

Syllabus COMM 4557
Communication Networks
Online Class (with two introductory Live Zoom Sessions)

The Ohio State University
School of Communication

Instructor:

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Online Office Hours via Carmen Zoom:

Thursdays 8:30 a.m. – 12:30 p.m.

(Please also see on Carmen/Canvas Homepage)

Course Objectives, Description, and Work Expectation

How is sound transmitted over the telephone network? How does data flow across the Internet? What is the difference between a telephone call and a Skype call? Between a television broadcast and a YouTube video? These are a few of the questions that you should be able to answer after completing this course. The focus of the class is on developing a basic understanding of telecommunication technologies, from radio broadcasting and PSTN to streaming audio and HDTV. We will cover a variety of contemporary telecommunication systems, addressing both what they can do and how they work. We will pay particular attention to the similarities and differences between digital and analog technologies. For a better understanding of communication technologies, we will also go into technological details such as wave propagation, data compression, cryptography and several others.

With these skills, you will be better prepared to

- Read tech news
- Explain technologies to those who are less knowledgeable
- Think critically about key capabilities and limitations of existing and novel telecommunication systems
- Follow and participate in technology discussions with engineers and other experts when working together in development projects.

What do I need to do for class?

Short Version: Work through the online material/lectures regularly as soon as they are released, reflect on the topics, complete assignments on time, participate in class activities and cooperate with others when possible or mandatory, always cite sources of used material/information, follow academic conduct rules, ask questions and also have a little fun with the class.

Longer Version: Follow online instructions very carefully, participate in online class activities and assignments, take your notes while working through class content, ask questions if you are not sure about a topic, and reflect on things based on your own experiences and ideas. The more you are willing to reflect on class topics and activities, the better the chance to make it a really good learning experience for you and others with whom you may work together.

This class is an online class with a combination of asynchronous tasks/activities and teamwork (plus two introductory live Zoom sessions). While the goal of online teaching is to increase learning flexibility and efficiency, students are more challenged to set up their own learning schedule and pace. It is important to keep an oversight of all the online assignments and deadlines to complete the class successfully. All necessary information to do so is posted on Carmen under Modules, is part of this syllabus, and is provided through email.

This is a 3-credit hour course. According to Ohio State policy, students should expect around 3 hours per week of time spent with instruction material and Carmen activities and 6 hours of homework (reading and assignment preparation, for example) to receive a grade of (C) average. However, the time necessary to succeed in class also depends on every student's learning pace.

How this Course Works – Live Sessions, Online Material, Posting

The class is online but has two live sessions via video conferencing (the live sessions are not mandatory but helpful). One is on the first lecture day of the semester for a general course introduction and the second one is to introduce the final paper assignment during the second half of the semester, both at 2:20 to 3:40 p.m. (see schedule in this syllabus).

All other lectures and activities happen asynchronous and provide more flexibility, but still follow a specific schedule (based on the original Tuesday/Thursday schedule for this class – see registrar system).

New lecture material will be uploaded on Carmen on Tuesdays and Thursdays (at 12:01 a.m.) with assignment due dates on those same days (at 11:59 p.m.). Thus, by blocking the originally scheduled class times for work in this class will help to stay on track and keep deadlines.

The posted online material will consist of narrated PowerPoint presentations with my voice recorded (as MP4 file) and presentation handouts with accompanying texts (both as PDF files). You can use the MP4 video or the PDF files or both, depending what works best for you. Just try it out, but I recommend using both. Additionally, you will find instructions for the bigger assignments as PDF files.

All material will be available under Modules on Carmen/Canvas.

You will receive regular information about the posting of new lecture content, upcoming assignments, and news at the beginning of each week on Mondays per email. Thus, make sure to check your email regularly. However, information about tasks and deadlines is always posted under each topic header under Modules, which follows the class schedule in the syllabus.

Copyright Disclaimer

Per the Study Code of Conduct, you may not share recorded lectures or other class materials with anybody not officially enrolled in this class. Sharing material like this is a copyright violation.

Used Text (required):

Goleniewski, Lillian. (2007). *Telecommunications Essentials* (2nd ed.). Upper Saddle River: Addison Wesley.

This book is available through the library as an eBook. If not otherwise stated, chapter numbers in the class schedule (at the end of this syllabus) relate to the book. The page numbers will only help if you should use the printed version

(eBook and print version differ here). If you use the eBook use chapter numbers and topic keywords.

I also recommend using optional dictionaries for this class, e.g. the one listed here:

Newton, Harry. (2018). *Newton's Telecom Dictionary* (31th ed.). New York: Flatiron Publishing.

We will also make use of some popular web sites (e.g. HowStuffWorks and Wikipedia). Links to the relevant entries are included in this syllabus. Unless otherwise noted, you should read all sections of the articles/entries listed. I also encourage you to pursue links within the required entries if there are terms or topics that you do not understand or want to know more about.

Please be aware that although I have reviewed these sources and consider them to be quite reliable in regard to the specific topics, the content can change, and the entries may sometimes contain errors. Cross checking the information you find here with the dictionary and lecture is strongly encouraged.

Class Web site via Carmen/Canvas:

Please be sure to check Carmen regularly also for news or changes,...

Assignments and Exams

All assignments need to be uploaded to the corresponding folder, accessible on Carmen under Modules (and Assignments/Discussions) on the assigned days. Papers or text entries in wrong folders will not count and will lead to a zero for the assignment.

Always follow instructions and upload your work in the correct format. For example, if an assignment uses Carmen discussions and you are asked to upload a Word or PDF document, do not use the text/comment field to post your work. Text/Comment fields are to be used for comments or text only if the instructions explicitly say so.

Also, be prepared to sign up for a team at the beginning of the semester, necessary for important assignments (see sign-up time window in class schedule below).

Exams (online)

The information taught before an exam will be tested on this exam. It will not be tested on the following exam again (exams in this class are not cumulative).

Exams are designed as Carmen Quizzes (multiple-choice), based on the material from the readings and lectures. The overall exam time is 45 minutes for 27 questions (about 1 ½ minutes per question). Make-up exams will only be offered for medical or other similar, legitimate reasons.

Failure to take an exam will result in a zero for the exam.

The online exams have to be completed within the scheduled time window.

Starting toward the end of the time window may reduce the time students have to answer the questions. For example: time window is 9:00 a.m. to 9:00 p.m. on the scheduled day and students have 45 minutes to complete. A late start at 8:30 p.m. will leave 30 minutes to complete the exam and not 45 minutes because the online exam closes when the time window elapses.

Topic Reflection Assignments (TRA)

Online Lectures (materials) are posted on Tuesdays and Thursdays. On those online lecture days, there will be Topic Reflection Assignments (15 over the course of the semester) where you should take a few minutes to work on an assigned topic. TRAs must be completed on those days (within a time window of about 24 hours – 12:01 a.m. – 11:59 p.m.). They should help you to reflect specific topics of the current lecture. Review the lecture material under Modules regularly on those days not to miss any assignment deadlines.

Two of the TRAs provide the opportunity for bonus points. Only 13 of the 15 TRAs are necessary to obtain the chance to score 100% in this class.

(Example: You have completed all 15 TRAs successfully = 26 regular points + 4 bonus point; you have completed 13 TRAs successfully = 26 regular points and 0 bonus points.)

Topic Reflection Exercises (TRE)

There will be three topic reflection exercises where students are asked to work together on a class topic. Those exercises will allow you to learn about views and attitudes of fellow students and how to take those different thoughts into consideration to discuss the topics and/or to come to a mutual decision. Your team has about 48 hours from the assigned day to complete the exercise.

The sign-up for the teams will happen at the beginning of the semester (see class schedule).

Lecture Review Discussions (LRD)

There will be 6 lecture review discussions throughout the semester where students are asked to answer topic related questions based on previous lectures (also very useful as exam preparation). After answering the questions and uploading their paper to the corresponding discussion folder, students need to read and comment on a paper of another student. The lecture review discussions have to be completed on those assigned days to receive credit. Detailed instructions will be posted on Carmen.

Team Assignment – Final Paper

There will be a team assignment that needs to be completed together with other students. Every team member will get the same score. Detailed instructions will be provided during our second live Zoom meeting during the second half of the semester (see schedule). Late submissions will be penalized. The teams will be the same as for the TREs and assigned at the beginning of the semester.

Grade Distribution

Topic Reflection Assignments	22% (26 points – 13*2)
Topic Reflection Exercises	8% (9 points – 3*3)
Lecture Review Discussions	15% (18 points – 6*3)
Team Assignment (Final Paper)	9% (10 points)
Exams (weighted equally)	46% (54 points – 2*27)
<i>Total</i>	<i>100% (117 points)</i>

The grading in this class is based on OSU's grading scheme (posted on Carmen under Syllabus and Modules).

Grade Change Requests

Students are strongly encouraged to check posted points for all assignments and exams regularly on Carmen. Any missing points have to be reported 14 days after posting of the score in question. Later requests will not be considered. The last day for requesting any score changes is the first day of finals week, Monday, 4/26/2021.

Late Assignments

Assignment papers, text entries, or comments need to be uploaded/posted by the deadline to the corresponding assignment folder or discussion to receive credit. Submissions to wrong folders cannot be considered for grading. Late submissions won't be accepted if not explicitly stated in the assignment instructions.

Makeup of missed Assignments

Completing missed assignments late will only be allowed for serious, legitimate reasons (documentation needed like doctor's note). Students are required to inform the instructor before the originally scheduled assignment/exam time. Otherwise, a makeup opportunity cannot be granted. If a student is missing more than 3 assignments throughout the semester, make-up opportunities cannot be granted even if documentation is presented.

Instructor Illness or Absence

If the *instructor* is too ill to teach the course for a period of time, the designated backup for this course will step in. You will be notified via email from the School of Communication.

Instructor Feedback and Response Times

I am always happy to help and suggest that you make use of my office hours, especially with more personal or more complex questions and any grade/assignment issues. Just email me to set up a Carmen Zoom meeting. If you have technical problems, you should call 614-688-HELP for the OSU helpline.

You can also email me with questions, and I will reply within 24 hours on school days. There will also be a Q&A Discussion on Carmen (on our homepage and

under Discussions) where you can ask topic related questions. I will reply to those questions within 24 hours on school days.

You can expect to see your points for smaller assignments within 2-3 days and for larger ones within 7-14 days.

Discussion and Communication Guidelines

The best learning experience is when everyone is participating in class activities and discussions, sharing topic related views, standpoints, and experiences. We are all different and can learn a lot from each other. To take full advantage of this, we need a positive learning environment of respectful and thoughtful communication.

I expect that everybody is supportive to others so that we all feel safe, even if we should disagree on certain topics/issues. Thus, please remain civilized and respectful in your email and discussions. You will see that I work very hard to provide a positive learning experience.

Also keep in mind to cite your sources. For most assignments you are asked to use APA style for all used sources (for online sources, be sure to include a link).

Course Technology

For help with your password, university e-mail, Carmen, or any other technology issues, questions, or requests, contact the OSU IT Service Desk. Standard support hours are available at <https://ocio.osu.edu/help/hours>, and support for urgent issues is available 24x7.

- **Carmen:**

- Carmen, Ohio State's Learning Management System, will be used to host materials and activities throughout this course. To access Carmen ([Carmen accessibility](#)), visit [Carmen.osu.edu](https://carmen.osu.edu). Log in to Carmen using your name.# and password. If you have not setup a name.# and password, visit my.osu.edu.
- Help guides on the use of Carmen can be found at <https://resourcecenter.odee.osu.edu/carmen>

- **Carmen Zoom:**

- Office hours will be held through Ohio State's conferencing platform, Carmen Zoom in addition to some live class sessions.
- Students may use the audio and video functions if a webcam and microphone are available. If not, there is still a chat function within Carmen

Zoom for the student to live chat with the professor or TA in the virtual office hours room.

- [Carmen Zoom](#) help guide

Baseline technical skills necessary for online courses

- Basic computer and web-browsing skills
- Navigating Carmen and Carmen Zoom

Necessary equipment

- Computer: current Mac (OS X) or PC (Windows 7+) with high-speed internet connection
- Web cam and microphone

Necessary software

- Word processor with the ability to save files under .doc, .docx, .rtf, or .pdf. Most popular word processing software programs including Microsoft Word and Mac Pages have these abilities.
- OSU students have access to Microsoft Office products free of charge. To install, please visit https://osuitsm.service-now.com/selfservice/kb_view.do?sysparm_article=kb04733

Other Course Policies

Student Academic Services

Arts and Sciences Advising and Academic Services' website provides support for student academic success. Information on advising issues such as tutoring, transfer credits, academic standing, and contact information for Arts and Sciences advisors can be obtained through this website. The site is: <http://advising.osu.edu/welcome.shtml>

Student Services

The Student Service Center assists with financial aid matters, tuition and fee payments. Please see their site at: <http://ssc.osu.edu>

Accessibility Accommodations for Students with Disabilities

The University strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on your disability (including mental health, chronic or temporary medical conditions), please let me know via email immediately so that we can privately discuss options. You are also welcome to register with Student Life Disability Services to establish reasonable accommodations. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: slds@osu.edu ; 614-292-3307; slds.osu.edu ; 098 Baker Hall, 113 W. 12th Avenue.

Academic Integrity and Academic Misconduct

It is imperative that all work you submit be your own. When you use someone else's ideas, you must give proper credit to the original author(s). Please adhere to the 5th edition of the APA manual of style when citing others' work.

According to the Committee on Academic Misconduct "Academic misconduct is defined as any activity which tends to compromise the academic integrity of the institution, or subvert the educational process." Further, the term "academic misconduct" includes all forms of student academic misconduct wherever committed and is illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). It is the responsibility of the Committee of Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. For additional information, see the Code of Student Conduct (<http://studentlife.osu.edu/csc/>).

Diversity

The School of Communication at The Ohio State University embraces and maintains an environment that respects diverse traditions, heritages, experiences, and people. Our commitment to diversity moves beyond mere tolerance to recognizing, understanding, and welcoming the contributions of

diverse groups and the value group members possess as individuals. In our School, the faculty, students, and staff are dedicated to building a tradition of diversity with principles of equal opportunity, personal respect, and the intellectual interests of those who comprise diverse cultures.

Title IX

Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories (e.g., race). If you or someone you know has been sexually harassed or assaulted, you may find the appropriate resources at <http://titleix.osu.edu> or by contacting the Ohio State Title IX Coordinator, Kellie Brennan, at titleix@osu.edu

PLEASE TAKE CARE OF YOURSELF (Mental Health Statement)

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. The Ohio State University offers services to assist you with addressing these and other concerns you may be experiencing.

If you are or someone you know is suffering from any of the aforementioned conditions, you can learn more about the broad range of confidential mental health services available on campus via the Office of Student Life's Counseling and Consultation Service (CCS) by visiting ccs.osu.edu or calling 614-292-5766. CCS is located on the 4th Floor of the Younkin Success Center and 10th Floor of Lincoln Tower. You can reach an on-call counselor when CCS is closed at 614-292-5766.

If you are thinking of harming yourself or need a safe, non-judgmental place to talk, or if you are worried about someone else and need advice about what to do, 24 hour emergency help is also available through the Suicide Prevention Hotline (Columbus: 614-221-5445 / National: 800-273-8255); or text (4hope to 741741); or at suicidepreventionlifeline.org

Class Schedule and Reading List

Day	Date	Topic	Readings
January			
T	12 2:20-3:40 p.m.	Live Zoom Session Course Overview and Introduction Team sign-up for assignments between 1/13 and 1/22/2020	
R	14	Waves and Signals TRA1 Due 11:59 p.m.	Telekom Introduction + Chapter 13: p. 550 (start at history) – 557 (stop before phased array) http://science.howstuffworks.com/humans-hear-in-space1.htm http://www.youtube.com/watch?v=-oGwFDQNjps http://en.wikipedia.org/wiki/Waveform http://en.wikipedia.org/wiki/Frequency (stop before examples) http://en.wikipedia.org/wiki/Amplitude
T	19	Modulation and Spectrum TRA2 Due 11:59 p.m.	Chapter 1: p. 11 (start at Spectrum) – 18, Chapter 1: Multiplexing 23 – 26 (stop before TDM) http://en.wikipedia.org/wiki/Modulation (Just intro, stop before content) http://en.wikipedia.org/wiki/Amplitude_modulation (just introduction and figure 1) http://en.wikipedia.org/wiki/Frequency_modulation (Introduction, "radio", and associated figures) http://en.wikipedia.org/wiki/Bandwidth_(signal_processing) (just introduction) http://en.wikipedia.org/wiki/Multiplexing (introduction and frequency-division multiplexing)
R	21	Transmission Basics TRA3 Due 11:59 p.m.	Chapter 1: p. 1-11 (stop before Spectrum) http://electronics.howstuffworks.com/radio-spectrum.htm (first three pages of entry)
T	26	Digital Basics TRA4 Due 11:59 p.m.	Chapter 1: Analog/Digital Transmission p. 20-23 (esp. table 1.1), Chapter 5: Coding Schemes p. 160-162 http://computer.howstuffworks.com/bytes.htm (first four pages of entry) http://electronics.howstuffworks.com/analog-digital.htm (first four pages of entry)

R	28	Lecture Review Discussion 1 Due 11:59 p.m.	
February			
T	2	Digital Representation TRA5 Due 11:59 p.m.	http://www.library.cornell.edu/preservation/tutorial/intro/intro-01.html (Just "Basic Terminology" section, 8 pages in all http://www.wfu.edu/~matthews/misc/DigPhotog/alias/ https://en.wikipedia.org/wiki/Raster_graphics https://en.wikipedia.org/wiki/Vector_graphics
R	4	Compression & Cryptography TRA6 Due 11:59 p.m.	Chapter 9: p. 375 (start with encryption) - 381, Chapter 10: Digital Video p. 390-396 http://computer.howstuffworks.com/file-compression.htm http://computer.howstuffworks.com/encryption.htm (first four pages of entry)
T	9	Digital Data Transmission TRA7 Due 11:59 p.m.	Chapter 1: p. 26-27 (TDM), Chapter 3: Networking and Switching Modes p. 83-87, Packet Switching 92-94, Chapter 6: p., 173-187 (stop before LAN interconnection), Chapter 7: Packet Switched Networks p. 215-219 http://en.wikipedia.org/wiki/Circuit_switching (introduction) http://en.wikipedia.org/wiki/Multiplexing (time-division multiplexing) http://en.wikipedia.org/wiki/Packet_switching (Stop at X.25 vs. Frame Relay packet switching)
R	11	Lecture Review Discussion 2 Due 11:59 p.m.	
T	16	Digital Network Performance TRA8 Due 11:59 p.m.	Chapter 5: Modems and Modulation p. 154-156, Forms of Data Transmission 159-160, Chapter 15: Bluetooth p. 661-664, Chapter 10: Broadband Applications p. 388-390 (stop before digital video), Chapter 15: WiMax p. 621-622 and Table 15.3 http://computer.howstuffworks.com/cable-modem.htm (All) http://electronics.howstuffworks.com/dsl.htm (All) http://computer.howstuffworks.com/wimax.htm http://en.wikipedia.org/wiki/Bitrate (first section only)

R	18	Communication Technology - Use and Dependency Topic Reflection Exercise 1 Due 2/19 11:59 p.m.	
T	23	Instructional Break	
R	25	Lecture Review Discussion 3 Due 11:59 p.m.	
March			
T	2	Online Exam I Between 9:00 a.m. - 9:00 p.m.	
R	4	The Internet: Protocol Stack, IP TRA9 Due 11:59 p.m.	Chapter 5: OSI Reference Model p. 165-171, Chapter 8: Internet Infrastructure and IP p. 245-256 (stop before TCP) <a href="http://computer.howstuffworks.com/internet-
infrastructure.htm">http://computer.howstuffworks.com/internet- infrastructure.htm http://computer.howstuffworks.com/osi.htm http://en.wikipedia.org/wiki/Internet_Protocol
T	9	The Internet: TCP, UDP, Firewall TRA10 Due 11:59 p.m.	Chapter 8: p. 256-257 (TCP and UDP), Internet Network Architecture 264-275 (stop before IPv6) http://en.wikipedia.org/wiki/Transmission_Control_Protocol (introduction, "historical origin", "network function", and "data transfer") http://en.wikipedia.org/wiki/User_Datagram_Protocol (just introduction) http://compnetworking.about.com/od/networkprotocols/ l/aa071200b.htm
R	11	The Internet: DNS, HTTP TRA11 Due 11:59 p.m.	Chapter 8: p. 280 (DNS) - 289 (stop before Internet challenges) http://en.wikipedia.org/wiki/Http http://www.iana.org/gtld/gtld.htm
T	16	Lecture Review Discussion 4 Due 11:59 p.m.	
R	18	Advanced Internet Topics: Cookies, SSL, Email TRA12 Due 11:59 p.m.	http://computer.howstuffworks.com/cookie.htm (all pages) http://computer.howstuffworks.com/encryption4.htm (this is the fifth page of the encryption entry) http://computer.howstuffworks.com/question369.htm http://communication.howstuffworks.com/email.htm

T	23	Privacy and Security Issues Online Topic Reflection Exercise 2 Due 3/24 11:59 p.m.	
R	25 2:20-3:40 p.m.	Live Zoom Meeting Introduction Team Assignment <i>Final Paper</i>	
T	30	Telephony: PSTN & Voice Over IP TRA13 Due 11:59 p.m.	Chapter 4: PSTN p. 103-113, Signaling Systems p. 129 – 135 http://electronics.howstuffworks.com/telephone.htm http://en.wikipedia.org/wiki/Local_exchange_carrier Chapter 4: p. 140-142, Chapter 9: p. 334 (start at SIP) - 342 (stop before IPTV) http://electronics.howstuffworks.com/ip-telephony.htm
April			
R	1	Instructional Break	
T	6	Mobile Telephony TRA14 Due 11:59 p.m.	Chapter 12: Wireless Broadband p. 529, Chapter 14: Wireless WAN's p. 579-614 https://en.wikipedia.org/wiki/Mobile_telephony https://en.wikipedia.org/wiki/4G https://en.wikipedia.org/wiki/5G
R	8	Lecture Review Discussion 5 Due 11:59 p.m.	
T	13	Audio and Video Broadcasting TRA15 Due 11:59 p.m.	http://electronics.howstuffworks.com/radio8.htm (this page only -- this is review) http://electronics.howstuffworks.com/question323.htm http://electronics.howstuffworks.com/hd-radio.htm http://electronics.howstuffworks.com/satellite-radio.htm http://www.howstuffworks.com/internet-radio.htm http://www.howstuffworks.com/dtv.htm http://electronics.howstuffworks.com/cable-tv.htm http://www.howstuffworks.com/satellite-tv.htm http://en.wikipedia.org/wiki/IPTV (Stop before "markets", but you can skim "History")
R	15	Future Technologies Topic Reflection Exercise 3 Due 4/16 11:59 p.m.	

T	20	Lecture Review Discussion 6 Due 11:59 p.m.	
R	22	Online Exam II Between 9:00 a.m. - 9:00 p.m.	
M	26	<i>Deadline Final Paper</i> <i>Due 11:59 p.m.</i>	

Only two days in the schedule are labeled as “Live Zoom Session” so that all other days relate to asynchronous learning/activities where students can work at their own pace within the given deadlines for assignments.

Caveat

I reserve the right to update or change portions of this syllabus in order to make the class a better experience for everyone. Any changes will be posted to Carmen.