Course Syllabus

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Course Information

Course Name: Cryptography for Cybersecurity

Course Number: CS 463/563

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

Semester/Year: **Spring 2026**

Instructor Information

Instructor: Jonathan S. Takeshita, Ph.D. Assistant Professor, School of Cybersecurity and Department of Computer Science. You can also just call me "Dr. Takeshita", "Dr. T", or "竹下先生".

Instructor Email: jtakeshi+cs463@odu.edu (mailto:jtakeshi+cs463@odu.edu) (Please read this   (https://medium.com/@lportwoodstacer/how-to-email-your-professor-without-being-annoying-af-cf64ae0e4087) before emailing)

Instructor Office Hours: **Wednesdays, 1PM-2PM, by Zoom, or in person (location available upon request).**

Office Hours Zoom Link: https://odu.zoom.us/j/96411336263?pwd=zXPQ6QRPjJWeWC6jxG72nK9CK3kMk9.1   (https://odu.zoom.us/j/96411336263?pwd=zXPQ6QRPjJWeWC6jxG72nK9CK3kMk9.1)

(I receive an email notification when someone joins the Zoom meeting, so it may take me a moment to join you.)

Course Type

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

Course Description

After completing this 3-credit course, students should have strong mathematical foundations including information theory, number theory, factoring, and prime number generation; cryptographic protocols including basic building blocks and protocols; cryptographic techniques including key generation and key management, and applications; cryptographic algorithms including DES, AES, Stream Ciphers, Hash functions, digital signatures, and more.

Required Textbooks

Paar, C. Pelzl, J. (2010). *Understanding Cryptography: A Textbook for Students and Practitioners*. Springer Heidelberg Dordrecht London New York, 1st edition. ISBN: 978-3-642-04100-6. Available (please let me know if the link is incorrect): **https://odu.primo.exlibrisgroup.com/permalink/01ODU_INST/2qoc17/alma991024114**

(https://odu.primo.exlibrisgroup.com/permalink/01ODU_INST/2qoc17/alma9910241140069031

Rosulek, Mike. The joy of cryptography. Oregon State University, 2021. Available: **https://joyofcryptography.com/**   **(https://joyofcryptography.com/)**

Herzberg, Amir. Applied Introduction to Cryptography and Cybersecurity. WORLD SCIENTIFIC PUB, 2025. Available: **https://sites.google.com/site/amirherzberg/crypto-cyber-book (https://sites.google.com/site/amirherzberg/crypto-cyber-book)**

Other readings are listed in each module. Besides these textbooks and readings, students may need to do independent research in this course.

Course Objectives

Upon successful completion of this course, students will:

1. Explain the functionality of current cryptographic techniques
2. Identify the basic mathematical techniques underlying cryptology
3. Evaluate the computational and memory needs of cryptographic techniques
4. Measure the security strengths and risks of cryptographic techniques
5. Discern implications of hardware and software implementations of cryptographic techniques
6. Analyze and critique new cryptographic protocols
7. Analyze applications in terms of security needs
8. Match the security needs of application with appropriate cryptographic techniques

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 lectures and presentations, threaded discussions, websites, video clips, reading and written assignments, self-assessment checks, examinations, e-mail, and electronic access of information.

All homework and exams will be completed using LaTeX - homework typeset in any other format (e.g., via Microsoft Word) will not be accepted. You may use any standard file format for the final project, but I strongly recommend LaTeX for papers.

Assignments are generally due on Sunday nights, though I have changed this for your first assignment to ensure that you have one week for it.

Grading Criteria

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

Criteria	Percentage
Mid-Term Examination	25%
Final Examination	25%
Discussion & CIQ	5%

Criteria	Percentage
Course Project	20%
Homework	25%
Total	100%

Grading Scale

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

For CS 563:

Letter Grade	Range
A	95-100
A-	90-94
B+	87-89
B	84-86
B-	80-83
C+	77-79
C	74-76
C-	70-73
F	0-69

For CS 463:

Letter Grade	Range
A	90-100
A-	87-89
B+	84-86
B	80-83
B-	77-79
C+	74-76
C	70-73

Letter Grade	Range
C-	67-69
D+	64-66
D	60-63
D-	57-59
F	0-56

Since the ODU graduate student grade scale does not include any D grades, a D, D-, or D+ for a graduate student will be reported as an F. Students enrolled in CS 563 will have more difficult exams and will be expected to have higher-quality final projects.

Also, students must make serious efforts to complete all or most of this course's assignments. **Students who do not meaningfully attempt at least seven (7) of the eleven (11) homework assignments will automatically be assigned a grade of F (or WF, if appropriate).**

Late Assignments

Any assignment submitted after its deadline is considered late. The following penalties for late assignments apply:

- 0-24 hours late: -20%
- After 24 hours: Late work will not be 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 particular assignments. Late submissions are only accepted for homework, and not for projects or exams. Late work after the grace period is not accepted - no exceptions!

Student Responsibilities

Time Management

Students are expected to spend at least 10 hours per week on the course materials and assignments. Of these, students are expected to spend approximately 3 hours per week

to read the material and another 3 hours/week for the homework and discussions. Students are expected to stay on top of their deadlines and turn in work on time.

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 journal writing. Each of these components is graded and counted toward the final grade.

Intellectual Independence

Students should make their best possible efforts before seeking instructor guidance. When asking for help, expect to be asked "what have you tried so far?". If the answer to a question is directly apparent from the syllabus or course materials, then the student will be prompted to review these materials. This encourages self-sufficiency and student-centered learning. Students must also produce work that is only a result of their own efforts - using AI or other prohibited resources will only reduce the intellectual load on a student, harming their development and skills. For this reason, no student work produced using AI will be given a grade higher than zero, independently of any consequences from a referral to the OSAAI.

Communication

Students are expected to not only learn course material, but effectively communicate their understanding of it through clear and elegant communication in all assessments. Students' communication must also be professional and respectful, and refrain from making unfair or unreasonable requests, especially regarding grading and course policies. Grade grubbing (https://www.psychologytoday.com/us/blog/culture-mind-and-brain/201705/dear-students-no-i-wont-raise-your-grades) is strictly prohibited! Asking course staff to bump or otherwise falsify grades, or for any other unfair advantage, is a violation of academic honesty, and will result in a grade penalty and a referral to the ODU Office of Student Accountability & Academic Integrity.

Course Policies

Online Classroom Conduct (Netiquette)

Students are expected to follow good **Netiquette (http://www.albion.com/netiquette/corerules.html)** rules. Netiquette is the accepted behavior for online participation. 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.
- Avoid flaming—disrespectful language is unacceptable.

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 journal writing. Each of these components is graded and counted toward the final grade.

Tests and Makeups

No makeup or early exams are given. Students have periods of approximately three (3) days in which to complete exams, and should take the exam well before the end of that period to preclude issues such as Internet connectivity or other computer troubles.

Course Disclaimers

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.

Course staff do occasionally make mistakes. If you have found an arithmetic or logical error in one of your grades, then please contact course staff via email or Canvas message with a detailed description of the error. Requests for corrections must come **no sooner than 24 hours before** and no later than 7 days after the grade is returned.

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 if 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 Honor Council (https://www.odu.edu/about/monarchcitizenship) .

Under no circumstances will an assessment linked to a violation of academic honesty be given a grade higher than 0%. False or misleading statements made to an instructor my also be considered violations of this policy.

Any violation of this policy places the entire body of work produced by a student into question. For this reason, a finding of responsibility in violating this policy will generally result in the assignment of an automatic failing grade in the course. Egregious violations may result in forfeiture of the privilege to enroll in my future courses.

Important Note on the Use of AI Tools: Please note that the use of AI tools, including ChatGPT, MonarchMind, Copilot, Gemini, Grammarly, etc., is strictly prohibited for this course. It is the responsibility of the student to avoid using AI tools, even those that are integrated with other software. Any use of such tools will be considered a violation of both course policy and the university honor code and will result in disciplinary action. Students must use their own knowledge and skills to complete any homework, assignments, quizzes, blogs, papers, discussion posts, etc. See here (https://link.springer.com/content/pdf/10.1007/s00146-025-02323-9.pdf) for discussion on how the use of LLMs can harm student learning.

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 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/)** .

For an accommodation to be enacted, I require 1) reasonable advance notice, 2) validation by the OEA and/or other appropriate authorities, e.g., a physician's note, and 3) that the accommodation is reasonable, i.e., not introducing excessive burdens on course staff, or compromising fairness or rigor.

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 (Canvas, faculty websites, etc.).

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 (https://www.odu.edu/academics/calendar)** . For more information, please visit the Office of the **University Registrar (https://www.odu.edu/registrar)** .

Student Acknowledgement

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

Course Summary:

Date	Details	Due
	💬 **CIQ Journal - Module 1** (https://canvas.odu.edu/courses/201354/assignments/2964764) 🔴	due by 11:59pm
Sun Jan 25, 2026	🚀 **Complete Syllabus Quiz** (https://canvas.odu.edu/courses/201354/assignments/2964790) 🟢	due by 11:59pm
	💬 **Module 1 Discussion (Personal Introduction)** (https://canvas.odu.edu/courses/201354/assignments/2964755) 🟢	due by 11:59pm
Tue Jan 27, 2026	📝 **Homework 1** (https://canvas.odu.edu/courses/201354/assignments/2964574) 🔴	due by 11:59pm
Sun Feb 1, 2026	📝 **Homework 2** (https://canvas.odu.edu/courses/201354/assignments/2964575) 🔴	due by 11:59pm
	💬 **Module 2 Discussion** (https://canvas.odu.edu/courses/201354/assignments/2964754) 🟢	due by 11:59pm
Sun Feb 8, 2026	📝 **Homework 3** (https://canvas.odu.edu/courses/201354/assignments/2964576) 🔴	due by 11:59pm

Date	Details	Due
	Module 3 Discussion (https://canvas.odu.edu/courses/201354/assignments/2904755)	due by 11:59pm
Sun Feb 15, 2026	**Homework 4** (https://canvas.odu.edu/courses/201354/assignments/2904777)	due by 11:59pm
	Module 4 Discussion (https://canvas.odu.edu/courses/201354/assignments/2904756)	due by 11:59pm
Sun Feb 22, 2026	**Homework 5** (https://canvas.odu.edu/courses/201354/assignments/2904778)	due by 11:59pm
	Module 5 Discussion (https://canvas.odu.edu/courses/201354/assignments/2904757)	due by 11:59pm
Sun Mar 1, 2026	**CIQ journal - Module 6** (https://canvas.odu.edu/courses/201354/assignments/2904765)	due by 11:59pm
	Homework 6 (https://canvas.odu.edu/courses/201354/assignments/2904779)	due by 11:59pm
	Module 6 Discussion (https://canvas.odu.edu/courses/201354/assignments/2904758)	due by 11:59pm

Date	Details	Due
Sun Mar 22, 2026	📝 **Homework 7** (https://canvas.odu.edu/courses/201354/assignments/2964760)	due by 11:59pm
	💬 **Module 7 Discussion** (https://canvas.odu.edu/courses/201354/assignments/2964759)	due by 11:59pm
Tue Mar 24, 2026	🚀 **Midterm Exam** (https://canvas.odu.edu/courses/201354/assignments/2964751)	due by 11:59pm
Sun Mar 29, 2026	💬 **Final Project - Proposal and Feedback** (https://canvas.odu.edu/courses/201354/assignments/2964752)	due by 11:59pm
	📝 **Homework 9** (https://canvas.odu.edu/courses/201354/assignments/2964761)	due by 11:59pm
	💬 **Module 9 Discussion** (https://canvas.odu.edu/courses/201354/assignments/2964758)	due by 11:59pm
Wed Apr 1, 2026	📝 **Topic of the Course Project** (https://canvas.odu.edu/courses/201354/assignments/2964782)	due by 11:59pm
Sun Apr 5, 2026	💬 **CIQ Journal - Module 10** (https://canvas.odu.edu/courses/201354/assignments/2964766)	due by 11:59pm

Date	Details	Due
	📝 **Homework 10** (https://canvas.odu.edu/courses/201354/assignments/2964772)	due by 11:59pm
	💬 **Module 10 Discussion** (https://canvas.odu.edu/courses/201354/assignments/2964761)	due by 11:59pm
Sun Apr 12, 2026	📝 **Homework 11** (https://canvas.odu.edu/courses/201354/assignments/2964773)	due by 11:59pm
	💬 **Module 11 Discussion** (https://canvas.odu.edu/courses/201354/assignments/2964762)	due by 11:59pm
	📝 **(Extra Credit) Progress Report** (https://canvas.odu.edu/courses/201354/assignments/2964769)	due by 11:59pm
Sun Apr 19, 2026	📝 **Homework 12** (https://canvas.odu.edu/courses/201354/assignments/2964774)	due by 11:59pm
	💬 **Module 12 Discussion** (https://canvas.odu.edu/courses/201354/assignments/2964763)	due by 11:59pm
Sun Apr 26, 2026	💬 **Module 13 Discussion** (https://canvas.odu.edu/courses/201354/assignments/2964768)	due by 11:59pm
Mon May 4, 2026	💬 **CIQ Journal - Module 14** (https://canvas.odu.edu/courses/201354/assignments/2964767)	due by 11:59pm

Date	Details	Due
	📝 **Course Project Submission** (https://canvas.odu.edu/courses/201354/assignments/2964770)	due by 11:59pm
Fri May 8, 2026	🚀 **Final Exam** (https://canvas.odu.edu/courses/201354/assignments/2964750)	due by 11:59pm