Prerequisites:

ELEG 3023 – Signals and Systems, and MATH 3023 – Probability and Statistics.

Textbook:


Reference:


Instructor:

Dr. Lijun Qian
Office: New EE Building Room 332
Phone: (936)857-9908
Email: LiQian@pvamu.edu

Office Hours:

TR 1:00-3:00 PM, M 2:00-4:00 PM, and by appointment

Lectures:

TR 11:00-12:20 PM, NENR 00117

Catalog Description:

(3-0) Credit 3 semester hours, Signals and spectra. Transmission and processing of signals. Continuous-wave modulation and pulse modulation. Baseband pulse transmission and passband digital transmission. Signal space analysis. Information measures. Prerequisites: ELEG 3023 and MATH 3023.

Course Objectives:

The objective of this course is to provide an introduction to the basic principles in the analysis and design of communication systems. Areas of study include signals and spectra, transmission and processing of signals, continuous-wave modulation and pulse modulation, baseband pulse transmission and passband digital transmission, signal space analysis, and information measures. Modern communication systems will also be introduced and used as examples. The use of computer is emphasized through class assignments, projects using MATLAB/SIMULINK and generation of graphical results. Students are expected to gain an understanding of communication theory methodologies employed to design communication systems.

Expected Outcomes:

Upon successful completion of ELEG 4003, the student will be capable of
• Understand basic principles in the analysis and design of communication systems.
• Understand the representation of signals and systems in communications systems.
• Be knowledgeable with MATLAB
• Understand the theoretical and practical concepts of continuous-wave modulation, and pulse modulation.
• Understand signal-space analysis, baseband pulse and passband digital transmissions.
• Understand information measures and data compaction.
• Be able to apply and implement the communication theory techniques necessary for the design of real world communication systems.
• Gain an understanding of communication theory methodologies employed to design communication systems.
• Be able to use computers through class assignments, projects using MATLAB/SIMULINK, and generation of graphical results.

Course Contents:

1. Introduction to communication theory 2 classes
2. Review of probability and random processes 1 class
3. Information theory and source coding 4 classes
4. Review of signals and systems 1 class
5. Continuous-wave modulation 4 classes
6. Introduction to MATLAB and Project #1 1 class
7. Pulse modulation 2 classes
8. Baseband pulse transmission 4 classes
9. Signal-space analysis 2 classes
10. Passband digital transmission 3 classes
11. Project #2 1 class
12. Spread-spectrum modulation 1 class

Grading Policy:

The following grading policy will be used as a guide to determine academic performance:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
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</thead>
<tbody>
<tr>
<td>Homework</td>
<td>10%</td>
</tr>
<tr>
<td>Project</td>
<td>10%</td>
</tr>
<tr>
<td>Quizzes</td>
<td>20%</td>
</tr>
<tr>
<td>Midterm Exam</td>
<td>30%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>30%</td>
</tr>
</tbody>
</table>

Total 100%

Any deviation from the above grading policy will be discussed in advance with the class. Such deviations will be considered only in situations to provide learning enrichment opportunities for the entire class.
Assignments:
Homework and design problems will be assigned to complement each unit of instruction. Students will be required to turn in or demonstrate each assignment. Homework has to be handed in one week from the date that it is assigned. Late homework will NOT be accepted unless due to acceptable reasons (as defined by University policy).

Project Policy:
There will be two assigned projects using MATLAB/SIMULINK. The projects will help the students to absorb the lectures through an interactive approach. Students are required to hand in the project reports.

Exam Policy:
Announced quizzes will be administered. Exams and Quizzes are close-book and close-notes. Every student must take all exams on the assigned dates. Any student who misses an exam without a valid excuse will automatically receive zero for that exam. Make-up exams will be administered in accordance with university policy.

Computer Usage:
The software package, MATLAB/SIMULINK, will be used in the class. It will allow the students to practice the theory and techniques used in communication systems through hands-on experiences.

Ethics:
Cheating or plagiarism on assignments or exams will not be tolerated. Proven cases of ethical violations will result in a zero for the assignment/exam and possibility of further disciplinary actions in accordance with university policies.

Class Attendance:
PVAMU requires regular class attendance. Attending all classes supports full academic development of each student. Excessive absenteeism may result in a student’s course grade being reduced to a grade of “F”. Accumulation of one week of unexcused absences constitutes excessive absenteeism.

Attendance Policy:
See the University Class Attendance Policy in the Undergraduate Catalog page 111.

Student Academic Appeal Process:
Authority and responsibility or assigning grades to students rest with the faculty. However, in those instances where students believe that miscommunication, errors, or unfairness of any kind may have adversely affected the instructor's assessment of their academic performance, the student has a right to appeal by the procedure listed in the Undergraduate Catalog and by doing so within thirty days of receiving the grade or experiencing any other problematic academic event that prompted the complaint.

Americans with Disability (ADA) Statement:
Students with disabilities who believe that they may need an academic adjustment in this class, are encouraged to contact the Office of Disability Services at (936)857-2610/2620 as soon as possible. Once you have received a letter of adjustment from the office, kindly make an appointment with me to discuss appropriate adjustments for this class.
Accreditation:

The National Accreditation Board for Engineering and Technology (ABET) established new criteria (ABET 2000) for all institutions seeking accreditation of engineering programs. The criteria for evaluation include: (1) students, (2) program objectives, (3) program outcomes and assessments, (4) professional component, (5) faculty, (6) facilities, (7) institutional support and financial resources and (8) program criteria.

ELEG-4003 will be used to document the extent in which several criteria are being met within the department. Your homework, assignments, quizzes and exams will be copied and used as documentation for the ABET evaluation team.

ELEG-4003 will be used to document ABET Criteria 3 – Program Outcomes in the following categories:
(e). Ability to identify, formulate and solve engineering problems
(i). A recognition of the need for, and an ability to engage in life-long learning
(j). Knowledge of contemporary issues
(l). Application of probability and statistics