

North Carolina Agricultural and Technical State University
Aggie Digital Collections and Scholarship

Open Educational Resources Syllabus Review

Distance Education and Extended Learning

2020

Introduction to Telecommunications

North Carolina Agricultural and Technical State University

Follow this and additional works at: <https://digital.library.ncat.edu/oerrs>

Recommended Citation

North Carolina Agricultural and Technical State University, "Introduction to Telecommunications" (2020).
Open Educational Resources Syllabus Review. 60.
<https://digital.library.ncat.edu/oerrs/60>

This Book is brought to you for free and open access by the Distance Education and Extended Learning at Aggie Digital Collections and Scholarship. It has been accepted for inclusion in Open Educational Resources Syllabus Review by an authorized administrator of Aggie Digital Collections and Scholarship. For more information, please contact iyanna@ncat.edu, snstewa1@ncat.edu.



COURSE SYLLABUS

College Name: College of Engineering
Department Name: Electrical and Computer Engineering
Course Name: Introduction to Telecommunications

COURSE INFORMATION

- Course Number/Section: ECEN 647
- Term:
- Semester Credit Hours: 3
- Times and Days:
- Class Location:

INSTRUCTOR CONTACT INFORMATION

- Instructor:
- Office Location:
- Office Phone:
- Email Address:

Faculty must notify students of the approximate time and method they can expect to receive an answer to all communications (e.g., email, phone, course messages). Excluding holidays, the response should be provided within 48 hours.

If there's a graduate teaching assistant assigned to work with this course, please include their names also.

STUDENT HOURS

These are times students may visit the professor without an appointment to request the assistance they need.

NOTE: Students are responsible for reading, understanding, and following the syllabus.

: AM / PM – : AM / PM

Monday Tuesday Wednesday Thursday Friday

COURSE PREREQUISITES

NONE

COURSE DESCRIPTION

This course introduces telecommunication networks utilization and design. Emphasis is on using and designing voice, video and image digital networks.

STUDENT LEARNING OBJECTIVES/OUTCOMES (SLO)

Learning outcomes should be specific, measurable, and focused on the content knowledge the students are expected to master and not what the faculty will teach.

If the course is a General Education Course, the SLO should be listed and labeled as "General Education."

SLO 1: Choose the most appropriate technology or process that satisfy the design criteria

SLO 2: Analyze the behaviors of networks and their components.

SLO 3: Demonstrate an understand of the operation and performance of networks and their components

SLO 4: Compose a summary of internetworking technologies as part of a research project

SLO 5: Evaluate the processes and behaviors that increase online learning effectiveness

REQUIRED TEXTBOOKS AND MATERIALS

Any course-level subscriptions and tools linked in Blackboard Learn learning management system (LMS) should be listed here. The Blackboard LMS must have links to their student data privacy statement.

REQUIRED TEXTS:

Tanenbaum, A. S., & Feamster, N. (2019). *Computer networks*. Boston, Mass: Pearson Education.

REQUIRED MATERIALS:

SUGGESTED COURSE MATERIALS

SUGGESTED READINGS/TEXTS:

B S Jeffrey. (2009) *Networking*, Prentice-Hall

Comer, D. (2016). *Computer networks and internets*, Pearson

SUGGESTED MATERIALS:

GRADING POLICY

ASSIGNMENTS AND GRADING POLICY

94% and above	A		76% - 74%	C
93% - 90%	A-		73% - 70%	C-
89% - 87%	B+		69% - 67%	D+
86% - 84%	B		66% - 64%	D
83% - 80%	B-		63% - 60%	F
79% - 77%	C+			

For GRADUATE COURSES: See 2019-2020 Graduate Catalog p.38 for graduate grading scale and Non-Graded Courses

GRADING ALLOCATION

Course grades are based on a weighted grading scale of 100%. The breakdown for the course is as follows: *[Faculty, please adjust according to your course.]*

Category	# of Activities	Percentage Grade Weight
Discussion Boards	15	20%
Assignment	14	25%
Exam	2	45%
Research Project	1	10%
Total	32	100%

COURSE POLICIES

USE OF BLACKBOARD AS THE LEARNING MANAGEMENT SYSTEM

Blackboard is the primary online instructional and course communications platform. Students can access the course syllabus, assignments, grades, and learner support resources. Students are encouraged to protect their login credentials, complete a Blackboard orientation, and log in daily to the course.

Note: Uploading assignments through Blackboard presents a challenge for Chromebook users in locating the files for submission. If you use a Chromebook, please be sure you also have access to a Mac computer or Windows computer so you can fully participate in your Blackboard class. For more information about student computer recommendations, please visit <https://hub.ncat.edu/administration/its/computer-recommendations.php>.

MAKE-UP EXAMS

See << Update Academic Year >> *Undergraduate Bulletin*:

<https://www.ncat.edu/provost/academic-affairs/bulletins/index.php>

**For GRADUATE STUDENTS: See 2019-20 Graduate Catalog p. 54
EXTRA CREDIT**

LATE WORK

SPECIAL ASSIGNMENTS

For GRADUATE STUDENTS: FAILING TO MEET COURSE REQUIREMENTS (Graduate Catalog p.40)

For GRADUATE STUDENTS: CLASS ATTENDANCE (see 2019-20 Graduate Catalog p. 53-54)

Students are expected to attend class and participate on a regular basis in order to successfully achieve course learning outcomes and meet federal financial aid requirements ([34 CFR 668.22](#)). Class attendance in online courses is defined as active participation in academically-related course activities. Active participation may consist of course interactions with the content, classmates, and/or the instructor. Examples of academically-related course activities include, but are not limited to:

- Completing and submitting assignments, quizzes, exams, and other activities within Blackboard or through Blackboard (3rd-party products).
- Participating in course-related synchronous online chats, discussions, or meeting platforms such as Blackboard Collaborate in which participation is tracked.

CLASSROOM CITIZENSHIP

Courtesy, civility, and respect must be the hallmark of your interactions.

COMPLIANCE WITH THE AMERICANS WITH DISABILITIES ACT

North Carolina A&T State University is committed to following the requirements of the Americans with Disabilities Act Amendments Act (ADAAA) and Section 504 of the Rehabilitation Act. If you need an academic accommodation based on the impact of a disability, you must initiate the request with the Office of Accessibility Resources (OARS) and provide documentation in accordance with the Documentation Guidelines at N.C. A&T. Once documentation is received, it will be reviewed. Once approved, you must attend a comprehensive meeting to receive appropriate and reasonable accommodations. If you are a student registered with OARS, you must complete the Accommodation Request Form to have accommodations sent to faculty.

OARS is located in Murphy Hall, Suite 01 and can be reached at 336-334-7765, or by email at accessibilityresources@ncat.edu. Additional information and forms can be found on the internet at <https://www.ncat.edu/provost/academic-affairs/accessibility-resources/index.php>.

Please note: Accommodations are not retroactive and begin once the Disability Verification Form is provided to faculty.

TITLE IX

North Carolina A&T State University is committed to providing a safe learning environment for all students—free of all forms of discrimination and harassment. Sexual misconduct and relationship violence in any form are inconsistent with the university’s mission and core values, violates university policies, and may also violate federal and state law. Faculty members are considered “Responsible Employees” and are required to report incidents of sexual misconduct and relationship violence to the Title IX Coordinator. If you or someone you know has been impacted by sexual harassment, sexual assault, dating or domestic violence, or stalking, please visit the Title IX website to access information about university support and resources. If you would like to speak with someone confidentially, please contact Counseling Services at 336-334-7727 or the Student Health Center at 336-334-7880.

TECHNICAL SUPPORT

If you experience any problems with your A&T account, you may call Client Technology Services (formerly Aggie Tech Support and Help Desk) at 336-334-7195, or visit <https://hub.ncat.edu/administration/its/dept/ats/index.php>.

FIELD TRIP POLICIES / OFF-CAMPUS INSTRUCTION AND COURSE ACTIVITIES

If applicable:

Off-campus, out-of-state, foreign instruction, and activities are subject to state law and university policies and procedures regarding travel and risk-related activities. Information regarding these rules and regulations may be found at <https://www.ncat.edu/campus-life/student-affairs/index.php>.

STUDENT HANDBOOK

<https://www.ncat.edu/campus-life/student-affairs/departments/dean-of-students/student-handbook.php>

STUDENT TRAVEL PROCEDURES AND STUDENT TRAVEL ACTIVITY WAIVER

https://hub.ncat.edu/administration/student-affairs/staff-resources/student_activity_travel_waiver.pdf

OTHER POLICIES (e.g., *Copyright Guidelines, Confidentiality, etc.*)

STUDENT HANDBOOK

<https://www.ncat.edu/campus-life/student-affairs/departments/dean-of-students/student-handbook.php>

[Graduate Catalog](#)

SEXUAL MISCONDUCT POLICY

<https://www.ncat.edu/legal/title-ix/sexual-harassment-and-misconduct-policies/index.php>

FAMILY EDUCATIONAL RIGHTS AND PRIVACY ACT (FERPA)

<https://www.ncat.edu/registrar/ferpa.php>

STUDENT COMPLAINT PROCEDURES

<https://www.ncat.edu/current-students/student-complaint-form.php>

STUDENT CONDUCT AND DISCIPLINE

North Carolina A&T State University has rules and regulations that govern student conduct and discipline meant to ensure the orderly and efficient conduct of the educational enterprise. It is the responsibility of each student to be knowledgeable about these rules and regulations.

Please consult the following about specific policies such as academic dishonesty, cell phones, change of grade, disability services, disruptive behavior, general class attendance, grade appeal, incomplete grades, make-up work, student grievance procedures, withdrawal, etc.:

- Undergraduate Bulletin
<https://www.ncat.edu/provost/academic-affairs/bulletins/index.php>
- Graduate Catalog
<https://www.ncat.edu/tgc/graduate-catalog/index.php>
- Student Handbook
<https://www.ncat.edu/campus-life/student-affairs/departments/dean-of-students/student-handbook.php>

ACADEMIC DISHONESTY POLICY

Academic dishonesty includes but is not limited to the following:

1. Cheating or knowingly assisting another student in committing an act of cheating or other academic dishonesty;
2. Plagiarism (unauthorized use of another's words or ideas as one's own), which includes but is not limited to submitting exams, theses, reports, drawings, laboratory notes or other materials as one's own work when such work has been prepared by or copied from another person;
3. Unauthorized possession of exams or reserved library materials; destroying or hiding source, library or laboratory materials or experiments or any other similar actions;
4. Unauthorized changing of grades, or marking on an exam or in an instructor's grade book or such change of any grade record;
5. Aiding or abetting in the infraction of any of the provisions anticipated under the general standards of student conduct;
6. Hacking into a computer and gaining access to a test or answer key prior to the test being given. N.C. A&T reserves the right to search the emails and computers of any student suspected of such computer hacking (if a police report of the suspected hacking was submitted prior to the search); and
7. Assisting another student in violating any of the above rules.

A student who has committed an act of academic dishonesty has failed to meet a basic requirement of satisfactory academic performance. Thus, academic dishonesty is not only a basis for disciplinary action, but may also affect the evaluation of a student's level of performance. Any student who commits an act of academic dishonesty is subject to disciplinary action.

In instances where a student has clearly been identified as having committed an act of academic dishonesty, an instructor may take appropriate disciplinary action, including loss of credit for an assignment, exam, or project; or awarding a grade of "F" for the course, **subject to review and endorsement by the chairperson and dean.**

For GRADUATE STUDENTS: Reference for academic dishonesty – 2010-2020 Graduate Catalog, p.58-59

ASSIGNMENTS AND ACADEMIC CALENDAR

Include topics, reading assignments, due dates, exam dates, withdrawal dates, pre-registration and registration dates, all holidays, and convocations.*

THE WEEK OF MM/DD/YY	SUBJECT	UNIT LEARNING OUTCOMES (ULO)	READING IN TEXT, ACTIVITY, HOMEWORK, EXAM
	Unit 1: Introduction to Computer Networks	<p>ULO 1: Describe uses of computer networks (SLO 5)</p> <p>ULO 2: Give examples of network hardware and software (SLO 5)</p> <p>ULO 3: Recall the OSI reference model (SLO 5)</p>	<ol style="list-style-type: none"> Read Textbook: Tanenbaum, A. S., & Feamster, N. (2019). <i>Computer networks</i>. Boston, Mass: Pearson Education. a. Chapter 1 Review: Chapter 1 PPT Complete: Assignment #1: End-of-Semester Research Paper (ULO2) Complete: Assignment #2: End-of-Chapter Problems (ULO1,2,3) Complete: Discussion Board#1: What would be different?
	Unit 2: Physical Layer Part I: Media and Fundamental Limits	<p>ULO 1: Contrast various media based on characteristics (SLO 2)</p> <p>ULO 2: Use the appropriate equation of fundamental performance limit to identify expected performance (SLO 3)</p>	<ol style="list-style-type: none"> Read Textbook: Tanenbaum, A. S., & Feamster, N. (2019). <i>Computer networks</i>. Boston, Mass: Pearson Education. a. Chapter 2 (2.1-2.3 only) Introduction to Networking Read: Chapter 2 Slides (1-24) Read: Network Media Slides Read: Fundamental Limits Slides Complete: Assignment #3: End-of-Chapter Problems (ULO 2) Complete: Discussion Board# 2: My favorite media? (ULO 1)
	Unit 3: Physical Layer Part II: Modulation and Multiplexing	<p>ULO 1: Explain how several modulation schemes work and their application (SLO 3)</p> <p>ULO 2: Illustrate the operation of</p>	<ol style="list-style-type: none"> Read Textbook: Tanenbaum, A. S., & Feamster, N. (2019). <i>Computer networks</i>. Boston, Mass: Pearson Education. a. Chapter 2 (2.4,2.8 only) Introduction to Networking

		<p>multiplexing systems (SLO 3)</p>	<ol style="list-style-type: none"> Read: Chapter 2 Slides (25-38 & 55-58) Read: Modulation and Multiplexing Slides Complete: Assignment #4: End-of-Chapter Problems (ULO 1,2) Complete: Discussion Board# 3: What system design constraints might influence modulation or multiplexing of a communication system? (ULO 1,2)
	Unit 4: Data Link Layer	<p>ULO 1: Explain the functions performed by the data link layer and why they are required (SLO 2)</p> <p>ULO 2: Describe the operation of at least one example data link protocol (SLO 2)</p>	<ol style="list-style-type: none"> Read Textbook: Tanenbaum, A. S., & Feamster, N. (2019). <i>Computer networks</i>. Boston, Mass: Pearson Education. <ol style="list-style-type: none"> Chapter 3 (3.1-3.4, 3.6) Modulation, Multiplexing Read: Chapter 3 Slides (1-62) Complete: Discussion Board# 4: As in the previous unit, there are system design and implementation decisions that might influence the data link layer implementation. Discuss one aspect of that in this week's post. (ULO 3) Complete: Assignment #5: End-of-Chapter Problems (ULO 1,2)
	Unit 5: Medium Access Control Sublayer	<p>ULO 1: Explain why channel throughput is impacted by channel utilization (SLO 2)</p> <p>ULO 2: Describe why wired networks need different access protocols than wireless networks (SLO 3)</p> <p>ULO 3: Evaluate the worst-case waiting time to detect a collision (SLO 3)</p>	<ol style="list-style-type: none"> Read Textbook: Tanenbaum, A. S., & Feamster, N. (2019). <i>Computer networks</i>. Boston, Mass: Pearson Education. <ol style="list-style-type: none"> Chapter 4 (4.1-4.2) Read: Chapter 4 Slides _1-21 Complete: Assignment #6: End-of-Chapter Problems (ULO 2,3) Complete: Discussion Board#5 (ULO 1,2)
	Unit 6: Ethernet	<p>ULO 1: Calculate the worst-case time-to-collision for Ethernet (SLO 3)</p>	<ol style="list-style-type: none"> Read Textbook: Tanenbaum, A. S., & Feamster, N. (2019). <i>Computer networks</i>. Boston, Mass: Pearson

		<p>ULO 2: Describe the effect of collision domain on Ethernet performance (SLO 3)</p> <p>ULO 3: Recall the fields of an Ethernet frame (SLO 2)</p>	<p>Education.</p> <p>a. Chapter 4 (4.3 only)</p> <p>2. Read: Chapter 4 Slides _22-33_</p> <p>3. Complete: Assignment #7: End-of-Chapter Problems (ULO 1,2,3)</p> <p>4. Complete: Discussion Board#6 (ULO 1,2,3)</p>
	Unit 7: The Network Layer: Part I	<p>ULO 1: Recall the functions of the Network Layer (SLO 3)</p> <p>ULO 2: Differentiate Connectionless and Connection-Oriented Networks (SLO 3)</p> <p>ULO 3: Describe how decentralized (connectionless) routing occurs (SLO 2)</p>	<p>1. Read Textbook: Tanenbaum, A. S., & Feamster, N. (2019). <i>Computer networks</i>. Boston, Mass: Pearson Education.</p> <p>a. Chapter 5 (5.1– 5.4)</p> <p>2. Read: Chapter 5 Slides _1-46</p> <p>3. Complete: Assignment #8: End-of-Chapter Problems (ULO 1,2,3)</p> <p>4. Complete: Discussion Board#7 (ULO 1,2)</p>
	Unit 8: The Network Layer: Part II	<p>ULO 1: Juxtapose a variety of network configurations (SLO 2)</p> <p>ULO 2: Describe the process of moving packets between networked endpoints (SLO 2)</p> <p>ULO 3: Perform calculations required to create a network mask (SLO 2)</p>	<p>1. Read Textbook: Tanenbaum, A. S., & Feamster, N. (2019). <i>Computer networks</i>. Boston, Mass: Pearson Education.</p> <p>a. Chapter 5 (5.5, 5.7)</p> <p>2. Read: Chapter 5 Slides _47-96_</p> <p>3. Complete: Assignment #9: End-of-Chapter Problems (ULO 1,2,3)</p> <p>4. Complete: Discussion Board#8 (ULO 1,2)</p>
	Unit 9: Mid-Semester Review	<p>ULO 1: Identify the key elements presented thus far (SLO 2)</p> <p>ULO 2: Evaluate likely topics for the midterm examination (SLO 2)</p>	<p>1. Read: Chapter 5 Slides _1-46</p> <p>2. Complete: Exam #1 (ULO 1,2)</p> <p>3. Complete: Discussion Board #9: Midterm exam (ULO 1,2)</p>
	Unit 10: Subnetting: Part I	<p>ULO 1: Breakdown an IP address to extract all relevant information (SLO 3)</p> <p>ULO 2: Identify how to determine the “Class” of an IP address (SLO 3)</p>	<p>1. Read: Subnet I Presentation</p> <p>2. Complete: Assignment #10: Worksheets (ULO 2,3)</p> <p>3. Complete: Discussion Board #10: Subnet I (ULO 1,2,3)</p>

		ULO 3: Convert dotted decimal form addresses into binary (SLO 3)	
	Unit 11: Subnetting II	ULO 1: Apply subnetting process to generate subnet masks (SLO 4) ULO 2: Analyze network information to determine which subnet an IP address belongs to (SLO 4) ULO 3: Evaluate the relationship between two subnetted IP addresses (SLO 3)	<ol style="list-style-type: none"> 1. Review: Presentation from Unit 8 2. Review: Presentation, MarchMadness 3. Review: Subnetting PDF worksheet, "Subnet Question" 4. Complete: Assignment #11 (ULO 1,2,3) 5. Complete: Discussion Board #11 (ULO 2,3)
	Unit 12: Routing	ULO 1: Perform the steps required to route a datagram (SLO 4) ULO 2: Calculate the subnets of a source and destination (SLO 4)	<ol style="list-style-type: none"> 1. Read Textbook: Tanenbaum, A. S., & Feamster, N. (2019). <i>Computer networks</i>. Boston, Mass: Pearson Education. a. Chapter 5: The Network Layer 2. Read: Chapter 5 Lecture Notes (pp. 8-24, 28-29, and 86-93) 3. Read: IP Routing Click for more options 4. Complete: Assignment #12: Routing Homework (ULO 1,2)
	Unit 13: Transport Layer	ULO 1: Compare connection-oriented and connection-less protocols (SLO 3) ULO 2: Describe the operation of the TCP protocol (SLO 4) ULO 3: Evaluate the performance potential of UDP (SLO 4)	<ol style="list-style-type: none"> 1. Read Textbook: Tanenbaum, A. S., & Feamster, N. (2019). <i>Computer networks</i>. Boston, Mass: Pearson Education. a. Chapter 6: The Transport Layer 1. Read: Chapter 6 Lecture Notes Click for more options (pp. 8-24, 28-29, and 86-93) 2. Complete: Assignment #13: TCP protocol Homework(ULO 1,2,3)
	Unit 14: Network Address Translation and Port Forwarding	ULO 1: Explain how network address translation works (SLO 4)	<ol style="list-style-type: none"> 1. View Power Point: Network Address Translation (NAT) 2. Complete: Assignment #14: NAT Table Generation Homework (ULO 1,3)

		<p>ULO 2: Describe how port forwarding operates (SLO 4)</p> <p>ULO 3: Evaluate the performance differences of the two processes (SLO 4)</p>	<p>3. Complete: Discussion Board #14 (ULO 1,2,3)</p>
	Unit 15: Network Security	<p>ULO 1: List the fundamental attack principles. (SLO 5)</p> <p>ULO 2: Implement a simple encryption scheme. (SLO 5)</p> <p>ULO 3: Compare the advantages and disadvantages of public and private key encryption. (SLO 5)</p>	<p>1. Read Textbook: Tanenbaum, A. S., & Feamster, N. (2019). <i>Computer networks</i>. Boston, Mass: Pearson Education. a) Chapter 8: Security</p> <p>2. Read: Chapter 8 Lecture Notes</p> <p>3. Complete: Assignment #1: End-of-Semester Research Paper (ULO 1,2,3)</p> <p>4. Complete: Assignment #15: End-of-Chapter Problems Homework (ULO 1,2,3)</p> <p>5. Complete: Final Exam #1 (ULO 1,2,3)</p> <p>6. Complete: Discussion Board #15: Network Security (ULO 1,3)</p>

* These descriptions and timelines are subject to change at the discretion of the instructor.