

EE4332 ANTENNA ENGINEERING/EE5321 ANTENNA THEORY SYLLABUS

Classroom. Old Main 205

Time. Monday and Wednesday, 9:00 AM – 10:20 AM

Instructor. Dr. Benjamin C. Flores

Office. Engineering A336

Office Hours. By appointment. May request a virtual appointment by e-mail at least a day in advance

Textbook. Balanis, Constantine. *Antenna Theory: Analysis and Design*, John Wiley & Sons, Incorporated, 2016. *ProQuest Ebook Central*.

<https://ebookcentral.proquest.com/lib/utep/detail.action?docID=7104469>.

Class Notes. Available on Blackboard

Other. Scientific/Graphics calculator, laptop, MATLAB

COURSE DESCRIPTION

This course is an introduction to antenna theory and applications. The course can be taken by senior undergraduates and graduate students interested in a career in telecommunications, defense, and aerospace engineering. An understanding of electromagnetic field theory is needed. Prerequisite: EE3321 Electromagnetic Field Theory.

MAIN TOPICS

1. Electromagnetic propagation in free space
2. Reflection of electromagnetic fields at a perfect conductor boundary
3. TEM field propagation in coaxial cables
4. Antenna fundamentals
5. Friis equation and communication link budget analysis
6. One and two-dimensional antenna array factors
7. Wire antennas: electric dipole, magnetic dipole
8. Antenna arrays

LEARNING OUTCOMES

By the end of the semester, you will be able to:

- 1) Describe and quantify electromagnetic field propagation in free space and reflection by a perfect conductor.
- 2) Describe electromagnetic field propagation in coaxial cables.
- 3) Describe fundamental antenna concepts and parameters.
- 4) Apply the Friis equation to develop a link budget for communications.
- 5) Derive, compute, and analyze radiation patterns of wire antennas and wire antenna arrays.
- 6) Derive, compute, and analyze array factors for one-dimensional and two-dimensional arrays.

EXPECTATIONS

- Stay curious.
- Always keep academic integrity standards.

- Attend and take part in class. Poor attendance (4 or more unexcused absences) may be grounds for an administrative drop
- Take quizzes online before the due date. The score on late quizzes will be no more than 90%.
- Turn in reports on time. The score on late assignments will be no more than 90%.

FINAL GRADE

The final grade is based on online quizzes, MATLAB assignments, an experimental project, and a final comprehensive examination. MATLAB assignments will include added tasks for students taking the course for graduate credit. The percentage score will be decided as follows:

- 30% Quizzes
- 30% MATLAB Assignments
- 15% Antenna Project
- 25% Final Examination

The instructor keeps the right to revise this syllabus for the semester. Such changes will be discussed in class and posted.

CALENDAR

Important Dates

January 15	Martin Luther King, Jr. Holiday
January 31	Census Day
March 11-15	Spring Break
March 29	Cesar Chavez Holiday
April 26	Antenna Project Report Due Date
May 2	Last Day of Classes
May 8	Final Examination (Online) From 10:00 AM to 12:45 PM
May 15	Grades Due

POLICIES

Counseling Center. You are encouraged to go to Counseling and Psychological Services (202 Union West) for personal help as you work through personal concerns. Confidential counseling services are offered in English or in Spanish.

Disabilities. If you have a disability and need special accommodation, please contact the Center for Accommodations and Support Services (CASS). The Center aspires to provide students accommodations and support services to help them pursue their academic, graduation, and career goals. Phone 747-948. E-mail: cass@utep.edu.

AI (Artificial Intelligence) Use. Use of AI technologies or automated tools, particularly generative AI such as ChatGPT or DALL-E, is only allowed with approval from the instructor BEFORE being used. Without permission, you will be expected to think creatively and critically to complete assignments without aid from these tools. If given permission to use any of these tools, students must properly cite and give full credit to the program used upon submission of every relevant assignment. For example, text generated using ChatGPT must be cited:

Chat-GPT (version). Date of query (year/month/day). "Text of your query." Generated using OpenAI. <https://chat.openai.com/> A short paragraph describing how the tool(s) was/were used for the assignment must be included.

CHEGG Use. The use of CHEGG and similar online tutoring services is prohibited.

Academic Integrity. All students must abide by UTEP's academic integrity policies. For detailed information visit the Office of Student Conduct and Conflict Resolution (OSCCR) website. Academic Integrity is a commitment to fundamental values. From these values flow principles of behavior that enable academic communities to translate ideals into action." Specifically, these values are defined as follows:

- Honesty: advances the quest for truth and knowledge by requiring intellectual and personal honesty in learning, teaching, research, and service.
- Trust: fosters a climate of mutual trust, encourages the free exchange of ideas, and enables all to reach their highest potential.
- Fairness: sets up clear standards, practices, and procedures and expects fairness in the interaction of students, faculty, and administrators.
- Respect: recognizes the participatory nature of the learning process and honors and respects a wide range of opinions and ideas.
- Responsibility: upholds personal responsibility and depends upon action in the face of wrongdoing.

Unless otherwise indicated, all assignments, quizzes, and examinations are individual effort. Collusion is unacceptable.

Last Revised January 12, 2024, by Dr. Benajmin C. Flores