
ECE 4300 (HON)/6300 Section 001
Digital Communications

Class Location/Time: Surrine Hall 216, Tuesday/Thursday, 3:30 p.m. – 4:45 p.m.

Instructor: Dan Noneaker

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Office: 105 Riggs Hall

Phone: (864)656-0100

Office Hours: Tuesday/Thursday, 2:00 p.m. – 3:00 p.m., or by appointment

Course Pre-Requisites: ECE 3170 and ECE 3300 (each with a “C” or better) or equivalent; consent of instructor

Course Description

Introduction to modern digital communication systems, emphasizing modulation and detection, taking into account the effects of noise.

Course Objectives

This course develops the student's understanding of mathematical concepts and techniques used in modeling the behavior of digital communication systems, including random processes, linear filtering of random processes, and frequency-domain analysis of random processes in linear systems. It also develops the student’s understanding of baseband binary data transmission, coherent digital communications, and associated detection techniques.

Required Materials

Textbook: M. B. Pursley, *Introduction to Digital Communication*, Pearson Prentice Hall, 2005.

Topical Outline

Chap. 1: Probability and Random Variables: Review and Notation	1.50 weeks
Chap. 2: Introduction to Random Processes	1.50 weeks
Chap. 3: Linear Filtering of Random Processes	3.00 weeks
Chap. 4: Frequency-Domain Analysis of Random Processes in Linear Systems	1.50 weeks
Chap. 5: Baseband Transmission of Binary Data	4.00 weeks
Chap. 6: Coherent Communications	3.00 weeks

In-Class Exams

0.50 weeks

Grading

Grading weights: homework - 20% (4300 students)/15% (6300 students), project – 5% (6300 students only), mid-term exam - 30%, final exam – 50%.

Grading scale: A: 90 -100 B: 80 - 89 C: 70 - 79 D: 60 - 69 (4300) F : 0 – 59 (4300), F; 0-69 (6300)

Additional Policies

Project: The required project for ECE 6300 students will include reading assignments and analysis, and it may include the use of software such as Matlab. Various components of the project will be assigned and collected at different times during the course, possibly in conjunction with homework assignments. Each project assignment for the project must be turned in at the start of class on the date it is due.

Class handouts: Class notes, homework assignments, and homework solutions will either be provided in class or made available on-line through Canvas (<https://clemson.instructure.com>). It is the responsibility of each student to check the course's Canvas pages at least once per week for any notes, assignments, solutions, or other announcements that may be posted there.

Homework policy: Collaboration with your classmates on homework assignments IS allowed. However, consultation is permitted only with students who are currently enrolled in ECE 4300 (HON)/6300. No material from previous offerings of ECE 4300 (HON)/6300 may be used. Each student must develop and write up each homework solution independently. No copying of solutions from others is allowed, even if the solutions are obtained as a result of collaboration. Each homework assignment must be turned in at the start of class on the date it is due. Late homework will **not** be accepted.

Exam policy: Make-ups for an in-class exam will only be allowed for urgent reasons. Make-up exams must be requested and taken before the scheduled exam date. The final exam must be taken at the scheduled time. (See the one exception below.)

Delayed exam or homework date due to inclement weather: Any exam that was scheduled at the time of a class cancellation due to inclement weather will be given at the next class meeting unless contacted

by the instructor. Any assignments due at the time of a class cancellation due to inclement weather will be due at the next class meeting unless contacted by the instructor. Any extension or postponement of assignments or exams must be granted by the instructor via email or Canvas within 24 hours of the weather-related cancellation.

Reuse from prior courses: No work from previous or other current courses may be reused as material submitted for a grade in this course.

Disagreements regarding grading: Any student who disagrees with the grading of a homework assignment, project, or exam must contest the grading within one week of the date on which the graded material is returned to the class. This must be done by returning the original graded material to the instructor accompanied by a *written* description of the student's disagreement that is sufficiently detailed to allow accurate consideration of the claim.

Attendance, Class meetings: Regular class attendance is strongly recommended. Every attempt will be made to announce class cancellations in advance. A time for make-up lectures will be determined. Students may leave after 15 minutes if no one shows up to teach a class.

Academic Continuity Plan for this Class: Clemson has developed an academic continuity plan for academic operations. Should University administration officially determine that the physical classroom facility is not available, class will be conducted in a virtual (online) format. The University issues official disruption notifications through email/ www/ test notification / social media. When notified, use one of the following links to navigate for Clemson Canvas, where you will find important information about how we will conduct class:

- Primary access link: www.clemson.edu/canvas
- Secondary access link, if needed: <https://clemson.instructure.com/>
- You can also use the Canvas Student App.

Our activities for teaching and learning will occur through our Canvas course. A university-wide Academic Continuity Exercise is scheduled for Wednesday, February 19, 2020, which is a real-time test of the academic continuity plan. Since our course does not meet on that date, it will not be impacted by the Exercise.

The policies in this syllabus are general policies common to all courses in ECE. Course specific information will likely be included in a separate, course specific syllabus. **Students are responsible for reading and understanding the information in both this common syllabus and in the course specific syllabus.**

The syllabus is subject to change based on extenuating circumstances or at the instructor's discretion. **In the event that there is a conflict or discrepancy between the common syllabus and course specific syllabus, the course specific syllabus overrides the common syllabus.**

Attendance

Unless otherwise stated on the course specific syllabus, **students are expected to attend class, and to arrive on time.**

In the event of an **emergency**, students should contact the course instructor, preferably before class or the exam. Students should speak with instructors regarding any scheduled absence as soon as possible and develop a plan for any make-up work, if allowed by the instructor. It is the student's responsibility to secure documentation of emergencies, if required by the instructor. A student with an excessive number of absences may be withdrawn at the discretion of the course instructor.

If the instructor is late, students are expected to wait 15 minutes for the instructor to arrive.

Any further attendance policies in place will be listed on the course specific syllabus and will serve to supplement these policies.

Notification of Absence

The Notification of Absence module in Canvas allows students to quickly notify instructors (via an email) of an absence from class and provides for the following categories: court attendance, death of family member, illness, illness of family member, injury, military duty, religious observance, scheduled surgery, university function, unscheduled hospitalization, other anticipated absence, or other unanticipated absence. The notification form requires a brief explanation, dates and times. Based on the dates and times indicated, instructors are automatically selected, but students may decide which instructors will receive the notification. This does not serve as an "excuse" from class, and students are encouraged to discuss the absence with their instructors, as the instructor is the only person who can excuse an absence. If a student is unable to report the absence electronically, he/she may call the Office of Advocacy and Success at 864-656-0935 for assistance and guidance.

The Office of Advocacy and Success also assists students in identifying various appropriate methods of documenting absences and assists families in using the electronic Notification of Absence system when students are unable to do so themselves.

Academic Continuity Plan

In the event the physical classroom facility becomes unavailable, as determined by the University's administration, class will be conducted in a virtual (online) format. The University issues official disruption notifications through email /www /text notification/social media. When notified, use one of

the following links to navigate to Clemson Canvas where you will find important information about attending class:

- Primary access link: <https://www.clemson.edu/canvas>
- Secondary access link, if needed: <https://clemson.instructure.com/>
- You can also use the Canvas Student App.

February 19, 2020, has been declared an E-Learning Day by the university. A real-time test of the Academic Continuity Plan will be conducted.

Inclement Weather Policy

Any exam that was scheduled at the time of a class cancellation due to inclement weather will be given at the next class meeting unless contacted by the instructor. Any assignments due at the time of a class cancellation due to inclement weather will be due at the next class meeting unless contacted by the instructor. Any extension or postponement of assignments or exams must be granted by the instructor via email or Canvas within 24 hours of the weather related cancellation.

Academic Integrity

As members of the Clemson University community, we have inherited Thomas Green Clemson's vision of this institution as a 'high seminary of learning.' Fundamental to this vision is a mutual commitment to truthfulness, honor, and responsibility, without which we cannot earn the trust and respect of others. Furthermore, we recognize that academic dishonesty detracts from the value of a Clemson degree. Therefore, we shall not tolerate lying, cheating, or stealing in any form. In instances where academic standards may have been compromised, Clemson University has a responsibility to respond appropriately to charges of violations of academic integrity.

Further information on Academic Integrity can be found in the [Undergraduate Announcements](#) and in the [Graduate School Policy Handbook](#).

Access Accommodations

Clemson University values the diversity of our student body as a strength and a critical component of our dynamic community. Students with disabilities or temporary injuries/conditions may require accommodations due to barriers in the structure of facilities, course design, technology used for curricular purposes, or other campus resources. Students who experience a barrier to full access to this class should let the professor know, and make an appointment to meet with a staff member in Student Accessibility Services as soon as possible. You can make an appointment by calling 864-656-6848, by emailing studentaccess@lists.clemson.edu, or by visiting Suite 239 in the Academic Success Center building. Appointments are strongly encouraged – drop-ins will be seen if possible, but there could be a significant wait due to scheduled appointments. Students who receive Academic Access Letters are strongly encouraged to request, obtain and present these to their professors as early in the semester as possible so that accommodations can be made in a timely manner. It is the student's responsibility to follow this process each semester. You can access further information here: <https://www.clemson.edu/academics/studentaccess/index.html>.

Anti-Harassment and Non-Discrimination

Clemson University is committed to a policy of equal opportunity for all persons and does not discriminate on the basis of race, color, religion, sex, sexual orientation, gender, pregnancy, national origin, age, disability, veteran's status, genetic information or protected activity in employment, educational programs and activities, admissions and financial aid. This includes a prohibition against sexual harassment and sexual violence as mandated by Title IX of the Education Amendments of 1972. This policy is located at <http://www.clemson.edu/campus-life/campus-services/access/title-ix/>. Ms. Alesia Smith is the Clemson University Title IX Coordinator, and the Executive Director of Equity Compliance. Her office is located at 110 Holtzendorff Hall, 864.656.3181 (voice) or 864.656.0899 (TDD).

Online Courses

In an online course, you will interact with the content, instructor, and/or classmates on at least a weekly basis through course assignments, asynchronous discussions and/or synchronous sessions as indicated on the course specific syllabus. Further resources for online courses may be found here: <http://www.clemson.edu/online/students/>.

Computing technology questions may be sent to ITHELP@clemson.edu.

Emergency Procedures

Emergency procedures have been posted in all buildings and on all elevators. Students should review these procedures for their own safety. Clemson University is committed to providing a safe campus environment for students, faculty, staff, and visitors. As members of the community, we encourage you to take the following actions to be better prepared in case of an emergency:

- Ensure you are signed up for emergency alerts: <https://www.getrave.com/login/clemson>
- Download the Rave Guardian app to your phone: <https://www.clemson.edu/cusafety/cupd/rave-guardian/>
- Learn what you can do to prepare yourself in the event of an active threat: <http://www.clemson.edu/cusafety/EmergencyManagement/>

Copyright Statement

Materials in some of the courses are copyrighted. They are intended for use only by students registered and enrolled in a particular course and only for instructional activities associated with and for the duration of the course. They may not be retained in another medium or disseminated further. They are provided in compliance with the provisions of the Teach Act. Students should be reminded to refer to the Use of Copyrighted Materials and "Fair Use Guidelines" policy in on the Clemson University website for additional information: <https://clemson.libguides.com/copyright>.