

Syllabus

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Course Description

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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.

Technical Notes

The table of contents expands and contracts (+/- sign) and may conceal some pages. To avoid missing content pages, you are advised to use the next/previous page icons in the top right corner of the learning modules.

This course requires you to access files such as word documents, PDFs, and/or media files. These files may open in your browser or be downloaded as files, depending on the settings of your browser.

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:

- Effectively use networking terminology
- 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
- Evaluate new networking technologies

- Advance your knowledge of networking by taking additional courses or self study

Instructor

Maryan Rizinski

Computer Science Department
Metropolitan College
Boston University
1010 Commonwealth Ave, 3rd
floor
Boston, MA 02215



Maryan Rizinski received his B.Sc. degree in electrical engineering with a major in electronics and telecommunications in 2006 and M.Sc. degree in electrical engineering and information technologies with a major in wireless and mobile communications in 2011 from the Ss. Cyril and Methodius University in Skopje in the Republic of Macedonia. His research interests are in the areas of information theory, wireless communications and cooperative networks. Prior to starting his master's degree, he had worked as an IT project expert in Macedonia's major electric power company. Since 2011 he has been working as a support engineer in ProSyst Software GmbH, a leading provider of software middleware for the Internet of Things. He has been facilitating the course MET CS 625 Business Data Communications and Networking since 2013 and has been also involved in course development work.

Office Hours and Questions: You will have ample opportunity for questions at our many Live Classrooms. I also welcome your questions via Online Campus and standard email.

Initial Course Developer

Lou Chitkushev, Ph.D.

Computer Science Department
Boston University Metropolitan
College
1010 Commonwealth Ave., 3rd
floor
Boston, MA 02215



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.

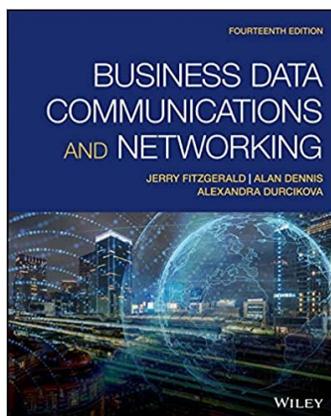
Professor Chitkushev was part of the academic team that played a crucial role in the initiatives leading to Boston University's designation as a National Center of Academic Excellence in Information Assurance Education and Research by the National Security Agency and U.S. Department of Homeland Security.

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.

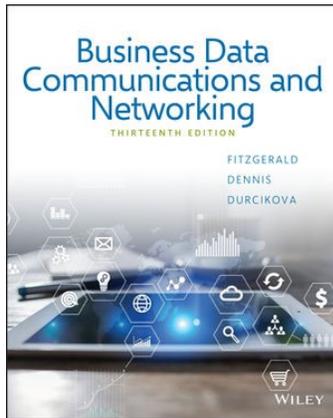
Course Materials and Resources

Required Course Materials



FitzGerald, J., Dennis, A., & Durcikova, A. (2021). *Business Data Communications and Networking* (14th ed.). John Wiley and Sons. ISBN 9781119702849.

An e-book is available at [Vitalsource.com](https://www.vitalsource.com). An e-book is available through Amazon. An e-book is available through the BU bookstore. Students may also use the 13th edition.



FitzGerald, J., Dennis, A., & Durcikova, A. (2017). *Business data communications and networking* (13th ed.). Hoboken, NJ: Wiley Global Education. ISBN 978-1-119-36883-0.

An important note on the textbook edition. The supported textbook editions for the Spring 1 2020 semester are either the 14th and 13th editions. While the latest edition of the textbook is the 14th edition, the 13th edition is also fine. There are relatively few differences between these two editions, and none of the differences will affect you in this course. That being said, the 12th and earlier editions are not sufficient for this course.

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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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.

Free Tutoring Service



Free online tutoring with Smarthinking is available to BU online students for the duration of their courses. The tutors do not rewrite assignments, but instead teach students how to improve their skills in the following areas: writing, math, sciences, business, ESL, and Word/Excel/PowerPoint.

You can log in directly to Smarthinking from Online Campus by using the link in the left-hand navigation menu of your course.



Please Note

Smarthinking may be used only for current Boston University online courses and career services. Use of this service for purposes other than current coursework or career services may result in deactivation of your Smarthinking account.

Study Guide

This course starts on a **Thursday**. The modules in this course run from **Thursday to Wednesday**.

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

Live Classroom Sessions

There will be synchronous Live Classroom sessions scheduled on Saturdays (11:00 AM to 1:00 PM Eastern Time), for six weeks starting from the first week of the course. Additional sessions or schedule adjustments may be announced during the course. These sessions will be archived for further viewing. In order to participate in these discussions or to access the archived sessions, you will need to go to the Live Classrooms/Offices links.

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 due **Friday, January 21 at 6:00 am ET**
- Assessments:
- Quiz 1 due **Friday, January 21 at 6:00 am ET**
- Live Classroom:
- **Saturday, January 15 from 11:00 am - 1:00 pm ET**

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 due **Friday, January 28 at 6:00 am ET**
- Assessments:
- Quiz 2 due **Friday, January 28 at 6:00 am ET**
- Live Classroom:
- **Saturday, January 22 from 11:00 am - 1:00 pm ET**

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 due **Friday, February 4 at 6:00 am ET**
- Assessments:
- Quiz 3 due **Friday, February 4 at 6:00 am ET**

Live Classroom: • **Saturday, January 29 from 11:00 am - 1:00 pm ET**

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 due **Friday, February 11 at 6:00 am ET**

Assessments: • Quiz 4 due **Friday, February 11 at 6:00 am ET**

Live Classroom: • **Saturday, February 5 from 11:00 am - 1:00 pm ET**

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 due **Friday, February 18 at 6:00 am ET**

Assessments: • Quiz 5 due **Friday, February 18 at 6:00 am ET**

Live Classroom: • **Saturday, February 12 from 11:00 am - 1:00 pm ET**

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 due **Friday, February 25 at 6:00 am**

ET

- Assessments: • Quiz 6 due **Friday, February 25 at 6:00 am ET**
- Live Classroom: • **Saturday, February 19 from 11:00 am - 1:00 pm ET**

Final Exam Details

The final exam is a proctored exam available from **Friday, February 25, at 6:00 AM ET to Monday, February 28, at 11:59 PM ET**. The Computer Science department requires that all final exams be administered using an online proctoring service called Examity that you will access via your course in Blackboard. In order to take the exam, you are required to have a working webcam and computer that meets Examity's system requirements. A detailed list of those requirements can be found on the How to Schedule page. Detailed instructions regarding your proctored exam will be forthcoming from the Assessment Administrator. You will be responsible for scheduling your own appointment within the defined exam window

The Final Exam will be **closed book/closed notes** and is accessible only during the final exam period. You can access it from the Assessments section of the course. Your proctor will enter the password to start the exam.

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.

Final Exam duration: **three hours**

The exam consists of **35 multiple-response questions**.

Course Grading Information

Please check the **Study Guide** in the syllabus for Live Classroom dates and specific due dates for assignments and assessments.

Course Structure

The course is organized as a sequence of six main modules, plus a seventh module for the 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. Each of the six modules also includes graded concepts assignments, labs, and quizzes.

Grade Weighting

The following table summarizes the five 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.

Deliverable	Weight
Concepts Assignments	25%
Labs	25%
Quizzes	20%
Final Exam	30%

Concepts Assignments

In each of the six modules you will complete concepts assignments that help you solidify the concepts you have read in the textbook and online lectures. If you are stuck, and just can't complete part of an assignment, send what you have completed to your facilitator via Online Campus email asking for help. Your facilitator can then provide you with guidance in the areas where you are stuck, and return the partial assignment to you for further work.

Labs

In each of the six modules you will complete hands-on labs that help you gain important technical skills in data communications and networking.

Quizzes

There is one review quiz in each of the six modules. These review quizzes are primarily to help you prepare you for the module quizzes. When you finish a review quiz you will see the questions, your answer, the correct answers and tutorial material for each question, as well as grading rubrics for paragraph questions and references in the text. The review quizzes do not count in your grade. You can take the review quizzes at any time, as many

times as you want.

There is also one graded quiz in each of the six modules. 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

There will be a proctored Final Exam in this course using a proctor service called Examity. Detailed instructions regarding your proctored exam will be forthcoming from the Assessment Administrator. You will be responsible for scheduling your own appointment. You will have three hours to complete it; there should be plenty of time. 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.

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.

How We Help You Succeed

We on the teaching team are eager to see you learn and succeed in the course. We treat each person with respect and professionalism, work hard to give everyone a great learning experience, and strive to be fair to everyone in the course. To these ends, the following describes how we structure the course to best help you.

Getting Help

The teaching team is here to help you. We are happy to answer your questions about the course material, course administration, course structure, and where to find the material for specific assignment and lab problems. We have an Ask the Facilitators forum monitored by all facilitators where you may ask questions. We have many live sessions that help explain the material and give you a chance to ask questions in real-time. If you find that something is not covered in the material adequately, ask away! We are happy to help.

We do follow a policy whereby all items you submit (assignments, labs, quizzes, projects, and so on) must be authored by you. Facilitators do not provide solutions before submission. We do however offer live sessions with problems similar to the assignments and labs, and show you step-by-step how to solve them.

Researching

We strive to provide you many resources in the course, so that course materials provide for the bulk of your research. This includes the textbook, online lectures, live sessions, email communications, and your questions in the forum. You are free to use quality external sources as needed to fill in extra details. We do follow a policy that research should not include submissions from current or prior students on the same assignment or lab. We want each person in the course to go through the healthy struggle of answering each question, for the sake of learning, and do not want anyone to bypass the learning process by copying from others.

Including Others' Material

While most of your work will be written in your own words, it is reasonable to include others' work where it provides benefit. While we ask that there be a clear delineation between your own work and others' work through citations (such as APA style citations), we do not expect you to cite everything you write. It is only necessary to cite information that is not common knowledge in the field, or when you use verbatim quotes from others' material.

Interacting With Your Facilitator

Your facilitator is here to help you. We carefully select facilitators based upon their academic and industry experience, as well as their ability to positively interact with students. We also continually vet facilitators based upon feedback in course evaluations. Many of our facilitators have years of experience and a proven track record.

We follow a policy where each person in the course is assigned to a facilitator through a random assignment process, to help ensure fairness. We want to give you the best experience possible in the course, so if despite our efforts and process your facilitator engages in what you see as misconduct, please let the course instructor know. While course enrollees are not able to switch facilitators upon request, your instructor will work with you to remedy the situation in other ways.

Review Of Your Submissions

Your facilitator uses a grading rubric in combination with course and field experience to thoughtfully assign each item a fair and objective grade. The grades are calculated carefully with a grading rubric developed by the instructor and vetted over time, and this is combined with the course and field experience of your facilitator. Due to their experience, facilitators will see both areas needing improvement and areas the exhibit excellence in most submissions. You will receive feedback on both. We instruct facilitators to be respectful and kind in their words, and to accurately point out both areas. Dialoging about the review of your submissions is a great way to learn what worked well and what could be improved, and this is encouraged. Your facilitator is happy to further explain their comments and the reason for a grade determination, should something be unclear.

To be fair to all, the same grading process is used for every person in every group. Facilitators are not allowed to negotiate grades individually (unless something is really off, of course).

Submission Schedule

To keep the course running smoothly for everyone, we have a schedule of when assignments, labs, quizzes, and so on should be submitted. If you find yourself unable to complete an item by its deadline due to circumstances out of your control, please dialog with your facilitator about this in advance of the deadline (unless it is an emergency which makes this impossible, of course). We may request additional documentation, but are happy to accommodate your situation as much as we are able.

We endeavor to be both reasonable and equitable to everyone, since each person in the course sacrifices much to keep pace with this demanding schedule. If an item is submitted after its deadline without approval, the item will still be reviewed and graded; however, 5 points per day, for a maximum of 20 points, will be deducted from its grade.

Life Impacting Events

While we wish for each person enrolled in the course to enjoy a regular, uninterrupted course term, we recognize that emergencies and other life impacting events can happen during the semester. Examples of such events are car accidents, a death in the family, the loss of a job, and other difficult events. We will do everything we can to support you in the course if this happens and we do have some options. Please reach out to the teaching team as soon as you are able to explain your situation and to open a dialog about your best course options. For some situations, we may be able to offer a flexible schedule to enable you to catch up on the course deliverables. For others, we may be able to offer an incomplete grade and allow you to finish a few items after the course term is over. While we do not systematically require documentation for all situations, we may require it for some at our discretion.

Incompletes, while helpful when the situation merits it, carry some disadvantages as well, especially the fact that those who take incompletes do not have access to peers, facilitators, and live sessions in the same capacity as when the course is running. We prefer to use other options when possible, and rely on incompletes as a last resort. Should a life impacting event occur affecting your ability to proceed with the course, please contact us to open a dialog to explore your options.

Concepts Assignment Grading Rubric

All assignment submissions are evaluated on the quality of the original content, and on how well the content is expressed.

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 for both criteria, then your assignment grade will be a 96, and facilitators will not attempt to distinguish between a 97, 96, or 95. If you receive an A- for both criteria, your assignment grade will be a 92, and facilitators will not attempt to distinguish between a 93, 92, or 91.

	Grade	Qualities Demonstrated by the Assignment Submission
Content (70%) Measures the quality of the content in the assignment	A+	The content demonstrates exceptional understanding of all relevant subject matter and its inter-relationships. All major relevant issues are thoroughly covered, and all content is very focused and on-topic. There is no known way to improve the content, and there are absolutely no technical or coverage errors present.
	A	The content demonstrates exceptional understanding of all relevant subject matter and its inter-relationships. All major relevant issues are thoroughly covered, and all content is very focused and on-topic. At most one insignificant technical or coverage error may be present
	A-	The content demonstrates deep understanding of all relevant subject matter and its inter-relationships. All major relevant issues are covered, and all content is on-topic.
	B+	The content demonstrates understanding of all relevant subject matter and its inter-relationships. Almost all major relevant issues are covered, and the content is at least reasonably on-topic.
	B	The content demonstrates understanding of most relevant subject matter and its inter-relationships. Almost all major relevant issues are covered, and all content is at least reasonably on-topic.
	B-	The content demonstrates moderate understanding of much relevant subject matter and its inter-relationships. There is reasonable coverage of major relevant issues, and the content is at least reasonably on-topic.
	C+	The content demonstrates some understanding of relevant subject matter and its inter-relationships. Some major relevant issues are covered, and at

		least some content is on-topic.
	C	The content demonstrates understanding of a small portion of the relevant subject matter and its inter-relationships. Some major relevant issues are covered, and at least a small portion of the content is on-topic.
	C-	The content demonstrates little understanding of and insight into the relevant subject matter and its inter-relationships. A small portion of the major relevant issues are covered. The focus of the content may be off topic or on insubstantial or secondary topics
	D	The content demonstrates almost no understanding of or insight into the relevant subject matter and its inter-relationships. Almost none of the major relevant issues are covered, and the content may be almost entirely off-topic.
	F	The content demonstrates no understanding of or insight into the relevant subject matter and its inter-relationships. No major relevant issues are covered, and the content is entirely off-topic.
Exposition (30%) Measures how well the content is expressed	A+	The presentation of all ideas and designs is exceptionally clear and persuasive; the entire submission is exceptionally organized. There is no known way to improve the clarity or organization of the submission.
	A	The presentation of all ideas and designs is exceptionally clear and persuasive; the entire submission is exceptionally organized. There may be at most one insignificant way to improve the clarity or organization of the submission.
	A-	The presentation of all ideas and designs is very clear and persuasive; the entire submission is very organized.
	B+	The presentation of all ideas and designs is clear and persuasive; the entire submission is organized.
	B	The presentation of most ideas and designs is clear and persuasive; most of the submission is organized.
	B-	The presentation of most ideas and designs is generally clear; most of the submission is reasonably organized.
	C+	Some parts of the submission are hard to understand; some parts are disorganized.

	C	About half of the submission is hard to understand; about half is disorganized.
	C-	Most parts of the submission are hard to understand; most parts are disorganized.
	D	Almost all of the submission is hard to understand and disorganized.
	F	The entire submission is hard to understand and disorganized.

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	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 $\frac{3}{4}$ of the steps. Likewise, the methodologies used to derive the answers are applicable to the given problems, and are implemented correctly, for about $\frac{3}{4}$ of the steps.
C+	The answers are correct or almost correct for about $\frac{3}{4}$ 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 $\frac{3}{4}$ 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

used for lab steps

	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 at the beginning of the module. However you should not access the quiz until you have completed all learning activities for the module and are prepared to meet the objectives for that module. The quiz closes the second morning of the following module at 6:00 AM ET. If you miss the deadline contact your facilitator immediately.

Quiz Details

- You can access the quiz details from the assessments menu.
- You will have **105 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 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/help/tech/learn/
Phone	(888) 243-4596

Academic Conduct Policy

Please visit Metropolitan College's website for the full text of the department's [Academic Conduct Code](#).

A Definition of Plagiarism

“The academic counterpart of the bank embezzler and of the manufacturer who mislabels products is the plagiarist: the student or scholar who leads readers to believe that what they are reading is the original work of the writer when it is not. If it could be assumed that the distinction between plagiarism and honest use of sources is perfectly clear in everyone’s mind, there would be no need for the explanation that follows; merely the warning with which this definition concludes would be enough. But it is apparent that sometimes people of goodwill draw the suspicion of guilt upon themselves (and, indeed, are guilty) simply because they are not aware of the illegitimacy of certain kinds of “borrowing” and of the procedures for correct identification of materials other than those gained through independent research and reflection.”

“The spectrum is a wide one. At one end there is a word-for-word copying of another’s writing

without enclosing the copied passage in quotation marks and identifying it in a footnote, both of which are necessary. (This includes, of course, the copying of all or any part of another student's paper.) It hardly seems possible that anyone of college age or more could do that without clear intent to deceive. At the other end there is the almost casual slipping in of a particularly apt term which one has come across in reading and which so aptly expresses one's opinion that one is tempted to make it personal property."

"Between these poles there are degrees and degrees, but they may be roughly placed in two groups. Close to outright and blatant deceit-but more the result, perhaps, of laziness than of bad intent-is the patching together of random jottings made in the course of reading, generally without careful identification of their source, and then woven into the text, so that the result is a mosaic of other people's ideas and words, the writer's sole contribution being the cement to hold the pieces together. Indicative of more effort and, for that reason, somewhat closer to honest, though still dishonest, is the paraphrase, and abbreviated (and often skillfully prepared) restatement of someone else's analysis or conclusion, without acknowledgment that another person's text has been the basis for the recapitulation."

The paragraphs above are from H. Martin and R. Ohmann, *The Logic and Rhetoric of Exposition, Revised Edition*. Copyright 1963, Holt, Rinehart and Winston.

Academic Conduct Code

I. Philosophy of Discipline

The objective of Boston University in enforcing academic rules is to promote a community atmosphere in which learning can best take place. Such an atmosphere can be maintained only so long as every student believes that his or her academic competence is being judged fairly and that he or she will not be put at a disadvantage because of someone else's dishonesty. Penalties should be carefully determined so as to be no more and no less than required to maintain the desired atmosphere. In defining violations of this code, the intent is to protect the integrity of the educational process.

II. Academic Misconduct

Academic misconduct is conduct by which a student misrepresents his or her academic accomplishments, or impedes other students' opportunities of being judged fairly for their academic work. Knowingly allowing others to represent your work as their own is as serious an offense as submitting another's work as your own.

III. Violations of this Code

Violations of this code comprise attempts to be dishonest or deceptive in the performance of academic work in or out of the classroom, alterations of academic records, alterations of official data on paper or electronic resumes, or unauthorized collaboration with another student or students. Violations include, but are not limited to:

A. **Cheating on examination.** Any attempt by a student to alter his or her performance on an

- examination in violation of that examination's stated or commonly understood ground rules.
- B. **Plagiarism.** Representing the work of another as one's own. Plagiarism includes but is not limited to the following: copying the answers of another student on an examination, copying or restating the work or ideas of another person or persons in any oral or written work (printed or electronic) without citing the appropriate source, and collaborating with someone else in an academic endeavor without acknowledging his or her contribution. Plagiarism can consist of acts of commission-appropriating the words or ideas of another-or omission failing to acknowledge/document/credit the source or creator of words or ideas (see below for a detailed definition of plagiarism). It also includes colluding with someone else in an academic endeavor without acknowledging his or her contribution, using audio or video footage that comes from another source (including work done by another student) without permission and acknowledgement of that source.
- C. **Misrepresentation or falsification of data** presented for surveys, experiments, reports, etc., which includes but is not limited to: citing authors that do not exist; citing interviews that never took place, or field work that was not completed.
- D. **Theft of an examination.** Stealing or otherwise discovering and/or making known to others the contents of an examination that has not yet been administered.
- E. **Unauthorized communication during examinations.** Any unauthorized communication may be considered prima facie evidence of cheating.
- F. **Knowingly allowing another student to represent your work as his or her own.** This includes providing a copy of your paper or laboratory report to another student without the explicit permission of the instructor(s).
- G. **Forgery, alteration, or knowing misuse of graded examinations, quizzes, grade lists, or official records of documents,** including but not limited to transcripts from any institution, letters of recommendation, degree certificates, examinations, quizzes, or other work after submission.
- H. **Theft or destruction of examinations or papers** after submission.
- I. **Submitting the same work in more than one course** without the consent of instructors.
- J. **Altering or destroying another student's work or records,** altering records of any kind, removing materials from libraries or offices without consent, or in any way interfering with the work of others so as to impede their academic performance.
- K. **Violation of the rules governing teamwork.** Unless the instructor of a course otherwise specifically provides instructions to the contrary, the following rules apply to teamwork: 1. No team member shall intentionally restrict or inhibit another team member's access to team meetings, team work-in-progress, or other team activities without the express authorization of the instructor. 2. All team members shall be held responsible for the content of all teamwork submitted for evaluation as if each team member had individually submitted the entire work product of their team as their own work.
- L. **Failure to sit in a specifically assigned seat during examinations.**
- M. **Conduct in a professional field assignment that violates the policies and regulations of the host school or agency.**
- N. **Conduct in violation of public law occurring outside the University that directly affects the academic and professional status of the student, after civil authorities have imposed**

sanctions.

- O. **Attempting improperly to influence the award of any credit, grade, or honor.**
- P. **Intentionally making false statements to the Academic Conduct Committee or intentionally presenting false information to the Committee.**
- Q. **Failure to comply with the sanctions imposed under the authority of this code.**

Important Message on Final Exams

Dear Boston University Computer Science Online Student,

As part of our ongoing efforts to maintain the high academic standard of all Boston University programs, including our online MSCIS degree program, the Computer Science Department at Boston University's Metropolitan College requires that each of the online courses includes a proctored final examination.

By requiring proctored finals, we are ensuring the excellence and fairness of our program. The final exam is administered online.

Specific information regarding final-exam scheduling will be provided approximately two weeks into the course. This early notification is being given so that you will have enough time to plan for where you will take the final exam.

I know that you recognize the value of your Boston University degree and that you will support the efforts of the University to maintain the highest standards in our online degree program.

Thank you very much for your support with this important issue.

Regards,

Professor Lou Chitkushev, Ph.D.
Associate Dean for Academic Affairs
Boston University Metropolitan College

Microsoft Azure Dev Tools for Teaching

Microsoft Azure Dev Tools for Teaching is a Microsoft program that supports technical education by providing access to Microsoft software for learning, teaching, and research purposes. Our membership allows faculty and students currently enrolled in MET courses to obtain certain Microsoft products free of charge. All MET students are granted access to download the software for the duration of their study at MET College.

FAQ and basic information are at [Microsoft Azure Dev Tools for Teaching](#) (You may have to enter your personal

BU login credentials to access this page.)

Who's Who: Roles and Responsibilities

You will meet many BU people in this course and program. Some of these people you will meet online, and some you will communicate with by email and telephone. There are many people behind the scenes, too, including instructional designers, faculty who assist with course preparation, and video and animation specialists.

People in Your Online Course in Addition to Your Fellow Students

Your Facilitator. Our classes are divided into small groups, and each group has its own facilitator. We carefully select and train our facilitators for their expertise in the subject matter and their excellence in teaching. Your facilitator is responsible for stimulating discussions in pedagogically useful areas, for answering your questions, and for grading homework assignments, discussions, term projects, and any manually graded quiz or final-exam questions. If you ask your facilitator a question by email, you should get a response within 24 hours, and usually faster. If you need a question answered urgently, post your question to one of the urgent help topics, where everyone can see it and answer it.

Your Professor. The professor for your course has primary responsibility for the course. If you have any questions that your facilitator doesn't answer quickly and to your satisfaction, then send your professor an email in the course, with a cc to your facilitator so that your facilitator is aware of your question and your professor's response.

Your Faculty and Student Support Administrator, Jeff Behn. Jeff is here to ensure you have a positive online experience. You will receive emails and announcements from him throughout the semester. Jeff represents Boston University's university services and works for the Office of Distance Education. He prepares students for milestones such as course launch, final exams, and course evaluations. He is a resource to both students and faculty. For example, he can direct your university questions and concerns to the appropriate party. He also handles general questions regarding Online Campus functionality for students, faculty, and facilitators, but he does not provide tech support. He is enrolled in all classes and can be contacted within the course through Online Campus email as it is running. You can also contact him by external email at jeffbehn@bu.edu or call (617) 358-1985.

People Not in Your Online Course

Although you will not normally encounter the following people in your online course, they are central to the program. You may receive emails or phone calls from them, and you should feel free to contact them.

Your Computer Science Department Online Program Coordinator, Peter Mirza. Peter administers the academic aspects of the program, including admissions and registration. You can ask him questions about the program, registration, course offerings, graduation, or any other program-related topic. He can be reached at metcsol@bu.edu or (617) 353-2566.

Your Computer Science Department Program Manager, Kim Crosta. Kim is responsible for administering most aspects of the Computer Science Department. You can reach Kim at kimrich@bu.edu or (617) 353-2566.

Andrew Gorlin, Academic Advisor. Reviews requests for transfer credits and waivers. Advises students on which courses to take to meet their career goals. You can reach Andrew at asgorlin@bu.edu, or (617)-353-2566.

Professor Anatoly Temkin, Computer Science Department Chairman. You can reach Professor Temkin at temkin@bu.edu or at 617-353-2566.

Professor Lou T. Chitkushev, Associate Dean for Academic Affairs, Metropolitan College. Dr. Chitkushev is responsible for the academic programs of Metropolitan College. Contact Professor Chitkushev with any issues that you feel have not been addressed adequately. The customary issue-escalation sequence after your course facilitator and course faculty is Professor Temkin, and then Professor Chitkushev.

Professor Tanya Zlateva, Metropolitan College Dean Dr. Zlateva is responsible for the quality of all the academic programs at Boston University Metropolitan College.

Disability and Access Services

In accordance with University policy, every effort will be made to accommodate students with respect to speech, hearing, vision, or other disabilities. Any student who may need an accommodation for a documented disability should contact [Disability and Access Services](#) at 617-353-3658 or at access@bu.edu for review and approval of accommodation requests.

Once a student receives their accommodation letter, they must send it to their instructor and/or facilitator each semester. They must also send a copy to their Faculty & Student Support Administrator, who may need to update the course settings to ensure accommodations are in place. Accommodations cannot be implemented if the student does not send their letter.

Netiquette

The Office of Distance Education has produced a netiquette guide to help you understand the potential impact of your communication style.



Before posting to any discussion forum, sending an email, or participating in any course or public area, please consider the following:



Ask Yourself...

- How would I say this in a face-to-face classroom or if writing for a newspaper, public blog, or wiki?
- How would I feel if I were the reader?
- How might my comment impact others?
- Am I being respectful?
- Is this the appropriate area or forum to post what I have to say?

Writing

When you are writing, please follow these rules:

- **Stay polite and positive in your communications.** You can and should disagree and participate in discussions with vigor; however, when able, be constructive with your comments.
- **Proofread your comments before you post them.** Remember that your comments are permanent.
- **Pay attention to your tone.** Without the benefit of facial expressions and body language, your intended tone or the meaning of the message can be misconstrued.
- **Be thoughtful and remember that classmates' experience levels may vary.** You may want to include background information that is not obvious to all readers.
- **Stay on message.** When adding to existing messages, try to maintain the theme of the comments previously posted. If you want to change the topic, simply start another thread rather than disrupt the current conversation.
- **When appropriate, cite sources.** When referencing the work or opinions of others, make sure to use correct citations.

Reading

When you are reading your peers' communication, consider the following:

- **Respect people's privacy.** Don't assume that information shared with you is public. Your peers may not want personal information shared. Please check with them before sharing their information.
- **Be forgiving of other students' and instructors' mistakes.** There are many reasons for typos and misinterpretations. Be gracious and forgive other's mistakes or point them out privately and politely.
- **If a comment upsets or offends you, reread it and/or take some time before responding.**

Important Note

Don't hesitate to let your instructor or your faculty and student support administrator know if you feel others are inappropriately commenting in any forum.

All Boston University students are required to follow academic and behavioral conduct codes. Failure to comply with these conduct codes may result in disciplinary action.

Registration Information and Important Dates

[View the drop dates for your course.](#)

[Withdraw or drop your course.](#)

- If you are dropping down to zero credits for a semester, please contact your college or academic department.
- **Nonparticipation in your online course does not constitute a withdrawal from the class.**
- If you are unable to drop yourself on Student Link, please contact your college or academic department.
- Online courses will open to students in Blackboard on the first day of the term.
- Online courses close to students three weeks after the last day of the term. Please plan to download and save any assignments or material you'd like to keep by that date.

Technical Support

Help Desk

Boston University IT Help Desk can be reached via email (ithelp@bu.edu), phone (617-353-4357) or by filling out the [support form](#) on their website. For IT Help Desk hours of operation, visit the [contact page](#). If you are contacting IT outside of business hours, you will receive a response the following day. Visit the BU Information Services & Technology (IS&T) [news page](#) for announcements and system-wide alerts.

Technology Requirements and Resources

To successfully view all content in your course, it is important that your computer setup meets the necessary minimum technical requirements. Certain courses with specific functionality or educational tools may require additional technical requirements, these details can be found on the Course Resources or Materials page in the Syllabus.

System Requirements

- Access to reliable, high-speed internet: Check your [internet connection speeds](#)
- Learning Management System (Blackboard): [System Requirements](#)
- Synchronous live classroom sessions (Zoom): [System requirements for Windows, macOS, and Linux](#)
- Courses with proctored exams (Examity): [System requirements for Windows, macOS](#)

Downloads

- Recommended web browsers: [Mozilla Firefox](#) or [Google Chrome](#)
- Synchronous live classroom sessions (Zoom): [Zoom download center](#)
- Courses with proctored exams (Examity): Desktop or laptop computer with [Google Chrome](#) or [Microsoft Edge](#)

Recommended Hardware

- Desktop or laptop computer recommended for best experience, some course functionality including proctored exams are not compatible with phones or tablets
- Headset with built-in microphone for high quality audio during live classroom sessions
- Webcam (required for proctored exams)
- Working computer speakers (required for proctored exams)

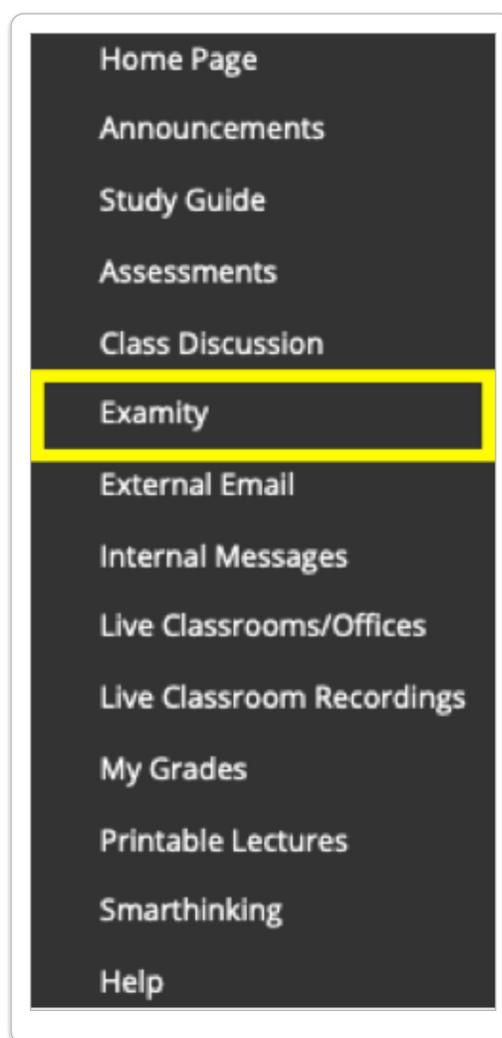
Clearing Your Browser Cache

It is recommended that users periodically [clear their browser cache](#) to ensure they are viewing the most current course content. Completing this step often resolves login issues and problems viewing course materials.

Proctored Exams

Courses with proctored exams will have an Examity link in the left-hand course navigation. This link will not appear until scheduling opens. The ODE Assessment Administrator will notify you when it is time to schedule your exam. Details on Examity's technical requirements and how to schedule your exam are in the Proctored Exam Information module on the course homepage. The Assessment Administrator can be reached at

pexams@bu.edu. Examity support is available 24/7 via phone (855-392-6489), email (support@examity.com), or 'live chat' when logged in to the Examity dashboard.



Navigating Courses

While navigating through your courses it's important to note that all hyperlinks will open in a new browser window.

The Blackboard navigation tools, as shown in the images below; allow you to show and hide both the Course Menu and the Table of Contents which can free up space when moving through weekly lecture material.

The Table of Contents may contain folders that open and close (+ and – signs) and may conceal some pages. To avoid missing content pages, you are advised to use the next- and previous-page buttons (and icons) in the top-right corner of the learning content.

Navigation tools for the Table of Contents are shown in the image below:

The screenshot shows a Blackboard course interface. On the left is a dark sidebar titled "DE Student Orientation (2020 Spring 2)" with a home icon. The sidebar contains links for Home Page, Announcements, Assessments, Assignments, Calendar, Class Discussion, External Email, and Internal Messages. On the right is a "Table of Contents" section. At the top of this section are window control icons (minimize, maximize, move to bottom) and the text "Page 1 of 9". Below these is a yellow button labeled "Hide Course Menu". Underneath is a list of nine items, each with a document icon: 1. Welcome (highlighted with a white box), 2. Student Orientation Cour, 3. Course Objectives, 4. Setting Up Your Comput, 5. Blackboard App for Onli, 6. Disability Services, 7. Netiquette, 8. Registration Informatio, and 9. Technical Support.

Clicking the space between the Course Menu and the Table of Contents allows you to show or hide the Course Menu on the left:

This close-up shows the window control icons (minimize, maximize, move to bottom) and the "Table of Contents" section. The icons are now active and highlighted with colored boxes: a purple box for minimize, an orange box for maximize, and a pink box for move to the bottom. Below the icons is the text "Page 1 of 9" and a right-pointing arrow. The "Table of Contents" list is visible, with the first item "1. Welcome" highlighted with a white box. The other visible items are "2. Student Orientation Cour", "3. Course Objectives", and "4. Setting Up Your Compute".

Boston University Metropolitan College