulation.		✔
16	05/09/2022 05/11/2022	**Project Presentation**	**Finals**	
17				

		Grades due to the Registrar		
		Graduation		

Grading Plan

Homework: 2.5
Class Participation: 2.5
Project(s):   10
Quizzes   10
Mid-term: 25
Final Exam: 25
Portfolio:

A = 100-90%
B = 89-80%
C = 79-70%
D = 69-60%
F = 59% or less

Grading Policy
Students must do their own work. Cheating and plagiarism are strictly forbidden. Cheating includes (but is not limited to) plagiarism, submission of work that is not one's own, submission or use of falsified data, unauthorized access to exams or assignments, use of unauthorized material during an exam, or supplying or communicating unauthorized information for assignments or exams.

Participation
Students are expected to attend and participate in all class activities. Points will be given to students who actively participate in class activities including guest speakers, field trips, laboratories, and all other classroom events.

Cell phone and headphone use
Please turn cell phones off **before** coming to class. Cell phone courtesy is essential to quality classroom learning. Headphones must be removed before coming to class.

Attendance Policy
Students are expected to attend all class sessions. 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 responsibility to complete all course work by 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 Class for Face-to-Face Courses
For every credit hour in class, a student is expected to spend two hours outside of class studying course materials.

Study Time for Hybrid or Blended Courses

For a hybrid or blended course of one credit hour, a student is expected to spend three hours per week studying course materials.

Study Time for Online Courses
For an online course of one credit hour, a student is expected to spend four hours per week studying 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 Siih Hasin which are essential and relevant to self-identity, respect and wisdom to achieve career goals successfully.

At NTU's Zuni Campus, the A:shiwi Philosophy of Education offers essential elements for helping students develop Indigenous and Western understandings. Yam de bena: dap haydoshna: akkya hon detsemak a:wannikwa da: hon de:tsemak a:ts'umme. *Our language and ceremonies allow our people to maintain strength and knowledge.* A:shiwi core values of hon i:yyułashik'yanna:wa (respect), hon delank'oha:willa:wa (kindness and empathy), hon i:yyayumoła:wa (honesty and trustworthiness), and hon kohoł lewuna:wediyahnan, wan hon kela i:tsemanna (think critically) are central to attaining strength and knowledge. They help learners develop positive self-identity, respect, kindness, and critical thinking skills to achieve life goals successfully.

Students with Disabilities
Navajo Technical University is committed to serving all students in a non-discriminatory and accommodating manner. Any student who feels that she or he may need special accommodations should contact the Accommodations Office (http://www.navajotech.edu/student-services#accomodations-services) in accordance with the university's Disability Accommodations Policy (see http://www.navajotech.edu/images/about/policiesDocs/Disability_Exhibit-A_6-26-2018.pdf).

Email Address
Students are required to use NTU's email address for all communications with faculty and staff.

Final Exam Date: 05/09/ 2022