Course Syllabus

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Course Information

Course Name**:** Cybersecurity Fundamentals

Course Number**:** CS462/562

Prerequisites**:**   MATH 162M (https://catalog.odu.edu/search/?P=MATH%20162M)

Instructor Information

Instructor**:** Susan Zehra

Instructor Email**:** szehra@odu.edu (mailto:szehra@odu.edu)

Instructor Office Hours**:** Via Zoom - Fridays 12:30pm to 2:30pm, or by appointment

Office Hours Zoom Link**:** https://odu.zoom.us/j/91696336483?
pwd=dE8wa2JRNSt0WS9UbzhISUFZSk9vQT09 (https://odu.zoom.us/j/91696336483?
pwd=dE8wa2JRNSt0WS9UbzhISUFZSk9vQT09)

Course Type

This is an asynchronous course offered online through Canvas. This course does not have any required
lecture times.

Course Description

From the ODU Catalog

Introduction to networking and the Internet protocol stack; Vulnerable protocols such as HTTP, DNS, and
BGP; Overview of wireless communications, vulnerabilities, and security protocols; Introduction to
cryptography; Discussion of cyber threats and defenses; Firewalls and IDS/IPS; Kerberos; Transport
Layer Security, including certificates; Network Layer Security.

Prerequisites

The main prerequisite for this course is MATH 162M (Precalculus I).

Course Overview

This is the first course in the **Graduate Certificate Program in Cybersecurity (https://graduate.cs.odu.edu/certificates/cybersecurity/)** . This course will introduce the networking and cybersecurity background that you'll need to succeed in the other courses in the certificate program.

Cybersecurity emphasizes prevention of attacks that are perpetrated using the Internet. It includes application security, information security, and network security. Because the foundations of cybersecurity rely so heavily on knowledge of networking, this course will cover networking background before discussing details of cybersecurity.

Course Readings

Required Textbook

Kurose and Ross (2017), *Computer Networking: A Top-Down Approach* ⇲ *(https://www.amazon.com/s? k=isbn+9780133594140&crid=3155Y00VBN4TK&sprefix=9780133594140%2Caps%2C145&ref=nb_sb_ss_i_1_* , 7th edition, ISBN: 9780133594140, Pearson Education, 2017.

Recommended (Optional) Textbooks

* *Network Security Essentials* ⇲ *(http://www.pearsonhighered.com/pearsonhigheredus/educator/product/products_detail.page? isbn=0133370437)* , 5th Edition, by William Stallings, 2014
  * This is the same textbook used for CS 564
* *Network Security: Private Communication in a Public World*, 2nd Edition, by Kaufman, Perlman, and Speciner, 2002
  * **available free via ODU Library (http://proquest.safaribooksonline.com.proxy.lib.odu.edu/book/networking/security/9780137155880)**
* *Introduction to Computer Networks and Cybersecurity*, by Wu and Irwin, 2013
  * this was the textbook few years back
  * **available free via ODU Library (http://proquest.safaribooksonline.com.proxy.lib.odu.edu/book/networking/security/9781466572133)**

Other Requirements

As this is an online-only course, you must have access to a computer with high-speed Internet. If you are an on-campus student, you may use the **university computer labs (https://www.odu.edu/ts/labs-classrooms)** or **Computer Science computer labs (https://systems.cs.odu.edu/Computing_Labs)** . Otherwise, you must provide your own computer and Internet access.

Course Goals and Objectives

After completing this course, students should have a strong foundation in the principles of the Internet architecture, an awareness of vulnerabilities in the Internet protocol stack, and an introduction to issues in cybersecurity. They should be prepared to take follow-on courses in the CS CyberSecurity certificate.

After successfully completing the entire certificate program (4 courses), students should be able to pass the [CompTIA Security+ Certification Exam ⤷ (http://certification.comptia.org/getCertified/certifications/security.aspx)](http://certification.comptia.org/getCertified/certifications/security.aspx) .

Upon successful completion of this course, students will:

- Gain experience with the online course system.
- Explain the general architecture of the Internet, including the main functions of end systems and routers.
- Describe the basic client-server architecture and how typical network applications (web, email) fit into the architecture.
- Explain how web pages are requested and delivered using HTTP.
- Explain in general how DNS enables our use of the Internet and, in particular, how hosts determine the IP address of network servers.
- Explain how MAC addresses are used and assigned to a packet as it traverses a network.
- Differentiate between wireless LANs and wired LANs.
- Explain how IP CIDR addressing is performed and how an IP address is assigned from a group of available addresses.
- Explain the core functions of TCP including details of connection setup.
- Analyze and differentiate among types of malware and attacks.
- Analyze and differentiate among types of wireless attacks and application attacks.
- Identify vulnerabilities potentially present in DNS, databases, and web applications.
- Summarize general cryptography concepts.
- Describe how certificates can be used for authentication and encryption.
- Explain how firewalls and VPNs can be used to protect a network.

More specific objectives for each topic are listed within each module.

How the Course Works

Methods of Delivery/Learning Activities

This online course employs several methods of delivery and learning activities including online videos and screencasts, threaded discussions, readings, written assignments, self-assessment checks, and exams.

Course Outline

The course is divided into two main sections, covering networking and cybersecurity. The material is divided into modules.

- Module 1 - Course Orientation and A Whirlwind Introduction to the Internet
- Module 2 - Application Layer, HTTP and DNS
- Module 3 - Transport Layer and Network Layer

- Module 4 - Link Layer and Wireless
- Module 5 - Cybersecurity Overview
- Module 6 - Cryptography
- Module 7 - Understanding Vulnerabilities
- Module 8 - MID-TERM EXAM
- Module 9 - Vulnerabilities, Exploits, Attacks, Countermeasures
- Module 10 - Vulnerabilities Mitigation, and Risk Management
- Module 11 - Cyber Attack, Exploitation, Authorities, and the Kill Chain
- Module 12 - Cyber Operations Components
- Module 13 - Cyber Operation Phases
- Module 14 - Application Attacks and Authentication
- Module 15 - FINAL EXAM

Discussion Board Policy

Every student must post their response to the discussion question for each module in the Discussion Forum. Though you are required to post your detailed response to each of the discussion question in the weeks when you have a discussion requirement by the deadline, you are also encouraged to response to other students' postings in order to have an interactive discussion environment. Your response to other students will not be graded though.

Grading Criteria

Please note that requirements differ for graduate and undergraduate students. Graduate students will have an additional assignment (more information will be provided later in the semester).

Grading

Your grade in this class will be based on the following:

Assignments	Description of Assignment	Percentage
Homework Assignments	- All the homework assignments will have equal weights and **only one attempt with no time limit.** - All homework assignments are in quiz format, encompassing question types such as MCQ, matching, ordering, fill in the blank, or very short essay questions. - Each homework assignment concludes with a query, allowing you to express which topic posed challenges in terms of comprehension. I strongly urge you to utilize that question for providing your feedback.	25%
Discussion Participation	In the weekly discussion forum, failing to submit your contribution on time will result in a score of 0.	5%

Assignments	Description of Assignment	Percentage
	• Responses such as "me too," nonsensical posts, or any content copied from the textbook or the internet without proper referencing will also receive a zero. • You are strongly encouraged to respond to posts made by other individuals.	
Hands-on Labs	• All the labs will have equal weights. • The labs encompass hands-on activities that involve data gathering from security/network-related websites, scenario-based multiple-choice questions, solution design, numerical calculations, and analysis, among other things.	10%
Course Project	• **CS462 Report** is only for the students who are registered to CS462 (not for CS562) • **CS562 Term Paper** is only for the students who are registered to CS562 (not for CS462)	10%
Mid-term Exam	• Please refer to the Course Summary at the end of the syllabus to view all the due dates. • The date for the mid-term exam is also indicated there. • Kindly mark the date, as no makeup exam opportunities will be provided.	25%
Final Exam	• Please refer to the Course Summary at the end of the syllabus to view all the due dates. • The date for the final exam is also indicated there. • Kindly mark the date, as no makeup exam opportunities will be provided.	25%

Grading Scale

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

For CS 562

Letter Grade	Range
A	95-100
A-	90-94
B+	87-89
B	84-86
B-	80-83

Letter Grade	Range
C+	77-79
C	74-76
C-	70-73
F	0-69

For CS 462

Letter Grade	Range
A	93 – 100
A-	89 – 92
B+	84 – 88
B	80 – 83
B-	77 – 79
C+	74 – 76
C	70 – 73
C-	67 – 69
D+	64 – 66
D	60– 63
D-	57 – 59
F	00 – 56

Since the graduate student grade scale does not include any D grade, a D, D-, or D+ for a graduate student will be reported as an F.

Late Submissions

Any submission after its deadline is considered late. The following penalties for late submissions apply:

- 0-24 hours late: -10%
- 25-48 hours late: -20%
- after 48 hours: not accepted

This time limit includes weekends--they are counted just like weekdays.

I reserve the right to specify that late submissions will not be accepted for specific submissions.

Student Responsibilities

Time Management

Students are expected to spend 10 hours per week on the course materials and assignments. Out of 10 hours, students are expected to spend approximately 5 hours/week to read the material, approximately another 4 hours/week for the homework and lab, and another 1 hour/week for discussions.

Attendance

Since this is an on-line course, there is no mandatory attendance policy. However, students are expected to actively participate in the discussions, homework submissions, and feedback. Each of these components is graded and counted toward the final grade.

Course Policies

Online Classroom Conduct

As most of our interactions will be online, please follow proper online etiquette. The following is a list of general guidelines for this course:

- Check your grammar and spelling.
- Keep your comments focused on the topic.
- Strive to write succinctly and clearly.
- Share your knowledge and include supportive evidence for your comments.
- Do not use all capital letters, as that is viewed as shouting.
- Disrespectful language is unacceptable.

Getting Help

If you need to contact the instructor about a private matter, the best way is through email, but do not expect or rely on an immediate response.

Attendance

Since this is an online course, there is no mandatory attendance policy. However, students are expected to actively participate in the discussions, homework submissions, and feedback. Each of these components is graded and counted towards the final grade.

Notification of Extenuating Circumstances

If a serious situation has occurred that will prevent you from submitting your work (assignments, exams, etc.) on time, notify your instructor 24 hours before the scheduled due date.

Disclaimer

Every attempt is made to provide a syllabus that is complete and that provides an accurate overview of the course. However, circumstances and events may make it necessary for the instructor to modify the

syllabus during the semester. This may depend, in part, on the progress, needs, and experiences of the students.

University Policies

Class Conduct

The following standards are intended to define acceptable behavior that preserves academic integrity and ensures that students have optimum environmental conditions for effective learning.

1. Students should notify instructors in advance when falling behind. In the event of an emergency that might affect the progress in the course, instructors must be notified as soon as possible.
2. Students will activate their Old Dominion email accounts and check them before each class. If the student chooses to have his/her messages forwarded to another account, it is the student's responsibility to take the necessary steps to have them forwarded.
3. Offensive language, gestures and the like are disrespectful and disruptive to the teaching-learning process.

Academic Integrity

Old Dominion University is committed to students' personal and academic success. In order to achieve this vision, students, faculty, and staff work together to create an environment that provides the best opportunity for academic inquiry and learning. All students must be honest and forthright in their academic studies. Your work in this course and classroom behavior must align with the expectations outlined in the Code of Student Conduct, which can be found at **www.odu.edu/oscai (https://www.odu.edu/oscai)** . The following behaviors along with classroom disruptions violate this policy, corrupt the educational process, and will not be tolerated.

- **Cheating:** Using unauthorized assistance, materials, study aids, or other information in any academic exercise.
- **Plagiarism:** Using someone else's language, ideas, or other original material without acknowledging its source in any academic exercise.
- **Fabrication:** Inventing, altering or falsifying any data, citation or information in any academic exercise.
- **Facilitation:** Helping another student commit, or attempt to commit, any Academic Integrity violation, or failure to report suspected Academic Integrity violations to a faculty member.

Important Note on the Use of AI Tools: Please note that the use of AI tools such as ChatGPT is strictly prohibited in this course. Any use of such tools will be considered a violation of the university honor code and will result in disciplinary action. Students must use their own knowledge and skills to complete any homework, assignments, labs, quizzes, blogs, papers, discussion posts, etc.

Academic dishonesty will be reported to the Office of Student Conduct & Academic Integrity and may result in sanctions up to and including expulsion from the University.

Plagiarism

No plagiarism will be tolerated under any circumstances. As faculty, I am bound to report any instances of plagiarism. All cases are heard before the honor council. If found guilty, the student automatically receives a failing grade in the course, and a notice is entered into the permanent record for a period of time.

College Class Conduct

The following standards are intended to define acceptable classroom behavior that preserves academic integrity and ensures that students have optimum environmental conditions for effective learning.

1. Students must turn off cell phones and pagers during class or have them set to vibrate mode.
2. Classes are expected to begin on time, and students will respect the time boundaries established by the professor. If classroom doors are locked, students may not knock or seek entrance in other ways.
3. Students should notify instructors in advance when a class will be missed. In the event of an emergency that causes a class to be missed, instructors must be notified as soon as possible.
4. Instructors may require that cell phones and other electronic devices be left on their desks during tests or examinations.
5. Students must not engage in extraneous conversations during classes. Such acts are considered to be violations of the Code of Student Conduct.
6. Students will activate their Old Dominion e-mail accounts and check them before each class. If the student chooses to have his/her messages forwarded to another account, it is the student's responsibility to take the necessary steps to have them forwarded.
7. Consumption of food and drink during class is prohibited, except when the professor has specifically approved of such acts.
8. Offensive language, gestures and the like are disrespectful and disruptive to the teaching-learning process.

Honor Code

The Old Dominion University Honor Code will be strictly enforced. By attending Old Dominion University, you have signed a pledge accepting the responsibility to abide by the following Honor Code found at Office of Student Conduct and Academic Integrity.

We, the students of Old Dominion University, aspire to be honest and forthright in our academic endeavors. Therefore, we will practice honesty and integrity and be guided by the tenets of the Monarch Creed. We will meet the challenge to be beyond reproach in our actions and our words. We will conduct ourselves in a manner that commands the dignity and respect that we also give to others. ODU Honor Code

This is an institutional policy approved by the Board of Visitors. The University Honor Code applies to all assignments.

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. ODU Honor Pledge

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 **Policies and Student Responsibilities (https://online.odu.edu/admissions/policies-and-student-responsibilities)** .

Educational Accessibility

In compliance with PL94-142 and more recent federal legislation affirming the rights of disabled individuals, provisions will be made for students with special needs on an individual basis. The student must be identified by the university and provide a letter from the Office of Educational Accessibility (OEA), located at 1021 Student Success Center. Any accommodations will be based upon written guidelines from the Office of Educational Accessibility (OEA). All students are expected to fulfill all course requirements.

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 which 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 **OEA Website (http://www.odu.edu/educationalaccessibility/)** .

University Email & Electronic Messaging Systems Policies

Electronic messaging systems and communication services are provided by Old Dominion University for the purpose of enhancing productivity and maintaining effective communication.

Old Dominion University employees, students, employees of affiliated organizations, and guests, volunteers, and researchers who are provided official email accounts must activate and maintain regular access to these accounts. These accounts must be used to send and receive electronic communications related to official University business.

Failure to access the email account will not exempt individuals from their responsibility of being aware of and meeting requirements and responsibilities included in electronic communications.

Message content is the sole responsibility of the individual sending the message and users must adhere to **University Policy 3500, Use of Computing Resources (https://www.odu.edu/about/policiesandprocedures/university/3000/3500)** , and **Information Technology Standard 09.1.0, Acceptable Use Standard (http://www.odu.edu/about/policiesandprocedures/computing/standards/09/01)** . Users are also encouraged to practice generally accepted online etiquette.

Instructors retain the discretion of establishing class expectations for email and other electronic messaging communication as a part of the course requirements.

Alternative messaging services should be arranged in cases where users' access to information technology resources is limited or unavailable.

Incomplete

Documented illnesses, deaths in family, car accidents, or other traumatic occurrences call for flexibility and good judgment on the part of the student and instructor. These situations are rare and are handled individually. Should such a situation occur, students **MUST** contact **Student Outreach & Support (https://www.odu.edu/life/support/student-outreach)** . Email **oducares@odu.edu (mailto:oducares@odu.edu)** or by phone **757-683-3442 (tel:+17576833442)** to acquire the necessary documentation. An incomplete grade will only be given under the following circumstances

1. The student has completed ½ or more of the course requirements with a C or better
2. There is legitimate deficiency due to the illness or emergencies deemed acceptable to the instructor
3. There is not neglect on the student's part.

Withdrawal

A syllabus constitutes an agreement between the student and the course instructor about course requirements. Participation in this course indicates your acceptance of its teaching focus, requirements, and policies. 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 - you should drop the class by the drop/add deadline, which is located in the ODU Schedule of Classes. For more information, please visit the Office of the Registrar.

Student Acknowledgement

"I, _____ , have completely read this syllabus and understand and agree to the course

Course Summary:

Date	Details	Due
Sun Jan 25, 2026	🚀 **Module 1 Lab** **(https://canvas.odu.edu/courses/201330/assignments/3025939)**	due by 11:59pm
	🚀 **Module 1: Homework** **(https://canvas.odu.edu/courses/201330/assignments/3025944)**	due by 11:59pm
	💬 **Module 1 - Discussion (Personal Introduction)** **(https://canvas.odu.edu/courses/201330/assignments/3025962)**	due by 11:59pm
Sun Feb 1, 2026	💬 **Module 2 - Discussion** **(https://canvas.odu.edu/courses/201330/assignments/3025972)**	due by 11:59pm
	🚀 **Module 2 Lab** **(https://canvas.odu.edu/courses/201330/assignments/3025955)**	due by 11:59pm
	🚀 **Module 2: Homework** **(https://canvas.odu.edu/courses/201330/assignments/3025947)**	due by 11:59pm
Sun Feb 8, 2026	💬 **Module 3 - Discussion** **(https://canvas.odu.edu/courses/201330/assignments/3025971)**	due by 11:59pm
	🚀 **Module 3 Lab** **(https://canvas.odu.edu/courses/201330/assignments/3025958)**	due by 11:59pm
	🚀 **Module 3: Homework** **(https://canvas.odu.edu/courses/201330/assignments/3025946)**	due by 11:59pm

Date	Details	Due
Sun Feb 15, 2026	📲 **Module 4 - Discussion** (https://canvas.odu.edu/courses/201330/assignments/3025967)	due by 11:59pm
	🚀 **Module 4 Lab** (https://canvas.odu.edu/courses/201330/assignments/3025953)	due by 11:59pm
	🚀 **Module 4: Homework** (https://canvas.odu.edu/courses/201330/assignments/3025936)	due by 11:59pm
Sun Feb 22, 2026	📲 **Module 5 - Discussion** (https://canvas.odu.edu/courses/201330/assignments/3025968)	due by 11:59pm
	🚀 **Module 5 Lab** (https://canvas.odu.edu/courses/201330/assignments/3025952)	due by 11:59pm
	🚀 **Module 5: Homework** (https://canvas.odu.edu/courses/201330/assignments/3025931)	due by 11:59pm
Sun Mar 1, 2026	📲 **Module 6 - Discussion** (https://canvas.odu.edu/courses/201330/assignments/3025970)	due by 11:59pm
	🚀 **Module 6 Lab** (https://canvas.odu.edu/courses/201330/assignments/3025932)	due by 11:59pm
	🚀 **Module 6: Homework** (https://canvas.odu.edu/courses/201330/assignments/3025938)	due by 11:59pm

Date	Details	Due
	💬 **Module 7 - Discussion** (https://canvas.odu.edu/courses/201330/assignments/3025969) ⓧ	due by 11:59pm
Sun Mar 8, 2026	🚀 **Module 7 Lab** (https://canvas.odu.edu/courses/201330/assignments/3025940) ⓧ	due by 11:59pm
	🚀 **Module 7: Homework** (https://canvas.odu.edu/courses/201330/assignments/3025950) ⓧ	due by 11:59pm
Thu Mar 12, 2026	🚀 **Mid-Term Exam** (https://canvas.odu.edu/courses/201330/assignments/3025941) ⓧ	due by 11:59pm
	💬 **Module 9 - Discussion** (https://canvas.odu.edu/courses/201330/assignments/3025961) ⓧ	due by 11:59pm
Sun Mar 29, 2026	🚀 **Module 9 Lab** (https://canvas.odu.edu/courses/201330/assignments/3025933) ⓧ	due by 11:59pm
	🚀 **Module 9: Homework** (https://canvas.odu.edu/courses/201330/assignments/3025937) ⓧ	due by 11:59pm
Sun Apr 5, 2026	💬 **Module 10 - Discussion** (https://canvas.odu.edu/courses/201330/assignments/3025964) ⓧ	due by 11:59pm
	🚀 **Module 10 Lab** (https://canvas.odu.edu/courses/201330/assignments/3025943) ⓧ	due by 11:59pm

Date	Details	Due
	🚀 **Module 10: Homework** **(https://canvas.odu.edu/courses/201330/assignments/3025949)**	due by 11:59pm
Sun Apr 12, 2026	💬 **Module 11 - Discussion** **(https://canvas.odu.edu/courses/201330/assignments/3025966)**	due by 11:59pm
	🚀 **Module 11 Lab** **(https://canvas.odu.edu/courses/201330/assignments/3025957)**	due by 11:59pm
	🚀 **Module 11: Homework** **(https://canvas.odu.edu/courses/201330/assignments/3025956)**	due by 11:59pm
Sun Apr 19, 2026	💬 **Module 12 - Discussion** **(https://canvas.odu.edu/courses/201330/assignments/3025963)**	due by 11:59pm
	🚀 **Module 12 Lab** **(https://canvas.odu.edu/courses/201330/assignments/3025951)**	due by 11:59pm
	🚀 **Module 12: Homework** **(https://canvas.odu.edu/courses/201330/assignments/3025948)**	due by 11:59pm
Sun Apr 26, 2026	💬 **Module 13 - Discussion** **(https://canvas.odu.edu/courses/201330/assignments/3025965)**	due by 11:59pm
	🚀 **Module 13 Lab** **(https://canvas.odu.edu/courses/201330/assignments/3025930)**	due by 11:59pm

Date	Details	Due
	🚀 **Module 13: Homework** **(https://canvas.odu.edu/courses/201330/assignments/3025945)**	due by 11:59pm
	📝 **Course Project - CS462 Report (for CS462 Students Only)** **(https://canvas.odu.edu/courses/201330/assignments/3025975)**	due by 11:59pm
	📝 **Course Project - CS562 Term Paper (for CS562 Students Only)** **(https://canvas.odu.edu/courses/201330/assignments/3025976)**	due by 11:59pm
Sun May 3, 2026	📝 **Extra Credit - Student Opinion Survey - Screenshot** **(https://canvas.odu.edu/courses/201330/assignments/3025977)**	due by 11:59pm
	💬 **Module 14 - Discussion** **(https://canvas.odu.edu/courses/201330/assignments/3025960)**	due by 11:59pm
	🚀 **Module 14 Lab** **(https://canvas.odu.edu/courses/201330/assignments/3025934)**	due by 11:59pm
	🚀 **Module 14: homework** **(https://canvas.odu.edu/courses/201330/assignments/3025954)**	due by 11:59pm
Fri May 8, 2026	🚀 **Final Exam** **(https://canvas.odu.edu/courses/201330/assignments/3025935)**	due by 11:59pm