Course Description

This module is also available as a concatenated page, suitable for printing or saving as a PDF for offline viewing.

MET CS625

Business Data Communication and Networks

Computer networks dominate today's information technologies and are essential for a business to compete in the global marketplace. This course is intended to provide you with knowledge and understanding of basic concepts of data communication in business environments as well as of computer networks and protocols. The material will be presented in the context of the Internet reference model, with particular focus on the network, transport, and application layers. Frequently used protocols are presented, which illustrate concepts and provide insight into practical networks. Examples include widely used network protocols, such as the TCP/IP suite. Those who have completed the course will have the basic knowledge of computer networks and data communications.

Course Overview

This course begins with a brief history of communications, information systems, and the Internet in order to help the student understand the evolution of different network models and current standards. Application architectures, and their relevance to specific network-based applications—such as the Web, email, ftp, telnet, and IM—are presented. The Physical Layer is presented in the form of basic data communications concepts over both wired and wireless transmission media. Data Link layer responsibilities including media access, error control, data link protocols, and transmission efficiency are covered. The basic functions of the Network and Transport layers are explained in context of design issues, addressing,

routing, and internetworking. The TCP/IP suite of protocols is used for an in-depth example. LANs are covered in detail including components, Ethernet, design, and performance. Wireless networks including Wi-Fi, WiMAX, Bluetooth, and best practices in WLAN design are then presented. Networks are covered in depth in order to address the needs of an enterprise backbone, including components, architectures, virtual LANs, technologies, and best practices in design. Moving from the local area networking environment, metropolitan and wide area networking technologies are covered. The course then concludes with significant coverage of network security, network design, and network management.

Course Objectives

The course will enable you to:

- Understand the role of network layering, the Internet Layer Model, and current standards
- Understand the major application architectures and applications that follow them
- Be familiar with the different types of network circuits and media, as well as understand how analog/digital data is transmitted with analog/digital signals
- Understand how communication is done reliably
- Understand how messages are moved from end to end via routers
- Understand LAN and WLAN technologies and be able to design a LAN and a WLAN
- Understand enterprise LAN technologies, including backbones, ATM, gigabit Ethernet
- Understand circuit switched, dedicated circuit, and packet switched services
- Understand the overall design of the Internet and access technologies
- Understand network security, design, and management issues

Learning Outcomes

By successfully completing this course you will be able to:

- Use and understand networking terminology
- Be able to design a small network
- Choose a networking technology suitable to solve a business problem
- Successfully communicate with networking professionals
- Apply basic network and security management techniques
- Understand and evaluate new networking technologies
- Be able to advance your knowledge of networking by taking additional courses or self study

Instructor

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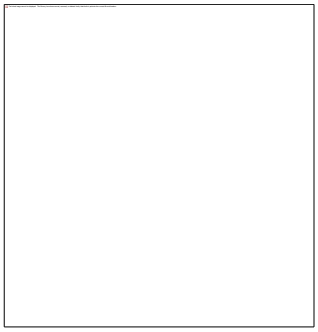

The best way to reach me outside of our class sessions is to email me at my BU email address. I normally pick up my course and regular email many times per day.

Initial Course Developer

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Professor Chitkushev is the Chairman of the Computer Science Department at Boston University's Metropolitan College, director of Information Security and Biometrics Laboratories, and the Coordinator of the Graduate program in Telecommunications.

He is co-founder and Associate Director of the Boston University Center for Reliable Information Systems and Cyber Security (RISCS), which was established to promote and coordinate research on reliable and secure computation and information assurance education by developing ideas and tools to protect critical

computational infrastructure and producing a growing number of highly educated research professionals with expertise in information reliability and security.

Professor Chitkushev was part of the academic team that played a crucial role in the initiatives leading to Boston University's designation as a National Center of Academic Excellence in Information Assurance Education and Research by the National Security Agency and U.S. Department of Homeland Security.

Throughout his career, Dr. Chitkushev has made scientific contributions and has lectured in the areas of data communications, advanced Internet technologies, medical informatics, and network security. He has served on a number of scientific committees and international telecom standard bodies, and has been a review panelist for the National Science Foundation.

Professor Chitkushev holds a Ph.D. in Biomedical Engineering (Bioinformatics) from Boston University, an M.S. in Biomedical Engineering from Medical College of Virginia, and an M.S. and B.S in Electronics and Telecommunications from University of Belgrade, Yugoslavia. He has extensive international industrial and academic consulting experience in the areas of telecommunications, data assurance, and biomedical informatics, with a number of leading IT corporations and government agencies.

Course Materials and Resources

Required Course Materials

Fitzgerald, J., Dennis, A., & Durcikova, A. (2014). *Business data communications and networking* (12th ed.). Hoboken, NJ: John Wiley & Sons. ISBN 9781118891681.

This textbook can be purchased from Barnes and Noble at Boston University. This course does *not* require you to have access to any premium content or access cards from the textbook. We rely only on the standard textbook content itself, so it is possible for you to obtain a used copy or an electronic copy if you are interested.

Boston University Library Information

Boston University has created a set of videos to help orient you to the online resources at your disposal. An introduction to the series is below:

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Download

All of the videos in the series are available on the Online Library Resources page, which is also accessible from the Campus Bookmarks section of your Online Campus Dashboard. Please feel free to make use of them.

As Boston University students, you have full access to the BU Library. From any computer, you can gain access to anything at the library that is electronically formatted. To connect to the library, use the link http://www.bu.edu/library. You may use the library's content whether you are connected through your online course or not, by confirming your status as a BU community member using your Kerberos password.

Once in the library system, you can use the links under “Resources” and “Collections” to find databases, eJournals, and eBooks, as well as search the library by subject. Some other useful links follow:

Go to http://www.bu.edu/library/research/collections to access eBooks and eJournals directly.

If you have questions about library resources, go to http://www.bu.edu/library/help/ask-a-librarian to email the library or use the live-chat feature.

To locate course eReserves, go to http://www.bu.edu/library/services/reserves.

Please note that you are not to post attachments of the required or other readings in the water cooler or other areas of the course, as it is an infringement on copyright laws and department policy. All students have access to the library system and will need to develop research skills that include how to find articles through library systems and databases.

Study Guide

The following material is collected here for your convenience. The study guides can also be accessed at the beginning of each weekly lecture.

Module 1 Study Guide and Deliverables

Readings: Online lecture material plus the following chapters from the textbook: Chapter 1 - Introduction to Networking; Chapter 2 - Application Layer; Chapter 3 - Physical Layer

Assignments: Concepts Assignment 1 and Lab 1 ***Refer to Calendar for Due Dates***

Assessments: Quiz 1 ***Refer to Calendar for Due Dates***

Module 2 Study Guide and Deliverables

Readings: Online lecture material plus the following chapters from the textbook: Chapter 4 - Data Link Layer; Chapter 5 - Network and Transport Layers

Assignments: Concepts Assignment 2 and Lab 2 ***Refer to Calendar for Due Dates***

Assessments: Quiz 2 ***Refer to Calendar for Due Dates***

Module 3 Study Guide and Deliverables

Readings: Online lecture material plus the following chapters from the textbook: Chapter 6 - Network Design; Chapter 7 - Wired and Wireless Local Area Networks

Assignments: Concepts Assignment 3 and Lab 3 ***Refer to Calendar for Due Dates***

Assessments: Quiz 3 d ***Refer to Calendar for Due Dates***

Module 4 Study Guide and Deliverables

Readings: Online lecture material plus the following chapters from the textbook: Chapter 8 - Backbone Networks; Chapter 9 - Wide Area Networks

Assignments: Concepts Assignment 4 and Lab 4 ***Refer to Calendar for Due Dates***

Assessments: Quiz 4 ***Refer to Calendar for Due Dates***

Module 5 Study Guide and Deliverables

Readings: Online lecture material plus the following chapters from the textbook: Chapter 10 - The Internet; Chapter 11 - Network Security

Assignments: Concepts Assignment 5 and Lab 5 ***Refer to Calendar for Due Dates***

Assessments: Quiz 5 due ***Refer to Calendar for Due Dates***

Module 6 Study Guide and Deliverables

Readings: Online lecture material plus the following chapters from the textbook: Chapter 12 - Network Management

Assignments: Concepts Assignment 6 and Lab 6 ***Refer to Calendar for Due Dates***

Assessments: Quiz 6 ***Refer to Calendar for Due Dates***

Final Exam Details

The Computer Science department requires that all final exams in the online program be proctored. Consequently, the Final Exam in this course will be proctored and available from **Date TBD**.

The final exam is a three-hour, closed-book comprehensive exam covering the material from the entire course. The exam will only be accessible during the final exam period. Students can access it from either the Assessments section of the course or from the Final Exam module on the home page. The exam is proctored, and the proctor will need to enter the password to start the exam.

During the final exam, students are required to work independently without using any additional notes or material. Final is a closed-book exam so accessing online material, lecture

notes, emails, discussion boards, chat features or any other online material during the exam is not permitted, and some features of the online course may be disabled.

Please note that student activity during the final exam is monitored and recorded in log files. Accessing any online or other material during the final exam is a major violation of the course policy and can result in serious academic disciplinary actions.

Course Grading Information

Course Structure

The course is organized as a sequence of six main weekly modules, plus a seventh module for the proctored final exam. Each of the six main modules includes assigned textbook readings and online lectures in text, graphic, and video formats. You have an opportunity each week to participate in supplemental, synchronous Live Classroom sessions where you can interact with me and our lead facilitator; these live sessions are recorded if you are unable to attend the session. The first five modules include graded concepts assignments, labs, and quizzes, and the sixth module homework includes a graded quiz.

Grade Weighting

The following table summarizes the six kinds of graded items and the default percentage of grades determined by each of these kinds of graded items. Each of these graded items is explained below.

note: Due to the mixed sections and combinations thereof which makeup this class the complete / detailed grading structure by will be explained in class. If you have any questions you should address them directly with your instructor.

Reference - Base Grading Distribution	
Deliverable	**Weight**

Discussion	5%
Labs	10%
Quizzes	10%
Assignments	15%
Term Project	30%
Final Exam	30%
TOTAL	100%

Concepts Assignments / Homework

In each of the first five weekly modules you will complete concepts assignments / Homework that help you solidify the concepts you have read in the textbook and online lectures. Due to the availability of the Homework Assignments from the first weekly lecture, No assignment will be accepted late for credit.

Labs

In each of the first weekly modules you will complete hands-on labs that help you gain important technical skills in data communications and IP networking. Due to the availability of the Labs from the first weekly lecture, No assignment will be accepted late for credit.

Quizzes

There is one graded quiz in each of the first modules, As the timing permits there will be a minimum of four up to six quizzes. The results for your quiz will be released as soon as possible after the quiz closes. When the quizzes are released you will be able to see the questions, your answers, the correct answers, and tutorial material, just as in the review quizzes. Your professor releases the quiz results. Quizzes may be taken after the results have been released, with permission, but the scores on late quizzes do not count on your grade.

The Final Exam

Your final exam will be offered in the last week of the course. You will have three hours to complete it; there should be plenty of time. Your final exam will be proctored and you must take it in person on campus on the scheduled evening. The intent of the final exam is to evaluate your mastery of the course material, so that if you learn the course material well, you will do well on the final exam.

If for some reason you cannot take the exam on the scheduled evening, you must notify the Instructor as soon as this is know, and alternate arrangements may be made for you to come

on campus and take it during the day - before the scheduled exam date. If you cannot take it when required you should opt to take an Incomplete and take it as soon as possible thereafter.

Note that your overall final exam score will be released to you, but the questions and answers will not be released. This is to maintain the integrity of the final exam for concurrent and future online and on-campus runnings of this course.

Grading Structure

Your assignments, quizzes, term project, and final exam will be graded on a percentage basis. The following table summarizes typical correspondence of percentage grades and letter grades for individual graded items.

Letter Grade	Approximate percentage grade range	Grade Points
A	95–100	4.0
A−	90–94.9	3.7

B+	87–89.9	3.3
B	83–86.9	3.0
B−	80-82.9	2.7
C+	77–79.9	2.3
C	73–76.9	2.0
C−	70-72.9	1.7
D	60–69.9	1.0

F	0–59.9	0

Note that C is the lowest grade that satisfies degree requirements in graduate courses and that you need to maintain a grade point average of 3.0 or better to graduate. For more information, see the MSCIS Academic Policies online manual.

The percentage ranges above are approximate. Your letter grade is determined by your professor as the best overall measure of how well you have demonstrated that you understand the material, taking into separate consideration your performance in the quizzes, assignments, term project, and final exam. Additional grading criteria include any substantial difference in your performance on the proctored final exam and the general trend of your scores over the term.

Lateness

We recognize that emergencies and unexpected but significant extensions in work hours occur in professional and personal lives. If one occurs that prevents your completion of a course item by a deadline, please make this plain to your facilitator and instructor. This must be done well in advance of the deadline (unless it is an emergency that makes this impossible, of course), and should be accompanied by particulars that back it up. Additional documentation may be requested. If this is permitted at the discretion of the instructor, a minimum of Twenty points will otherwise be deducted for late submissions on a per day basis: we want to be fair to everyone in this process, including the vast majority of you who sacrifice so much to submit your homework on time in this demanding schedule.

Lab Grading Rubric

All lab submissions are evaluated on the correctness and completeness of the answers and answer justifications, as well as the applicability and correct implementation of the methodologies used to derive the answers.

Your facilitator will grade your assignment submissions with the grading rubric below. When mapping the letter grade to a corresponding number grade, your facilitator will use the following letter-to-number mappings:

A+	A	A−	B+	B	B−	C+	C	C−	D	F
100	96	92	88	85	82	78	75	72	67	0

To avoid subjectivity and to maintain consistency across facilitator groups, facilitators will use only the letter to number mappings given above, and will not attempt to further distinguish the number grade. For example, if you receive an A, your lab grade will be a 96, and facilitators will not attempt to distinguish between a 97, 96, or 95. If you receive an A−, your lab grade will be a 92, and facilitators will not attempt to distinguish between a 93, 92, or 91.

The table below summarizes the qualities the lab submission must demonstrate to be assigned the corresponding grade.

	Letter Grade	Qualities Demonstrated by the Lab Submission
Answers and Methodology **Measures the correctness and completeness of the answers and methodology used for lab steps**	A+	The answers, and answer justifications where required, are entirely complete and correct for all steps. The methodologies used to derive the answers are entirely applicable to the given problems, and are implemented correctly, for all steps. There are absolutely no technical or other errors present.
	A	One insignificant technical or other error is present, but otherwise the answers, and answer justifications where required, are entirely complete and correct for all steps. Excluding the insignificant error, the methodologies used to derive the answers are entirely applicable to the given problems, and are implemented correctly, for all steps.
	A−	One or two technical or other errors are present, but otherwise the answers, and answer justifications where required, are entirely complete and correct for all steps. Excluding the one or two errors, the methodologies used to derive the answers are entirely applicable to the given

		problems, and are implemented correctly, for all steps.
	B+	The answers, and answer justifications where required, are complete and correct for most steps. Likewise, the methodologies used to derive the answers are applicable to the given problems, and are implemented correctly, for most steps.
	B	The answers are correct or almost correct for most steps. Some answer justifications may be missing or incorrect, but most are present and correct where required. The methodologies used to derive the answers are applicable and implemented correctly for most steps.
	B−	The answers, and answer justifications where required, are complete and correct for about ¾ of the steps. Likewise, the methodologies used to derive the answers are applicable to the given problems, and are implemented correctly, for about ¾ of the steps.
	C+	The answers are correct or almost correct for about ¾ of the steps. Some answer justifications may be missing or incorrect. The methodologies used to derive the answers are applicable to the given problems, and are implemented correctly, for about ¾ of the steps.

	C	The answers for about half of the steps are either missing or incorrect. Likewise, the methodologies used for about half of the steps are either inapplicable to the given problem, or are implemented incorrectly. Some answer justifications are missing or incorrect where required.
	C−	The answers for most of the steps are either missing or incorrect. Likewise, the methodologies used for most of the steps are either inapplicable to the given problem, or are implemented incorrectly. Some answer justifications are missing or incorrect where required.
	D	The answers for almost all of the steps are either missing or incorrect. Likewise, the methodologies used for almost all of the steps are either inapplicable to the given problem, or are implemented incorrectly. Some answer justifications are missing or incorrect where required.
	F	The answers for virtually all of the steps are either missing or incorrect. Likewise, the methodologies used for virtually all of the steps are either inapplicable to the given problem, or are implemented incorrectly. Some or all answer

		justifications are missing or incorrect where required.

Quiz Instructions

You will have access to the quiz on the Sunday of the week that they are assigned. (re: the course calendar for the assigned weeks) The quiz closes at midnight of the assigned date, (i.e. Sunday - Thursday) If you miss the deadline for any reason you should contact your facilitator and instructor immediately.

Quiz Details

- You can access the quiz details from the assessments menu.
- You will have **75 minutes** to complete the quiz. If you should exit the quiz and re-enter at a later time the clock is still running during the time you had left the quiz.
- Each quiz has 20 choose-multiple and multiple-choice questions.
- There is a 21st question (worth 0 points) where you may optionally provide comments. These comments will be reviewed by your facilitator and considered when he/she grades the quiz. This is an opportunity for you to let us know if you feel that a certain question or answer had some ambiguity, or you want to clarify your choice for a certain question.
- Not every student will have the same identical quiz questions. The quiz is generated for each student from a large question pool.
- The order of all questions and answers is randomized.
- The points for each question are shown.
- The quiz questions will display one at a time on your screen.
- You may skip over questions and revisit them in any order.

Also note:

- You can take each quiz only once.
- You will be able to continue to save answers to questions after the time has expired, but any late answers will be time stamped and marked as late. This will allow us to

grade your quiz fairly in the event that technical difficulties occur while you take your quiz.

- Click only the radio button/check box to choose an answer. Clicking in white space around the question choice can sometimes select that choice.

How to Handle Technical Difficulties

If you experience technical issues with your quiz, sometimes you will be able to continue simply by connecting to Blackboard using a different web browser, and then continuing the quiz. This is because your web browser may be in a problematic state. You can use one of Internet Explorer, Firefox, Google Chrome, Safari, or Opera. This is an easy workaround to try that will resolve many technical quiz issues.

If using a different browser does not resolve your issue, as would be the case with an internet connectivity problem, please complete the quiz as soon as you regain access to it, giving yourself only 75 minutes of total working time. You would do this by subtracting out any lost time due to the technical issue from the quiz timer. Though the quiz timer still runs during technical issues, going over 75 minutes will not prevent you from completing the quiz. After you complete your quiz, please email your facilitator immediately explaining the issue, and we will verify your story with the logs provided within Blackboard, which show us exactly which question was accessed and the time spent on each question. Stories that cannot be corroborated with the Blackboard logs will not be accepted.

Saving Answers

- To answer a multiple choice question, select the appropriate choice from the list below the question.
- When you have completed your response, click “Save Answer” at the top of the question.
- As you proceed through the exam, you can go back and edit previous responses that you saved.
- A timer is displayed above the questions tracking the remaining time available.

- You will see question number buttons above questions. You will need to click on "Question Completion Status" to see the question numbers. You can use these buttons to navigate from question to question at any time.
- When you have completed all answers, go to the last question of the exam and click the "Save and Submit" button.

Other Questions

If you have any questions about the quiz please feel free to contact your facilitator.

Technical Support

Assistance with course-related technical problems is provided by the IS&T Help Center. To ensure the fastest possible response, please fill out the online form using the link below.

IT Help Center Support	
Email	ithelp@bu.edu Please use "BB Learn Question" in the subject line
Web	http://www.bu.edu/tech/web/course-sites/blackboard-learn/
Phone	(888) 243-4596