Oregon State University
Ecampus

Course Name: Introduction to Computer Networks
Course Number: CS 372
Credits: 4
Instructor name: Joseph Jess
Instructor email: JessJo@OregonState.edu
Prerequisites: CS 261, and either ECE 271 or CS 271

Teaching Assistant name(s) and contact info:

- Dayeon Oh (ohda@oregonstate.edu)
- Rafid AlMahadi (mohammra@oregonstate.edu)
- Fariba Khan (khanfari@oregonstate.edu)

Two fundamental rules

- You are responsible for knowing the contents of the syllabus and all of the information about the course provided on Canvas.
- You are responsible for knowing the contents of instructor announcements made on Canvas and Piazza, which means that you should make sure you receive such announcements and that you check for new ones at least once a day.

Course Description

Computer network principles, fundamental networking concepts, packet- switching and circuit switching, TCP/IP protocol layers, reliable data transfer, congestion control, flow control, packet forwarding and routing, MAC addressing, multiple access techniques.

Communication

Please post all course-related questions in the Piazza discussion boards so that the whole class may benefit from our conversations. Not all posts require a reply from the instructor or learning assistants and often it is better for students to work on an answer to a question themselves, helping cement understanding or locate resources to answer questions.

To contact the learning assistants, open Canvas Inbox, compose a new message, select this course, then next to the 'To' box click the address book, select "Teaching Assistants", then choose the name(s) of learning assistants you wish to contact.

Please email the instructor only for matters of a personal or private (grading) nature. The instructor or a learning assistant will reply to most course-related questions within 24-48 hours.

If there are questions about grading, please contact your assigned grader first but feel free to reach out to an instructor directly if there are still questions afterward.

Office hours and other synchronous discussions will be held on Piazza, Slack, and potentially Zoom. Otherwise, this course is fully asynchronous. Students will be expected to make full use of the course materials and other engagement opportunities. Students are also encouraged to participate in discussions on Piazza and Slack. Not only is there opportunity

to have your questions answered, but also to help others, which is one of the best ways to learn.

Ground Rules for Online Communication & Participation:

- Online threaded discussions are public messages, and all writings in this area will be viewable by the entire class or assigned group members. If you prefer that only the instructor reads a communication, then send it to the instructor directly by email or Slack, making sure to identify yourself and the course.
- Posting of personal contact information is discouraged (e.g. telephone numbers, address, personal website address).
- Online Instructor Response Policy: Instructor and learning assistants check emaila few times a day and we will do our best to respond to course-related questions within 48 hours if you use a **[CS372]** at the front of your subject line.
- Observation of "Netiquette": All our online communications should be composed with fairness, honesty and tact. Spelling and grammar are very important in an online course. What we put into an online course reflects on our professionalism. Here are some references discussing
    - writing online: http://goto.intwg.com/
    - netiquette: http://www.albion.com/netiquette/corerules.html
- Please check Piazza and the course syllabus before asking general course questions. If you don't see the answer there, then post a new question on the Piazza discussion boards.

(Adapted from Jean Mandernach, PSY)

Guidelines for a productive and effective online classroom

- The discussion board is your space to interact with your colleagues related to current topics or responses to your colleague's statements.
- Participate actively in the discussions, after completing the readings and carefully considering the issues.
- Pay close attention to what your classmates write in online comments. Ask clarifying questions, when appropriate. These questions are meant to probe and shed new light … not to minimize or devalue comments.
- Think through and reread your comments before you post them.
- Assume the best about others in the class and expect the best from them.
- Value the diversity of the class. Recognize and value the experiences, abilities, and knowledge each person brings to class.
- It's okay to disagree with ideas, but remember that personal attacks rarely improve things.
- Be open to being challenged or confronted on your ideas or prejudices.

(Adapted from Susan Shaw, WS)

Course Credits

This course combines approximately 90 hours of instruction, online activities, and assignments for 4 credits.

Technical Assistance

If you experience any errors or problems while in your online 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

Textbook:

- Kurose and Ross, Computer Networking: A Top-Down Approach, 7th Edition, Pearson

Other references, books, and resources:

- Python Socket Programming Documentation
  - Free online at http://docs.python.org/3/library/socket.html
- Hall, Brian, "Beej's Guide to Network Programming: Using Internet Sockets"
  - Free online at http://beej.us/guide/bgnet.
- Wireshark Packet Analyzer
  - Free online at http://www.wireshark.org/
- Pingplotter Full Edition
  - 14-day Trial at http://www.pingplotter.com/download. Don't download Pingplotter until we get there in the labs.

Note: 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.

Measurable Student Learning Outcomes

At the completion of the course, students will be able to…

1. **Explain** the concept of packet-switching, and identify and analyze the different types of packet delay in packet-switched networks (CLO1).
2. **Describe** the essential principles of a transport layer protocol (reliable data transfer, flow control, congestion control) (CLO2).
3. **Use** IP addressing and **apply** routing algorithms to find shortest paths for network-layer packet delivery (CLO3).
4. **Describe** and **compare** data link layer services and multiple access techniques (CLO4).
5. **Describe** network security issues and some of the methods that address them (CLO5).
6. **Use** networking tools to observe and analyze behaviors of networking protocols (CLO6).

Evaluation of Student Performance

Various activities will be evaluated. Percentages are approximate.

- Weekly summary exercises (20%): These are weekly exercises available and automatically graded within Canvas. A student may take these two times, and the highest score is taken.
- Labs and their reports (20%) These assignments require running specified tests with *Wireshark*.
- Programming Projects (20%): These assignments require programming to solve specific problems. These are done offline, and programs will be submitted for evaluation of documentation, correctness, completeness, fulfillment of requirements, and readability. Evaluation criteria will be posted before the due date.
- Discussions and Demonstration Videos (10%): These will be completed in Canvas.
- Midterm Exam (15%): Proctored with Proctorio, no need to schedule in advance!
- Final Exam (15%): Proctored with Proctorio, no need to schedule in advance!

Tentative Letter Grade

The following table provides guidance on cut-off points for letter grades. Under certain circumstances, I may elect to curve final grades. This will ONLY benefit students; no student's grade will decrease as a result of a curve.

While achievement of the stated minimal percentage ensures the respective assigned grade, the cutoff for any letter grade may float down depending on the class curve. For example, the cutoff for an "A" might end up at 89% rather than 93%. However, students should not rely on a curve, as it is likely that one might NOT be implemented.

Grade	Percent Range
A	93+
A-	90 – 92.9
B+	87 – 89.9
B	83 – 86.9
B-	80 – 82.9
C+	77 – 79.9
C	73 – 76.9
C-	70 – 72.9
D+	67 – 69.9
D	63 – 66.9
D-	60 – 62.9
F	0 – 59.9

Course Content

Module	Topic	Reading Assignments	Learning Activities

1	Networking Basics	K&R Chapter 1.1 – 1.4	Summary exercises Lab 1 Discussion: Intros
2	Physical media, Layering models, Application Layer	K&R Chapter 1.5 – 1.8, 2.1	Summary exercises Project 1
3	Application Layer Protocols, DNS	K&R Chapter 2.2 - 2.4, 2.7, (2.6 optional)	Summary exercises Lab 2
4	Socket Programing and the Transport Layer	K&R Chapter 3.1 - 3.3, 3.5.4	Summary exercises Project 2
5	Transport Layer Part Deux, TCP	K&R Chapter 3.4 – 3.5, (re-read 3.5.4)	Summary exercises Lab 3 Discussion: modules 1-5
6	More on the Network Layer	K&R Chapter 3.6 – 3.8	Summary exercises Midterm exam
7	Finishing the Network Layer and Starting on the Link Layer	K&R Chapter 4.1 – 4.3	Summary exercises Lab 4
8	Routing, ICMP, NAT, and IP fragmentation	K&R Chapter 5.1 – 5.3, 5.6	Summary exercises Project 3
9	IPv6, Link-layer and Ethernet	K&R Chapter 6.1 – 6.4, 6.7	Summary exercises Lab 5 Project 4
10	Wireless, Mobility, and Network Security	K&R Chapter 7.1 – 7.3, 8.1 – 8.3	Summary exercises Discussion: modules 6-10 Prepare for final
Finals			Final exam

Course Policies

Late Work Policy

All assignments must be submitted before the due date. Late submissions will not be accepted. If you do not submit before the due date, you will receive no credit.

Revision Grace Period

The "revision grace period" policy is for labs and programming projects. If you are unable to fulfill a lab or programming project requirement to your satisfaction before the due date **for any reason** you may notify the learning assistants and instructors (via a Canvas comment along with an initial **on-time** submission) that you plan to submit a revision. You may then submit a revision within 3 days. Summary exercises, discussion posts and exams are not eligible for revisions.

If you

1. submit a partial fulfillment of the requirements before the due date,
2. notify the learning assistants and instructors when you submit your initial attempt, and then
3. resubmit a revised version of your work within 3 days,

your grade will reflect your final submission only without incurring penalties. If you do not resubmit within 3 days, then your grade will reflect your initial, potentially incomplete, submission.

Exceptions may be made at an instructor's discretion for emergencies or extenuating circumstances.

Using Proctorio automated proctoring for exams:

This course will use an automated online proctoring system called Proctorio, where your exam session is recorded for instructor review. You will **not** need to schedule proctoring appointments, and there is **no cost to you** to use Proctorio.

Please note that a functioning webcam and microphone are required for using Proctorio. If you do not have these, you will need to locate and submit an alternative proctor through the exams and proctoring form and pay for any associated proctoring fees. Also, contact your instructor to see if there are any other alternatives.

Your security and privacy are important. You can read more about Proctorio's privacy and data security policies on their website, and more information about using this tool can be found in the course site.

Makeup Exams

Makeup exams will generally be given only for missed exams excused in advance by the instructor. Excused absences will not generally be given for airline reservations, routine illness (colds, flu, stomach aches), or other common situations. Excused absences will generally not be given after the absence has occurred, except under unusual circumstances.

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 of a child in your primary care), if the student has turned in 80% of the points possible (in other words, usually everything but the final), and at the discretion of the instructor. If you are having any difficulty that might prevent you completing the coursework, please don't wait until the end of the term; let us know right away.

Statement Regarding Religious Accommodation

Oregon State University is required to provide reasonable accommodations for employee and student sincerely held religious beliefs. A student must make the faculty member aware of the request for the accommodation as soon as possible prior to the need for accomodation. See the Religious Accommodation Process for Students.

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 online course, paying particular attention to the following:

- Unless indicated otherwise, please complete the readings and view other instructional materials for each week before 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 expect that others may challenge or question your ideas. A positive atmosphere of healthy debate is encouraged.

Expectations for Student Conduct

Student conduct is governed by the university's policies, as explained in the Code of Student Conduct. Students are expected to conduct themselves in the course (e.g., on discussion boards, email postings) in compliance with the university's regulations regarding civility.

Academic Integrity

The Code of Student Conduct prohibits Academic Misconduct and defines it as:

> "Any action that misrepresents a student or group's work, knowledge, or achievement, provides a potential or actual inequitable advantage, or compromises the integrity of the educational process."

To support understanding of what can be included in this definition, the Code further classifies and describes examples of Academic Misconduct, including cheating, plagiarism, assisting and others. See the Code of Student Conduct for details.

You are expected to do your own work and demonstrate academic integrity in every aspect of this course. Familiarize yourself with the standards set forth in the OSU Code of Student Conduct Section 4.2. You must only access sources and resources authorized by the instructor. You may not show your work to any other current or future students without the instructor's authorization. Violations of these expectations or the Code of Student Conduct will be reported to the Office of Student Conduct and Community Standards. If there is any question about whether an act constitutes academic misconduct, it is your responsibility to seek clarification and approval from the instructor prior to acting.

Academic Integrity DOs and DON'Ts

- You are encouraged to discuss course content with each other, even including general discussion of homework assignments and how to approach specificsituations.
- You may post small snippets of non-working assignment code to Piazza or the official course Slack. If you have trouble narrowing the problem down to a small

snippet, just describe the problem as well as you can or ask a learning assistant for help.
- You may ask conceptual questions related to assignments on Piazza or the official course Slack.
- You may post code for the exploration exercises on Piazza or the official course Slack.
- You may not post any quiz or exam questions or answers in any form.
- You may not make your code publicly accessible. For example, any git repo you post assignment code on must be private, with the exception of the Portfolio assignment.
- You may share and compare your assignment code or lab results with other students on Piazza or the official course Slack 48 hours after the assignment was due. Keep in mind that there's not just one correct way to write a program - there's almost always a variety of correct approaches. As you compare with others' code, try to notice what seem to be advantages or disadvantages of a particular approach, and don't be afraid to ask questions about why someone made a certain design decision; we all may learn something from the question and answer.

It is important that you understand what student actions are defined as academic misconduct at Oregon State University. The OSU Libraries offer a tutorial on academic misconduct, and you can also refer to the OSU Student Code of Conduct and the Office of Student Conduct and Community Standard's website for more information. More importantly, if you are unsure if something will violate our academic integrity policy, ask your professors, GTAs, academic advisors, or academic integrity officers.

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 have attempted to be made accessible. If you require accommodations please contact Disability Access Services (DAS) or your instructor, who may then reach out to DAS for everyone's benefit.

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

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.

Ecampus Reach Out for Success

University students encounter setbacks from time to time. If you encounter difficulties and need assistance, it's important to reach out. Consider discussing the situation with an instructor or academic advisor. Learn about resources that assist with wellness and academic success.

Ecampus students are always encouraged to discuss issues that impact your academic success with the Ecampus Success Team. Email ecampus.success@oregonstate.edu to identify strategies and resources that can support you in your educational goals.

If you feel comfortable sharing how a hardship may impact your performance in this course, please reach out to me as your instructor.

For mental health:

Learn about counseling and psychological resources for Ecampus students. If you are in immediate crisis, please contact the Crisis Text Line by texting OREGON to 741-741 or call the National Suicide Prevention Lifeline at 1-800-273-TALK (8255).

For financial hardship:

Any student whose academic performance is impacted due to financial stress or the inability to afford groceries, housing, and other necessities for any reason is urged to contact the Director of Care for support (541-737-8748).

Student Evaluation of Courses

During Fall, Winter, and Spring term The online Student Evaluation of Teaching system opens to students the Wednesday of week 8 and closes the Sunday before Finals Week. 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 hybrid 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 or supervisor. Anonymous (unsigned) comments go to the instructor only.