Metropolitan State University:

Computer Networks and Security

ICS 460 -01

Fall 2021

4 Credits

SYNC - Completely online - Synchronous

Remote Teaching, No In-Person

Aug 26 - Dec 09

## Instructor and Department Contact Information

### Instructor Information

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| --- | --- |
| Name: | Damodar Chetty |
| Email: | damodar.chetty@metrostate.edu |
| Phone: | 651-793-1683 (Katie Wilson) |

### Department Information

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| --- | --- |
| Name: | Computer Science and Cybersecurity |
| Mailing Address: | Department of Computer Science and Cybersecurity  Metropolitan State University  700 7th Street East  Saint Paul, MN 55106-5000 |
| Phone: | 651-793-1683 (Katie Wilson) |

## **About the Course**

**Note:** I reserve the right to change this syllabus without prior notice. All changes will be posted as an announcement on D2L.

### Course Description

Principles and practices of the OSI and TCP/IP models of computer networks, with special emphasis on the security of these networks. Coverage of general issues of computer and data security. Introduction to the various layers of network protocols, including physical, data link, network, and transport layers, flow control, error checking, and congestion control. Computer system strengths and vulnerabilities, and protection techniques: Topics include applied cryptography, security threats, security management, operating systems, network firewall and security measures. Focus on secure programming techniques. Programming projects.

### Prerequisites

**This course requires both of these prerequisites**

ICS 240 - Introduction to Data Structures

MATH 215 - Discrete Mathematics

## Course Learning Outcomes

### Learning Outcomes

* Describe the high-level functions of, and interactions between, the protocol layers of network protocol stacks.
* Explain the purpose and workings of the link, network, and transport layers in network protocol stacks, including the IP, TCP, and UDP protocols.
* Evaluate the reliability and performance implications of different link, network, and transport layer protocols and solve quantitative problems involving these protocols.
* Compare and contrast the protocols used in wireless and mobile networking with those used in traditional fixed-infrastructure networking.
* Describe the goals of computer security to preserve confidentiality, integrity, and availability (CIA) of computer systems, and understand the threats to these goals.
* Evaluate the role of cryptography in meeting threats to the CIA goals.
* Evaluate the roles of operating system and network security measures in meeting threat to the CIA goals.
* Introduce secure programming techniques to implement security measures.

## Learning Methods

This course uses a variety of assignments in order to measure student outcomes. In this course:

* Student learning will be enabled by textbook reading, discussion topics, and quizzes.
* Students are expected to play an active role in different learning activities via D2L.

## Textbook

Computer Networking, 8th Edition  
by James Kurose; Keith Ross

## **Evaluation Criteria/Assignment Information**

### Assignments and Grading

|  |  |
| --- | --- |
| **Description of item** | **Points** |
| Exams: Chapter Quizzes, Midterm, Final | 200 |
| Assignments: Projects (see project description) | 100 |
| Total | 300 |

**Course Warnings**

This course requires significant programming.

Note that I cannot grade based on how many hours went into preparation or project work. I can only grade on final submissions.

### Course communications

* All course materials (lecture slides, assignments, announcements) will be posted on D2L.
* Class notices and announcements will go only to your Metro State email account.
* You can send me an email with any question or concern regarding the course. I will get back to you within 48-hours on week-days.

When using email, please **use ONLY your metrostate.edu email** with the following subject line:

* Your full name (first name followed by last name)
* The course number and section.
* A brief description of the topic of your email title.
* Here is an example: “*YourName*-**ICS 232-01**- *Question about chapter 2.”*

It is very important for tracking purpose that you follow this format.

**Remember to use your Metro State email account to avoid your message going to the spam folder.**

Metropolitan State University has designated e-mail as an official method of communication with students. **The university expects** students to be responsible for all information sent to them via their official university email account. Refer to [Policy 1050, University E-mail,](https://www.metrostate.edu/about/policies/6771) for further information.

### Grade Scale

Your letter grade will be determined based on the percentage of points that you earn during the semester.  The following table relates the percentage to a letter grade:

|  |  |
| --- | --- |
| Percentage | Grade |
| 94 – 100 | A |
| 90 – 93 | A- |
| 87 – 89 | B+ |
| 84 – 86 | B |
| 80 – 83 | B- |
| 77 – 79 | C+ |
| 74 – 76 | C |
| 70 – 73 | C- |
| 60 – 69 | D |
| Below 60 % | F |

I do not round up letter grades.

If you have selected the S/N grading option, then to receive a satisfactory rating (S) you must earn at least 70% of the possible points.

## Schedule of Topics and Due Dates \*

| Week | Date | Topic |  |
| --- | --- | --- | --- |
| 1 | August 26, 2021 | Syllabus, Project, Java Programming |  |
| 2 | September 02, 2021 | Computer Networks and the Internet |  |
| 3 | September 09, 2021 | Application Layer |  |
| 4 | September 16, 2021 | Transport Layer - 1 |  |
| 5 | September 23, 2021 | Transport Layer - 2 |  |
| 6 | September 30, 2021 | Network Layer - Data Plane - 1 |  |
| 7 | October 7, 2021 | Midterm Exam |  |
| 8 | October 14, 2021 | Network Layer - Data Plane - 2 | Project 1 due |
| 9 | October 21, 2021 | Network Layer - Control Plane - 1 |  |
| 10 | October 28, 2021 | Network Layer - Control Plane - 2 |  |
| 11 | November 4, 2021 | Link Layer and LANs |  |
| 12 | November 11, 2021 | Wireless Networks |  |
| 13 | November 18, 2021 | Security in Computer Networks |  |
|  | November 25, 2021 |  | |
| 14 | December 02, 2021 | Project reviews | Project 2 due |
| 15 | December 09, 2021 | Final exam |  |

\* Tentative, likely to change

## Course Materials

D2L will be used to distribute and collect all course materials (assignments, quizzes, exams, etc.)

You are expected to look at D2L every day for important announcements.

## Submission

All submissions will be turned in by uploading your files (source files, report, etc.) to D2L. Only files uploaded into drop boxes on D2L will be considered for grading - **do not email them to me**. I will post my evaluation back into D2L.

The submission date will be determined based on the date on which the last upload activity happened.

All submissions are due by start of class on their due date. Any submission after this period will be considered late.

Projects and assignments turned in late will receive penalties as follows:

|  |  |
| --- | --- |
| **Days Late** | **Penalty** |
| up to 5 days late, including weekends | -50% of grade |
| More than 5 days late | Not accepted |

All source files must be well documented and formatted.

You should also keep backup copies of all programs.

No work will be accepted after the last scheduled class period.

## No Makeup Exams

No makeup exams will be offered.  If you miss the midterm, the final exam will be doubly counted in order to replace the missed test. All students will take the final exam at the designated time to ensure that all students are tested in a uniform manner.

## Non-academic difficulties during the semester

During the course of the semester, some of you will likely have non-academic events, emergencies, and difficulties, that will impact your ability to submit your projects.

While I empathize with the fact that stuff happens, I will provide sufficient advance notice of the content and due dates for assignments, and expect that you will complete your project at least 2 weeks in advance in order to avoid succumbing to unexpected issues.

## Incompletes

A grade of incomplete may be considered only if the student is in good standing in the class. "Good standing" means that the requester has

1. attended at least 11 classes out of 13;
2. successfully completed two thirds of the assignments, quizzes, and tests; and
3. earned at least a B grade or higher.

I reserve the right to say no to any request for an incomplete.

## Attendance

I expect that you will attend all our classes and that you will actively foster a good learning environment for yourself and your classmates. However, if you need to miss a class, you can download all handouts from D2L. Late assignment penalties will apply whether you attend class or not.

Note: Federal Financial Aid regulations require that the University track ongoing attendance.

### Illness

If I am ill, I will post an announcement and assign homework to you via your Metro State email account.

### Plagiarism and Copyright

Plagiarism is defined as the act of claiming another person’s work as one’s own. This can be copying or copying even parts of sentences from an article, journal, internet site, another student’s work, or other written work. It can also mean using another student’s assignment and making minor changes. Changing a few words around in content is still plagiarism.

Sometimes students are not sure if they are committing plagiarism. Please consult the instructor regarding more information on plagiarism and how to avoid it. The instructor reserves the right to assess through <http://www.turnitin.com/> and/or asking for resources used. Student are encouraged to consult the Metropolitan State University Writing Lab and resources for assistance as well.

If a student is found to have plagiarized work, even if accidentally, the student will be provided a one-time opportunity to redo the assignment. The opportunity to redo the assignment will only be provided one time in the course. Points will be reduced on the revised submission by up to ½ (50%) of the total earned.

The instructor reserves the right to not grant the opportunity to revise and resubmit the assignment. This decision will depend upon the student’s overall progress in the course and adherence to course and assignment standards.

Future work that is found to be plagiarized will be given a grade of zero (0). The instructor will notify the student in the feedback for the assignment if work is found to have been plagiarized.

If plagiarism occurs repeatedly (even one more time) course failure will result. This policy is consistent with Metropolitan State University Student Handbook and University Procedures.

As part of academic honesty, students are expected to respect intellectual property laws, including copyright law. No parts of this site, your textbook, other publisher materials, or contribution from other class members can be used or distributed outside of this class without the permission of the author(s). Copyright law provides that any creative thought fixed into tangible form is copyrighted the moment it is created, whether or not a copyright notice is affixed.

Please review this excellent article on plagiarism to learn more. Parts of the article are posted below: <https://www.plagiarism.org/article/what-is-plagiarism>

Acts of plagiarism may be reported to the Associate Provost for Student Success.

## University Academic Policies & Information [*The information in this section is required.]*

### University Non-Attendance and Reporting Policy and Procedure

The purpose of the Non-Attendance and Reporting Policy is to ensure Federal Title IV regulations are adhered to with respect to a student’s enrollment level for the purpose of calculating and paying financial aid.  While Metropolitan State University is not required to take attendance, Federal Title IV financial aid regulations require a procedure to establish that students have attended, at a minimum, one day of class for each course in which the student’s enrollment status was used to determine eligibility for the Pell Grant Program.  In addition, the university needs to determine a last date of attendance for those students who receive all failing grades or unofficially withdraw. Attendance is defined based on course delivery mode. A student is “in attendance” if he or she meets the following conditions before the end of the second week of the course:

Classroom Courses –the student is present in the classroom.

Web-Enhanced (Reduced Seat Time Courses) –the student is present in the classroom or submits at least one academically relevant assignment.

Online Courses –the student submits at least one academically relevant assignment

Independent Studies – the student contacts the instructor or submits at least one academically relevant assignment

If a student does not attend the first two classes, either live and/or online, that student is automatically dropped from the course. If a student adds the course past the drop/add date, he/she will not receive points for any assignments, discussions, quizzes, or exams for which the due date has already occurred. Refer to the Non-Attendance & Reporting Policy 2259 [Policy 2259](https://www.metrostate.edu/about/policies/32331), and the Non-Attendance and Reporting Procedure 259 [Procedure 259](https://www.metrostate.edu/about/policies/32336).

Note to the student: The above description is the University Policy, but for some courses, based on how it is listed in the registration materials, participation must occur during the first week of class or the student is dropped from the course.

## Center for Accessibility Resources

### Diversity and Disability Statement:

Our institution values diversity and inclusion; we are committed to a climate of mutual respect and full participation. Our goal is to create learning environments that are usable, equitable, inclusive and welcoming. If there are aspects of the instruction or design of this course that result in barriers to your inclusion or accurate assessment or achievement, please notify the instructor as soon as possible. Students with disabilities are also welcome to contact the Center for Accessibility Resources to discuss a range of options to removing barriers in the course, including accommodations.

Phone: 651-793-1549

Web: [Center for Accessibility Resources](https://www.metrostate.edu/accessibility)

The University provides access to its programs and services by making reasonable accommodations for qualified students. Accommodations may include approval for early registration, note-takers, interpreters for the deaf, adaptive equipment, and testing arrangements.

## Technology Requirements and Expectations

### Computer Hardware and Software

For this course, your computer must fully pass the System Check found on the [D2L login page](https://metrostate.learn.minnstate.edu/).

Students must have internet access in order to log into (this is required) the D2L system at least two days per week in order to check for updates and complete required work. Your skills should include the ability to add browser plug-ins for viewing files and content presented within the course or be able to get such assistance from non-campus sources at your own expense.

### File Management

Intermediate or higher level skills at file management (ability to create folders, move and rename folders and files, identify type of file by its file-extension, attach files to emails, etc.)

### Anti-Virus Software

Updated virus scanning software for all files sent and received (such as McAfee Antivirus, Norton Internet Security, etc.) is required.

### Computer Software

Computer skills include proficiency in Microsoft’s Internet Explorer (or other web browser) and in using the Internet to access online resources and sites as well as competence at using Microsoft Office products such as Word and Power Point.

### Email

This course requires students to use their campus email account for all communication for related to this class. Emails originating from outside the campus email servers may be deleted without review of the instructor. This policy prevents viruses and spam. Please include in the subject line of your emails the course number and a brief description that summarizes the content of the email as well. It is very important to at least include your course and course number in the subject line to assure proper feedback and credit for you work.