

## COURSE SYLLABUS

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### 1 ECE 3770 - Electrical Communications

#### 2 Meeting Information

4 credits, 5 contact hours Two 75-minute lectures + 100-minute lab

a. **Section 001:**

Lecture: Tuesdays and Thursdays from 8:30am to 9:45am, **Tolentine Hall 210**

<https://villanova.zoom.us/j/91502595959>

Lab: Mondays from 4:00pm to 5:40pm, **Tolentine Hall 217**

<https://villanova.zoom.us/j/98804822607>

#### 3 Course Instructor(s), TA(s)

a. **Section 001:**

Class Instructor: [Edward A. Berde](#)

Office Hours: , or by appt.

Lab Instructor: [Edward A. Berde](#)

Office Hours: , or by appt.

TA(s):

Office Hours: , or by appt.

#### 4 Textbook

Simon Haykin and Michael Moher, *Communication Systems - 5th Edition*, Wiley, 2009. ISBN: 978-0471697909. OPTIONAL.

a. **Other Supplemental Materials:**

#### 5 Specific Course Information

a. **Catalog Description**

Analog and digital communications systems: characterization of communication channels, bandwidth and signal distortion; AM and FM, FM stereo and Dolby noise reduction; sample and hold, source encoding, matched filtering, digital modulations and error control coding. Practicum includes analysis and simulation of products such as compact discs and high speed modems.

b. **Prerequisites:** ECE 3225 or ECE 3245 and ECE 3720; **Co-requisites:** None

c. Required

#### 6 Course-specific Goals

a.

ABET Student Outcomes							
b.	1	2	3	4	5	6	7
	X						

The above student outcomes are defined by the Accreditation Board for Engineering and Technology (ABET) as:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics

## 7 List of Covered Topics

1. COURSE TOPICS
2. 1. Communication Layers / OSI Model (Chap. 1)
3. 2. Representation of signals and systems (Chap. 2)
4. 3. Amplitude Modulation (Chap. 3)
5. 4. Angle Modulation (Chap. 4)
6. 5. Probability Concepts in Communication (Chap. 5)
7. 6. Noise in Communications (Chap. 6)
8. 7. Transition from Analog to Digital (Chap. 7)
9. 8. Matched Filter and Binary Detection (Chap. 8)
10. 9. Digital Modulations (Chap. 9)
11. 10. Selected topics / Review
12. LAB TOPICS
13. Lab dates topics may change to match progression in the course.
14. 0. Installing MATLAB
15. 1. Signal, noise, power and SNR
16. 2. Bandwidth computation
17. 3. Properties of rectangular and RF pulses
18. 4. Amplitude Modulation
19. 5. Frequency Modulation
20. 6. Sampling and Quantization
21. 7. Line Codes and Spectra
22. 8. Matched Filter Detector
23. 9. Digital Modulations
24. 10. Bit Error Rate Estimation

## 8 Tentative Schedule

Tentative schedules for all sections follow. Be sure to refer to the schedule for your specific section, if more than one is provided.

## Tentative Schedule for All Sections

Week or Date	Topics or whatever	Chapters Covered
1	Communication Layers / OSI Model	Chapter 1
2	Representation of Signals and Systems	Chapter 2
3-4	Amplitude Modulation	Chapter 3
5	Angle Modulation	Chapter 4
6	Probability Concepts in Communication	Chapter 5
7	Noise in Communications	Chapter 6
8	Recess	
9	Transition from Analog to Digital	Chapter 7
10-11	Matched Filter and Binary Detection	Chapter 8
12-13	Digital Modulations	Chapter 9
14	Easter	
15	Selected topics / Review	

## 9 Grading Policy

Mid-Term - 22.5Final - 22.5Labs - 35Homework - 20

Letter grade scale: A(93–100), A–(90–92), B+(87–89), B(83–86), B–(80–82), C+(77–79), C(73–76), C–(70–72), D+(67–69), D(63–66), D–(60–62), F(<60)

You are allowed a calculator for exams. You are allowed 1 note-sheet for the mid-term, and 2 note-sheets for the final exam. It is suggested that you reuse your mid-term note-sheet as one of the two for the final.

## 10 HW Assignment and Laboratory Report Submission Policy

Homework and Lab submissions are in PDF format only, uploaded to Blackboard.

Homework and Labs will always be due on a class-day, at the start of the class.

Late assignments are discounted 25

Please check your grades regularly. There is a two week review period after graded work is returned. Beyond that, no grades will be changed.

## 11 Attendance Policy

Attendance is required.

Whenever possible, students should inform the instructor if they plan to be late or absent from class. In all cases, documentation is required to petition for *excused* absences to the Associate Dean for Student and Strategic Programs, Dr. Stephen Jones. The excused absence form is posted at: <https://www1.villanova.edu/villanova/engineering/resources/undergraduates.html>.

Excused absences do not count towards a failure in the course for first year students. Absence from class does not release the student from assigned work. Students who miss an in-class obligation such as an exam, a presentation, etc., due to an excused absence will not be penalized - the instructor may offer a make-up test, arrange an alternative time for a presentation, exempt a student from

the assignment, or provide another arrangement. In the case of illness or injury, the form must be submitted within 24 hours of missing a class. The University's list of excused absences for all students includes the following:

1. Participation in NCAA athletic competitions
2. Participation in special academic events such as: conferences, field trips, project competitions, etc., and in official university business such as student representatives attending meetings related to university governance
3. Attendance at significant events of the immediate family such as: funerals, weddings, etc.
4. Religious holidays - see the University's policy on Religious Holidays
5. College-approved participation in placement activities such as: job interviews, graduate school interviews, job fairs
6. Legally required absence such as: jury duty, court appearance, short-term military service
7. Documented serious illness or disability

## **12 Examination Policy**

The College of Engineering has adopted the following general examination guidelines:

1. Students must arrive before the start of the examination. Under exceptional circumstances a student may need to arrive late, but he/she can enter the examination room no later than five (5) minutes after the start of the exam.
2. Cell phones must be turned off until the student exits the examination room.
3. The official Villanova class attendance policy must be followed when requesting excuses for absences or lateness to an examination.
4. Each student must write and sign the following statement, "I have neither given nor received any unauthorized assistance in the completion of this examination."
5. For online examinations, the instructor may implement video proctoring or other measures to ensure academic integrity. For consent purposes, the instructor will inform students in advance if (s)he plans to use any form of video-proctoring and whether the examination will be recorded.

## **13 Academic Integrity Policy**

The College of Engineering is committed to creating an environment of academic integrity and ethical decision-making that we hope is reflected in the actions of our students and graduates. As Villanova students, integrity is central to the University mission. As engineers, our code of conduct requires us to place honor and integrity at the forefront of everything we do. As engineering students, it is expected that you will begin to adopt these values and instill them into your work habits. Students violating the academic integrity policy will receive a zero on that assignment or exam and the violation will be reported to the Associate Dean for Academic Affairs. The University's academic integrity policy can be found on the following web page:

<https://www1.villanova.edu/villanova/provost/resources/student/policies/integrity.html>.

## **14 Adherence to the Student Code of Conduct**

Students are expected to act in a professional and respectful manner to their fellow students, faculty, and staff. Students should become acquainted with and understand the responsibilities set

forth in the Student Handbook, especially those in the sections on Policy and Regulations. Adherence to university regulations is expected and required for successful completion of the program of studies. Enforcement within the classroom of policies regarding classroom behavior is the responsibility of the faculty member. All other discipline problems are to be referred to the Dean of Students.

## 15 Online Expectations

To foster a professional environment, please wear appropriate clothes, mute if you are not talking to cut down on background noise, refrain from eating, and select an appropriate setting when we are meeting online.

## 16 Inclusive Classroom

This classroom is a place where you will be treated with respect; we welcome individuals of all ages, backgrounds, beliefs, ethnicities, gender, gender identities and expressions, sexual orientation, and other visible and non-visible differences. All members of this class are expected to contribute to a respectful, welcoming, and inclusive environment to allow all among us to learn and flourish.

## 17 Students with Disabilities

It is the policy of the university to make reasonable academic accommodations for qualified individuals with disabilities. If you are a person with a disability (non-physical) please register with the office of Learning Support Services (LSS) by emailing [Learning.support.services@villanova.edu](mailto:Learning.support.services@villanova.edu) or by phoning 610-519-5176 as soon as possible. Registration is *required* in order to receive accommodations.

The Office of Disability Services (ODS) collaborates with students, faculty, staff, and community members to create diverse learning environments that are usable, equitable, inclusive and sustainable. The ODS provides Villanova University students with physical disabilities the necessary support to successfully complete their education and participate in activities available to all students. If you have a diagnosed disability and plan to utilize academic accommodations, please contact and register with Gregory Hannah, advisor to students with disabilities at 610-519-3209 or visit the office on the second floor of the Connelly Center.

## 18 Tutoring Services

Villanova's tutoring services include The Writing Center, The Learner's Studio, and The Center for Speaking and Presentation. These services are offered free of charge to students. Drop in as-needed or book a regular weekly session to supercharge your academic success. Sessions can be 30 or 60 minutes in length.

Register for an account and book sessions in advance at [villanova.mywconline.com](http://villanova.mywconline.com). If you don't see your class listed, request a tutor for a missing subject at: [tutorrequest.villanova.edu](mailto:tutorrequest.villanova.edu) For more information, contact Juliana Struder at [juliana.studer@villanova.edu](mailto:juliana.studer@villanova.edu) or at 610-519-5862.

## 19 Electronics Policy

Classes will typically be recorded and available for students to view, however this is not a guarantee since there have been issues with Zoom recordings in the past.

All recordings are confidential and must not be shared outside of those attending the class.

## 20 Copyright Policy

The materials used in Villanova University courses (“Course Materials”) generally represent the intellectual property of course instructors, third parties and/or the university which may not be disseminated or reproduced in any form for public distribution (e.g., sale, exchange, etc.) without the written permission of the course instructor. Course materials include all written or electronic documents and materials, including syllabi, current and past examination questions/answers, and presentations such as lectures, videos, slides, etc., provided by a course instructor. Course materials may only be used by students enrolled in the course for academic (course-related) purposes.

Published course readings (book chapters, articles, reports, etc.) available in “Blackboard” are copyrighted materials. These works are made available to students through licensed databases or fair use. They are protected by copyright law, and may not be further disseminated or reproduced in any form for distribution (e.g. uploading to websites, sale, exchange, etc.) without the permission of the copyright owner.

Follow these links for more information on [Intellectual Property](#), [Copyright](#), and [Computer Acceptable Use](#).

## 21 Professorial Duties

It is important to note that teaching is one of the many duties that professors perform as part of their job responsibilities. In addition to teaching, professors perform research, advise graduate students, edit journals and review journal articles, serve on committees for the university and professional societies, travel to conferences to remain abreast of current developments and to present their results... to name just a few commitments.