



Telecommunications Management

Summer 2024

Course Information*	<p>Course Number: 95705 Section: Z Course Title: Telecommunications Management Units: 12.0</p> <p>Instructor: Dr. Sakir Yucel Email: syucel@andrew.cmu.edu Office Hours: TBA and by appointment</p> <p>Teaching Assistant: TBA</p>
Prerequisites (if applicable)	<p>Prerequisite is an introductory course on Information Systems.</p>
Description*	<p>The purpose of this course is to provide an understanding of the key technical, managerial and policy issues in the effective development and use of telecommunication solutions by organizations. Discussion of technology and technology trends will be set in the context of applications. Topics covered will include basic concepts of telecommunication technologies, Internet and intranet technologies, issues related to the operational and strategic use of the technology, digital disruption and digital transformation happening in the markets, economics and policy aspects of telecommunication, the changing structure of the telecommunications industry, software defined networks, virtualization, cloud computing, content delivery networks, wireless, broadband, broadband policies, network neutrality, various applications of telecom. A number of case studies will be included in the curriculum providing students the opportunity to apply the concepts to real world situations.</p>
Course Overview	<p>We live in a very dynamic and interconnected world, which is largely driven by advances in telecommunication technology. This course is aimed at equipping students with technical, business and policy related tools to comprehend changes in telecommunication technology and its effect on markets, consumers and society. In accordance with this goal, the course covers the managerial and technical issues surrounding telecommunication and information technologies. We will cover the fundamentals of data transmission and networking, Internet, various networking technologies, interworking and peering, which are all crucial to understand the telecommunications from a technical perspective. We will review the history of telecommunication policy and look into today's challenging policy issues such as network neutrality. We will cover recent approaches to networking such as software defined networking and network function virtualization. We will cover various relevant topics including CDNs, cloud computing, virtualization, Internet of Things, wireless, broadband, policy issues around wireless and broadband. We will study the fundamental micro-economic concepts at high level and discuss how the economic concepts are applicable to the telecommunications industry. We will talk about the characteristics of digital economy, digital disruption and digital transformation. We will try to understand the basic concepts about disruptive technologies, innovation and technology adoption, and learn about methodologies to evaluate them. Covid has influenced the technology and particularly telecom technologies and how we approach them. We will include discussions around pandemic and crisis in general, and cover digital disruption and digital transformations during crisis. Various impacts of pandemic will be relevant in lectures, discussions, and case study presentations. The framework we develop while covering these topics will be used to analyze real world examples in the form of case studies. Case studies will focus on the recent developments in telecommunication technologies and the</p>

	<p>disruptive impact they are having on industries as diverse as music, video, television, business operations, commerce and social networks. All discussions will be set in the context of products, services and applications that are widely used in today’s industry. We will look at the different players in the complex ecosystems and how they compete and cooperate to attract consumers and dominate the marketplace.</p>
<p>Course Materials (if applicable)</p>	<p>Lecture Videos Links to lecture videos will be available for streaming and download in the Canvas page.</p> <p>Textbooks Recommended textbook is Business Data Communications by William Stallings and Thomas Case, 7th ed. This book provides a broad overview of many of the technologies discussed in the lectures. However, no single textbook covers the course material in the detail and depth required for this class and therefore additional references will be made available in the semester. Check the textbook website http://williamstallings.com/BusinessDataComm/ regularly during the semester. The site provides access to telecom resources related to each chapter in the text. Following books are good references:</p> <ul style="list-style-type: none"> • For a coverage of the broadband telecom field from technological, business and policy angles, “Broadband Telecommunications Technologies and Management”, 1st Edition by Riaz Esmailzadeh is recommended. • For an in depth coverage of data networks, Kurose & Ross "Computer Networking: A Top-Down Approach" 7th ed (2017) and Kurose “Computer Networking” 8th ed (2021) are excellent references. • For microeconomics, the following book is an excellent reference: Microeconomics: Hal R. Varian, Intermediate Microeconomics: A Modern Approach (Ninth Edition or later), W. W. Norton & Company. Note that microeconomics concepts will be covered at high level without getting into mathematical modeling. This book is a good reference for those who want to dwell into microeconomics topics. <p>Case Studies The case studies to be covered in the course will be available for your purchase as a course pack at the Harvard Business Publishing page at the beginning of the semester.</p>
<p>Evaluation* Method</p>	<p>Grading Policies Your grade is based on performance in assignments, case work, a term paper, a final exam and your contribution to discussion forums. These components are weighted as follows:</p> <ul style="list-style-type: none"> • Final Exam: 25% • Term paper: 30% • Assignments: 25% • Case Work: 15% • Discussion Forums Contribution: 5% <p>The breakdown for the term paper grade:</p> <ul style="list-style-type: none"> • Proposal: 5% • Progress report: 10% • Final Report: 15% <p>The breakdown for the assignments: each assignment is equal weight unless specified otherwise. The breakdown for the case work:</p> <ul style="list-style-type: none"> • 10% for group performance • 5% for individual performance <p>Final letter grades will be assigned as follows:</p> <ul style="list-style-type: none"> • A range (A-, A, A+) - Your total weighted average: >=90% • B range (B-, B, B+) - Your total weighted average: 81% - <90% • C range (C-, C, C+) - Your total weighted average: 72% - <81%

- D (Failing) - Your total weighted average: <72%

The distribution within a given letter grade range will be curved i.e. based on relative class performance.

Exam

There will be an open-notes final exam. It will be limited in duration (e.g. 3 hours). The final exam will be held over a time period of 3 days. Students must choose a time window for the duration of the exam during this period and complete the exam in one attempt. More information about the exam will be provided later in the semester.

Term Paper

Students are required to deliver a term paper in the following phases:

- The proposal which describes the focus and objectives, the methodology of research, the value proposition of the research and the initial list of references.
- The progress report which provides updates on progress in relation to the proposal.
- The final report.

See "General Information About Term Paper and Assignments" page for more information about the term paper.

Assignments

The assignments are designed to give students the opportunity to research relevant material in lecture notes and online resources to produce high quality answers. There will be 4 assignments. An optional assignment may be offered providing opportunity to override a low score of a regular assignment. These assignments are to be done individually. You are free to consult any external resources for reference, but you need to provide proper citation for anything you use apart from the lecture notes. See "General Information About Term Paper and Assignments" link under "Assignments" menu for more information.

Grading criteria for each homework assignment will be provided together with the assignment.

Case Work

Case studies are meant to elicit critical thinking on your part and apply the concepts we learn in class to real world situations. Students will enter their preferences on the case studies in a survey and teams will be formed to prepare a presentation about a case. The group will be given the opportunity to present the case to the rest of the class over a virtual meeting platform. Attendance to the case presentations is not required but highly recommended. Grades on the case work will depend upon the state of preparedness, slides, setting up the context of the case, coverage of technical material (if any), coverage of relevant economic/business concepts, summarization of important takeaways from the case. Individual grades may vary within a team due to peer assessment of the performance. Details will be available later during the semester.

Discussion Forums

Discussion forums provide a great opportunity to have virtual asynchronous conversations related to the lecture content.

There is one forum specifically created for the discussion of the course material, homework assignments and lectures. That forum is "Forum to Discuss Course Material". You may post your questions about the course there. The TAs and I will be looking at the posted messages regularly and provide feedback. Students are encouraged to provide answers to the questions on this discussion board. This board allows posting anonymous messages. Personal questions, on the other hand, should be directly addressed to the instructor and/or to the TA, rather than being posted on the discussion boards. Note that postings into the "Forum to Discuss Course Material" will not earn any credit.

The forum named "Forum to Discuss Telecom Topics" allows you to discuss various aspects of telecom (e.g. business, social, policy, technology). By using this forum, you will have chance to engage in topics that interest you and talk about them with your classmates. Also, you are encouraged to reply to the postings of other students expressing your viewpoint. You will earn 0.5% for each posting up to 5%

	<p>total. Only postings time stamped before the due date will contribute toward your discussion forums grade.</p> <p>The forum named "Forum to Discuss Term Paper Topics" allows you to share your research on your term paper topic with classmates and receive feedback from each other. Similar to the "Forum to Discuss Telecom Topics" forum, this forum earns you credit toward your discussion forums contribution.</p> <p>Since this is a distant section, we may not have opportunity to meet each other physically but we can still get to know one another. For this purpose, I created a forum where I would ask each of you to post a hello message to your classmates and introduce yourself. It is named "Introducing Yourself". Participating into this forum is optional and will not get you any credit toward your discussion forums contribution just similarly to the "Forum to Discuss Course Material".</p> <p>None of the forums is moderated at this time. I expect you to observe polite conduct in your postings and to act responsively. I keep the right to remove any posting and moderate the forums if I feel necessary (although I never exercised it in my previous classes).</p>
Learning/Course Objectives*	<p>This course is designed to teach the most fundamental technical principles of telecom, telecom market dynamics, telecom policy, and to discuss how all these interact with management and business practice. Students will study a number of case studies that will cover these principles in the context of real-world situations that have been challenging practitioners in the main telecom and information companies around the world. Students are expected to learn about the dynamics of the structure of the industry and about the role of factors such as economies of scale, disruptive technologies, network externalities and regulation. The course relies heavily on learning-by-doing by offering frameworks that students can use to anticipate the opportunities and challenges that new information and communication technologies can bring.</p>
Grading Scale*	<p>Final letter grades will be assigned as follows.</p> <p>A range (A-, A, A+) - Your total weighted average: $\geq 90\%$</p> <p>B range (B-, B, B+) - Your total weighted average: $81\% - < 90\%$</p> <p>C range (C-, C, C+) - Your total weighted average: $72\% - < 81\%$</p> <p>D (Failing) - Your total weighted average: $< 72\%$</p> <p>The distribution within a given letter grade range will be curved i.e. based on relative class performance.</p>
Grading Rubric/explanation of grades (optional but encouraged)	<p>Grading criteria for each homework assignment will be provided together with the assignment.</p>
Live Meetings	<p>There will be two types of live meetings as outlined below. These live meetings will be recorded and recordings will be made available to students. Attendance to these meetings is not mandatory.</p> <ol style="list-style-type: none"> 1. Students will be grouped into teams to deliver case presentation on their assigned case study. Teams will be allowed to choose the presentation time based on their availability. Only the presenting students will have to attend these sessions. 2. Weekly review sessions. These sessions will be used to go over the course material. Students are encouraged to attend these sessions and ask questions on course material, but their attendance will not be required.
Course/Topical Outline:*	<p>Schedule of lectures and due dates for deliverables will be available at the beginning of the semester.</p>
Plagiarism and cheating notice*	<p>Academic Dishonesty, Cheating and Plagiarism</p> <p>Everyone is expected to abide by the plagiarism policy of the university. Particularly pay attention to the following:</p> <ul style="list-style-type: none"> • Using someone else's work without proper citation is considered plagiarism. • Cutting and pasting without proper quotation marks and without citation is considered plagiarism. • Copying someone else's homework is considered plagiarism.

	<ul style="list-style-type: none"> • Copying answers from previous years' answer sheets is considered plagiarism. <p>Any violation of this policy will result in an automatic "F" grade and a report to the academic action committee. Please review CMU's policy here: https://www.cmu.edu/policies/student-and-student-life/academic-integrity.html</p> <p>In case of doubt, contact me or the program director Allison Frankoski.</p>
Course Policies & Expectations *	<p>Expectations from Students</p> <p>A high level of individual student motivation and initiative will be expected. Students will be expected to use extensive online resources on telecommunications technology and management. Self-guided research, experimentation, and an entrepreneurial attitude are important components of the course.</p> <p>Things to Do Right Away</p> <ul style="list-style-type: none"> • Purchase copies of the case studies via the course pack link in "Textbooks and Other Resources" section. • Familiarize yourself with the various features of the Canvas course website. In particular familiarize yourself with how to post/edit messages on the class discussion board. • Start thinking about your term paper topic and feel free to discuss any initial ideas with me.
Take Care of Yourself	<p>Do your best to maintain a healthy lifestyle this semester by eating well, exercising, avoiding drugs and alcohol, getting enough sleep and taking some time to relax. This will help you achieve your goals and cope with stress.</p> <p>All of us benefit from support during times of struggle. You are not alone. There are many helpful resources available on campus and an important part of the college experience is learning how to ask for help. Asking for support sooner rather than later is often helpful.</p> <p>If you or anyone you know experiences any academic stress, difficult life events, or feelings like anxiety or depression, we strongly encourage you to seek support. Counseling and Psychological Services (CaPS) is here to help: call 412-268-2922 and visit their website at http://www.cmu.edu/counseling/. Consider reaching out to a friend, faculty or family member you trust for help getting connected to the support that can help.</p>
Accommodations for Students with Disabilities	<p>If you have a disability and have an accommodations letter from the Disability Resources office, I encourage you to discuss your accommodations and needs with me as early in the semester as possible. I will work with you to ensure that accommodations are provided as appropriate. If you suspect that you may have a disability and would benefit from accommodations but are not yet registered with the Office of Disability Resources, I encourage you to contact them at access@andrew.cmu.edu.</p>