

Course Syllabus

Course Name: Network Security

Course Number: CS 478

Credits: 4

Instructor name: D. Kevin McGrath

Instructor email: d.kevin.mcgrath@oregonstate.edu

Teaching Assistant name and contact info: TBD

Course Description

Introduction to the skills and tools necessary to investigate network security. Packet capture, fuzzing, protocol analysis. Introduction to firewalls and intrusion prevention/detection systems.

Prerequisites: CS 372.

Communication

Please post all course-related questions through Slack (oregonstate.enterprise.slack.com) so that the whole class may benefit from our conversation. Please contact me privately via university supplied email for matters of a personal nature or if you are uncomfortable posting where the whole class can see/comment. I strive to reply to course-related questions within 24 hours. I will strive to return your assignments and grades for course activities to you within five business days of the due date. No other communication channels are used in this course.

Course Credits

This course combines approximately 120 hours of online activities, lab sessions, and assignments for 4 credits.

Technical Assistance

If you experience any errors or problems while in your course, contact 24-7 Canvas Support through the Help link within Canvas. If you experience computer difficulties, need help downloading a browser or plug-in, or need assistance logging into a course, contact the IS Service Desk for assistance. You can call (541) 737-8787 or visit the IS Service Desk online.

Learning Resources

This course is primarily taught via streaming media and posted online resources. No textbook is required. Virtual machines are used extensively, and a laptop/desktop supporting such is required, as per College of Engineering computing guidelines.

Primary office hours are via Slack call or Zoom session. I **strongly** encourage you to purchase a quality headset or microphone setup. Recommendations and details of meeting electronically will be posted to the introductory module on Canvas.

Note to prospective students: Please check with the OSU Beaver Store for up-to-date information for the term you enroll (OSU Beaver Store Website or 800-595-0357). If you purchase course materials from other sources, be very careful to obtain the correct ISBN.

Online Course Delivery

This is an online course delivered via Canvas. Within the course Canvas site you will access the learning materials and syllabus, submit assignments, and obtain additional resources as they are available.

Course discussion will be via the university supplied Slack environment. Direct communication with the instructor should be via email, but should be reserved for direct, personal, or sensitive issues. Class content related material should be discussed via Slack.

- **Online in Canvas**, you will view the lectures, as well as obtain assignment descriptions, links to additional resources, and submit assignments. This will include hands-on security activities, including protocol reverse engineering, network analysis, as well as discussion of current homework as necessary.
- **Discussion via Slack** will be expected, with weekly topics the primary discussion topic. Additional channels will be created as necessary to discuss relevant, but unrelated topics – including, but not limited to, current events in security, CTF (capture-the-flag) activities, and significant events in computer security.

Measurable Student Learning Outcomes

Upon successful completion of this *course*, students will be able to:

1.
 1. **Select** among packet capture strategies for specific situations
 2. **Analyze** protocols to determine potential security weaknesses
 3. **Create** protocol fuzzers to find potential vulnerabilities
 4. **Select** appropriate defensive strategies based on goals

Evaluation of Student Performance

This course uses a weighted average of assignments. All assignments will be graded out of 100 points, with the following weights towards the final grade:

- Weekly write-ups: 30%
- Final Exam: 40%
- Homework Assignments: 30%

While discussion will not be explicitly graded, it is expected that you will be involved in the online discussions.

Letter Grade

Letter grades will be assigned based on standard ranges with +/- steps.

Grade	Percent Range
A	90-100
B	80-90
C	70-80
D	60-70
F	<60

Course Content

Week	Topic	Learning Activities
1	Introduction, policy, legal aspects, audit	Module summary, explorations*
2	Network Reconnaissance	Module summary, explorations*
3	Capturing packets with tcpdump	Module summary, explorations*, HW1
4	Packet capture with wireshark	explorations*, module summary
5	Packet processing with scapy	HW2, explorations*, module summary
6	Advanced scapy	HW3, explorations*, module summary
7	Protocol reversing	explorations*, module summary
8	Protocol fuzzing	HW4, explorations*, module summary
9	Firewalls	Explorations*, module summary
10	IPS/IDS	Explorations*, module summary
Finals		Final paper

*Explorations are ungraded learning activities that typically involve a hands-on activity related to the current topic. These include usages of tools, looking at packet captures, etc.

Course Policies

Discussion Participation

Students are expected to participate in discussions. This is not a self-paced course, and you will be expected to keep up with the content. The discussions are provided to help you do that.

Late Work Policy

No late work will be accepted without prior discussion. I understand that life happens, but request for late hand-in must be submitted **prior** to the due date. Permission will be granted dependent upon reasons, current state of completion, etc.

Incompletes

Incomplete (I) grades will be granted only in emergency cases (usually only for a death in the family, major illness or injury, or birth/adoption of a child), and if the student has turned in 90% of the points possible **AT THE TIME OF REQUEST**. In other words, if you have been keeping up, but a major life event occurs, let me know as soon as possible. If you are having any difficulty that might prevent you completing the coursework, please don't wait until the end of the term; let me know right away.

Guidelines for a Productive and Effective Online Classroom

Students are expected to conduct themselves in the course (e.g. on discussion boards, email) in compliance with the university's regulations regarding civility. Civility is an essential ingredient for academic discourse. All communications for this course should be conducted constructively, civilly, and respectfully. Differences in beliefs, opinions, and approaches are to be expected. In all you say and do for this course, be professional. Please bring any communications you believe to be in violation of this class policy to the attention of your instructor.

Active interaction with peers and your instructor is essential to success in this course, paying particular attention to the following:

- Unless indicated otherwise, please complete the readings and view other instructional materials for each week before coming to class and/or participating in the discussion board.
- Read your posts carefully before submitting them.
- Be respectful of others and their opinions, valuing diversity in backgrounds, abilities, and experiences.
- Challenging the ideas held by others is an integral aspect of critical thinking and the academic process. Please word your responses carefully, and recognize that others are expected to challenge your ideas. A positive atmosphere of healthy debate is encouraged.

Statement Regarding Students with Disabilities

Accommodations for students with disabilities are determined and approved by Disability Access Services (DAS). If you, as a student, believe you are eligible for accommodations but have not obtained approval, please contact DAS immediately at 541-737-4098 or at <http://ds.oregonstate.edu>. DAS notifies students and faculty members of approved academic accommodations and coordinates implementation of those accommodations. While not required, students and faculty members are encouraged to discuss details of the implementation of individual accommodations.

Accessibility of Course Materials

All materials used in this course are accessible with the exception of some of the hands on materials which require vision and manual dexterity. If you require accommodations please contact Disability Access Services (DAS).

Additionally, Canvas, the learning management system, provides a vendor statement certifying how the platform is accessible to students with disabilities.

Expectations for Student Conduct

Student conduct is governed by the university's policies, as explained in the Student Conduct Code. Students are expected to conduct themselves in the course in compliance with the university's regulations regarding civility.

Academic Integrity

Students are expected to comply with all regulations pertaining to academic honesty. For further information, visit Student Conduct and Community Standards, or contact the office of Student Conduct and Mediation at 541-737-3656.

OAR 576-015-0020 (2) Academic or Scholarly Dishonesty:

1. a) Academic or Scholarly Dishonesty is defined as an act of deception in which a Student

seeks to claim credit for the work or effort of another person, or uses unauthorized materials or fabricated information in any academic work or research, either through the Student's own efforts or the efforts of another.
2. b) It includes:
 1. i) CHEATING - use or attempted use of unauthorized materials, information or study

aids, or an act of deceit by which a Student attempts to misrepresent mastery of academic effort or information. This includes but is not limited to unauthorized copying or collaboration on a test or assignment, using prohibited materials and texts, any misuse of an electronic device, or using any deceptive means to gain academic credit.
 2. ii) FABRICATION - falsification or invention of any information including but not limited to falsifying research, inventing or exaggerating data, or listing incorrect or fictitious references.
 3. iii) ASSISTING - helping another commit an act of academic dishonesty. This includes but is not limited to paying or bribing someone to acquire a test or assignment, changing someone's grades or academic records, taking a test/doing an assignment for someone else by any means, including misuse of an electronic device. It is a violation of Oregon state law to create and offer to sell part or all of an educational assignment to another person (ORS 165.114).
 4. iv) TAMPERING - altering or interfering with evaluation instruments or documents.

5. v) PLAGIARISM - representing the words or ideas of another person or presenting

someone else's words, ideas, artistry or data as one's own, or using one's own previously submitted work. Plagiarism includes but is not limited to copying another person's work (including unpublished material) without appropriate referencing, presenting someone else's opinions and theories as one's own, or working jointly on a project and then submitting it as one's own.

3. c) Academic Dishonesty cases are handled initially by the academic units, following the process outlined in the University's Academic Dishonesty Report Form, and will also be referred to SCCS for action under these rules.

Tutoring and Writing Assistance

NetTutor is a leading provider of online tutoring and learner support services fully staffed by experienced, trained and monitored tutors. Students connect to live tutors from any computer that has Internet access. NetTutor provides a virtual whiteboard that allows tutors and students to work on problems in a real time environment. They also have an online writing suite where tutors critique and return essays within 24 to 48 hours. Access NetTutor from within your Canvas class by clicking on the Tools button in your course menu.

The Oregon State Online Writing Suite is also available for students enrolled in Ecampus courses.

TurnItIn

Your instructor may ask you to submit one or more of your writings to Turnitin, a plagiarism prevention service. Your assignment content will be checked for potential plagiarism against Internet sources, academic journal articles, and the papers of other OSU students, for common or borrowed content. Turnitin generates a report that highlights any potentially unoriginal text in your paper. The report may be submitted directly to your instructor or your instructor may elect to have you submit initial drafts through Turnitin, and you will receive the report allowing you the opportunity to make adjustments and ensure that all source material has been properly cited. Papers you submit through Turnitin for this or any class will be added to the OSU Turnitin database and may be checked against other OSU paper submissions. You will retain all rights to your written work. For further information, visit Academic Integrity for Students: Turnitin – What is it?

Student Evaluation of Courses

The online Student Evaluation of Teaching system opens to students during the week before finals and closes the Monday following the end of finals. Students receive notification, instructions and the link through their ONID. They may also log into the system via Online Services. Course evaluation results are extremely important and used to help improve courses and the online learning experience for future students. Responses are anonymous (unless a student chooses to "sign" their comments, agreeing to relinquish anonymity) and unavailable to instructors until after grades have been posted. The results of scaled questions and signed comments go to both the instructor and their unit head/supervisor. Anonymous (unsigned) comments go to the instructor only.

