Course Syllabus

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CS 469/569: Data Analytics for Cybersecurity: Fall 2025

Instructor:

Title:	Professor and Chair
Name:	Ravi Mukkamala
Office Location:	ECS 3300
Office Hours:	Tuesday, Thursday 3-4PM or by appointment https://odu.zoom.us/j/92623705977 (https://odu.zoom.us/j/92623705977)
Email:	rmukkama@odu.edu
Phone:	7576837724
Instructor Bio:	*https://www.odu.edu/directory/ravi-mukkamala*

Contact Policy

I will respond to emails within 24 hours on weekdays. For any course-related communication, please use your ODU email. In the case of an urgent request, please text me at 757 748 2195.

Grader's Contact Information

Name:	Yongcheng Mu

Office Location:	Zoom: https://odu.zoom.us/j/96750454235 (https://odu.zoom.us/j/96750454235)
Office Hours:	Monday 10-11 AM
Email Address:	ymu004@odu.edu

Course Readings

Textbook: Data Mining and Machine Learning in Cybersecurity

You will also be provided with links to additional material.

Course Description

The course introduces classical and advanced models and techniques in machine learning and deep learning. It applies these techniques in the cybersecurity domain including anomaly detection, network security, and malware detection and classification. Advanced applications such as self-driving cars and IoT systems are also discussed. In addition, cyber-attacks on machine learning techniques and AI systems and the possible consequences are also discussed.

Prerequisites: CS 4/555 or CS 4/562 or experience in cybersecurity area

Goals and Objectives

By the end of the course, the students will be able to (i.e., objectives):

1. Discern the need for tools based Data mining, Artificial Intelligence, and Machine learning in Cybersecurity
2. Recognize the complexities and intricacies involved in employing DM/AI/ML techniques in Cybersecurity
3. Recognize the intricacies of ML and deep neural networks
4. Identify the role of ML techniques in secure communication and networking
5. Discern an in-depth knowledge of data mining techniques
6. Identify ways to apply DM/AI/ML in anomaly detection
7. Discern privacy concerns in applying DM/AI/ML techniques in cybersecurity applications
8. Identify countermeasures to defend cyber attacks
9. Discern the adversarial attacks on DM/AI/ML techniques
10. Recognize how AI/ML techniques may be used in security-critical applications
11. Identify different kinds of malware and their impact on cybersecurity
12. Discern ways to employ DM/AI/ML techniques in malware detection systems
13. Identify ways in which supervised and unsupervised learning techniques are used in cybersecurity

14. Recognize vulnerabilities of DM/AI/ML techniques
15. Discern ways to measure the effectiveness and robustness of DM/AI/ML techniques
16. Identify information privacy concerns of individual and organizations and impact on data availability

How the Course Works

Modules

The course is organized into 12 modules. Each module will contain:

- Course readings
- Homework assignments
- Discussion questions
- Course content forums
- Cyber Cafe forum guidelines
- Use this forum rather than emailing the instructors for questions about the course material or clarifying questions about assignments.
- If others have the same question, everyone will be able to see the answer. If you see a question on a forum that you know the answer to, please respond.
- This is a place where you can get help from and give help to your classmates. Note that homework assignments are to be done individually, so don’t ask your classmates to give you the answers.

Exams

- Online via Blackboard
- Open book and open notes

Undergraduate

Undergraduate student responsibilities that contribute toward the class final grade:

- Homework
- Two exams
- Class participation

Graduate

Gradate student responsibilities that contribute toward the class final grade:

- Homework
- Two exams
- Class participation
- Project

Grading Criteria

Please note the different grading criteria for the undergraduate and graduate courses.

CS 569

Grading Criteria for CS 569

Activity	Points	Weight	Details
Exam I	100	20%	Week 7 (10/11/2025)
Exam II	100	20%	Week 16 (12/6/2025)
Homework	150	30%	Best 10 of 12 HWs
Quiz	25	5%	
Course Project	100	20%	Due: 11/25/2025
Class Participation	25	5%	Discussion forum
Total	500	100%	

CS 469

Grading Criteria for CS 469

Activity	Points	Weight	Details
Exam I	125	25%	Week 7 (10/11/2025)
Exam II	125	25%	Week 16 (12/6/2025)
Homework	150	30%	Best 10 of 12 HWs
Quiz	50	10%	
Class Participation	50	10%	Discussion forum
Total	500	100%	

Grading Scale

The course grading scale is as follows (+ and - modifiers will be applied as appropriate):

Grade Percentage:

	CS 569	CS 469
A	95-100	90-100
A-	90-94	85-89
B+	87-89	82-84
B	84-86	79-81

B-	80-83	75-78
C+	76-79	71-74
C	72-75	67-70
C-	69-71	64-66
D		60-63
F	0-68	0-59

Student Responsibilities

Course Policies

University Policies

Educational Accessibility

Old Dominion University is committed to ensuring equal access to all qualified students with disabilities in accordance with the Americans with Disabilities Act. The Office of Educational Accessibility (OEA) is the campus office that works with students who have disabilities to provide and/or arrange reasonable accommodations.

- If you experience a disability that will impact your ability to access any aspect of my class, please present me with an accommodation letter from OEA so that we can work together to ensure that appropriate accommodations are available to you.
- If you feel that you will experience barriers to your ability to learn and/or testing in my class but do not have an accommodation letter, please consider scheduling an appointment with OEA to determine if academic accommodations are necessary.

The Office of Educational Accessibility is located at 1021 Student Success Center and their phone number is **(757) 683-4655 (tel:+17576834655)** . Additional information is available at the .

Cultural Diversity

Our aim in this class will be to have regard for diverse perspectives, all of which should add to and enhance our understanding of professional communication. I hope that you will participate in class, offer praise and criticism in a tactful fashion, and foster class cohesion, celebrating our similarities and differences. Please examine the course schedule as soon as possible; should there be any specific circumstances that the instructor needs to be aware of, such as a need for special services or a religious holiday conflict, please provide such information immediately via email.

Honor Pledge

"I pledge to support the honor system of Old Dominion University. I will refrain from any form of academic dishonesty or deception, such as cheating or plagiarism. I am aware that as a member of the academic community, it is my responsibility to turn in all suspected violators of the honor system. I will

report to Honor Council hearings if summoned." By attending Old Dominion University, you have accepted the responsibility to abide by this code. This is an institutional policy approved by the Board of Visitors. For more information, please visit

The Family Educational Rights and Privacy Act

The Family Educational Rights and Privacy Act prohibits me from talking to your parents about your work in my classes unless I have your written permission, or you accompany them.

University Email Policy

The Old Dominion University e-mail system is the official electronic mail system for distributing course-related communications, policies, announcements, and other information. A University e-mail user ID and password are necessary for authentication and access to numerous electronic resources (Blackboard, faculty websites, etc.).

Plagiarism

Plagiarism and academic misconduct are not tolerated. ODU defines as plagiarism ‘Using someone else’s language, ideas, or other original material without acknowledging its source in any academic exercise.’ You are expected to be fully aware of the policies in

Withdrawal

Please review the syllabus and the course requirements as soon as possible. If you believe that the nature of this course does not meet your interests, needs or expectations, if you are not prepared for the amount of work involved—or if you anticipate that the class meetings, assignment deadlines, or abiding by the course policies will constitute an unacceptable hardship for you then you should drop the class by the drop/add deadline, which is listed in the ODU Schedule of Classes. For more information, please visit the .

Student Acknowledgement

This syllabus constitutes an agreement between the student and the course instructor about course requirements. Participation in this course indicates your acknowledgment and acceptance of its teaching focus, requirements, and policies.

Course Summary:

Date	Details	Due
Wed Sep 10, 2025	Homework 1 (https://canvas.odu.edu/courses/187773/assignments/2816052)	due by 11:59pm

Date	Details	Due
	Quiz 1 (https://canvas.odu.edu/courses/187773/assignments/2816035)	due by 11:59pm
Wed Sep 17, 2025	Homework 2 (https://canvas.odu.edu/courses/187773/assignments/2816057)	due by 11:59pm
	Quiz 2 (https://canvas.odu.edu/courses/187773/assignments/2816045)	due by 11:59pm
Sat Sep 20, 2025	Week 1 | Discussion (https://canvas.odu.edu/courses/187773/assignments/2816047)	due by 11:59pm
Wed Sep 24, 2025	Homework 3 (https://canvas.odu.edu/courses/187773/assignments/2816058)	due by 11:59pm
	Quiz 3 (https://canvas.odu.edu/courses/187773/assignments/2816036)	due by 11:59pm
Wed Oct 1, 2025	Homework 4 (https://canvas.odu.edu/courses/187773/assignments/2816059)	due by 11:59pm
	Quiz 4 (https://canvas.odu.edu/courses/187773/assignments/2816031)	due by 11:59pm
Wed Oct 8, 2025	Homework 5 (https://canvas.odu.edu/courses/187773/assignments/2816060)	due by 11:59pm
	Quiz 5 (https://canvas.odu.edu/courses/187773/assignments/2816037)	due by 11:59pm

Date	Details	Due
Sat Oct 11, 2025	Exam 1 CS 469 Fall 2024 (NOT for CS 569) (https://canvas.odu.edu/courses/187773/assignments/2816040)	due by 11:59pm
	Exam 1 CS 569 Fall 2024 (NOT FOR CS469) (https://canvas.odu.edu/courses/187773/assignments/2816041)	due by 11:59pm
Sun Oct 12, 2025	Upload Exam 1 worksheet here (https://canvas.odu.edu/courses/187773/assignments/2816064)	due by 11:59pm
Wed Oct 15, 2025	Homework 6 (https://canvas.odu.edu/courses/187773/assignments/2816061)	due by 11:59pm
	Quiz 6 (https://canvas.odu.edu/courses/187773/assignments/2816039)	due by 11:59pm
Wed Oct 22, 2025	Quiz 8 (https://canvas.odu.edu/courses/187773/assignments/2816038)	due by 11:59pm
Wed Oct 29, 2025	Homework 8 (https://canvas.odu.edu/courses/187773/assignments/2816062)	due by 11:59pm
	Quiz 9 (https://canvas.odu.edu/courses/187773/assignments/2816033)	due by 11:59pm
Wed Nov 5, 2025	Homework 9 (https://canvas.odu.edu/courses/187773/assignments/2816063)	due by 11:59pm

Date	Details	Due
Mon Nov 10, 2025	Quiz 10 (https://canvas.odu.edu/courses/187773/assignments/2816034)	due by 11:59pm
Wed Nov 12, 2025	Homework 10 (https://canvas.odu.edu/courses/187773/assignments/2816053)	due by 11:59pm
Mon Nov 17, 2025	Quiz 11 (https://canvas.odu.edu/courses/187773/assignments/2816032)	due by 11:59pm
Wed Nov 19, 2025	Homework 11 (https://canvas.odu.edu/courses/187773/assignments/2816054)	due by 11:59pm
Mon Nov 24, 2025	Course project (https://canvas.odu.edu/courses/187773/assignments/2816051)	due by 11:59pm
	Quiz 12 (https://canvas.odu.edu/courses/187773/assignments/2816030)	due by 11:59pm
Wed Nov 26, 2025	Homework 12 (https://canvas.odu.edu/courses/187773/assignments/2816055)	due by 11:59pm
Mon Dec 1, 2025	Quiz 13 (https://canvas.odu.edu/courses/187773/assignments/2816043)	due by 11:59pm
Fri Dec 5, 2025	Homework 13 (https://canvas.odu.edu/courses/187773/assignments/2816056)	due by 11:59pm
Sat Dec 6, 2025	Exam 2 Fall 2024 CS 469/569 (https://canvas.odu.edu/courses/187773/assignments/2816042)	due by 11:59pm

Date	Details	Due
Sun Dec 7, 2025	CS 469/569: Exam 2 worksheet - Upload here (https://canvas.odu.edu/courses/187773/assignments/2816050)	due by 11:59pm
	Mid-Semester Course Evaluation (https://canvas.odu.edu/courses/187773/assignments/2816067)	
	Mid-Semester Course Evaluation (https://canvas.odu.edu/courses/187773/assignments/2816078)	
	Week 1 Assignment (https://canvas.odu.edu/courses/187773/assignments/2720400)	
	Week 1 Assignment (https://canvas.odu.edu/courses/187773/assignments/2816065)	
	Week 1 Assignment (https://canvas.odu.edu/courses/187773/assignments/2816066)	
	Week 1 | Discussion (https://canvas.odu.edu/courses/187773/assignments/2720384)	
	Week 1 | Discussion (https://canvas.odu.edu/courses/187773/assignments/2816048)	
	Week 1 | Feedback Survey (https://canvas.odu.edu/courses/187773/assignments/2816074)	
	Week 1 | Feedback Survey (https://canvas.odu.edu/courses/187773/assignments/2816083)	

Date	Details	Due