Organization And Introduction

CS 536: Data Communication And Computer Networks

Instructor: Vamsi Addanki

TAs: Gustavo Franco Camilo, Jiwon Kim, Shilong Lei

PURDUE UNIVERSITY | Department of Computer Science

General Information

Course page and announcements

- Schedule & course syllabus: https://stygianet.cs.purdue.edu/courses/2026springcs536.html
- Content: Brightspace
  - Materials
  - Assignments
  - Grading
- Discussions: Piazza
  - Polls
  - Q&A
  - Debates?

General Information

Timings

- Lecture: STEW 314
  - Tuesday/Thursday 10:30 – 11:45
  - ~10 minutes break in every class + ~10 minutes for questions
- PSO: HAAS G050
  - Tuesday 12:30 – 1:20
  - Wednesday 9:30 – 10:20
  - Wednesday 11:30 – 12:30
  - No PSO/office hours in the first week
- Office hours: Zoom
  - Please check the course website & Piazza

Team

- Lectures: Vamsi Addanki: https://stygianet.cs.purdue.edu/
- Teaching Assistants:
  - Gustavo Franco Camilo: https://www.gta.ufrj.br/~gustavo/
  - Jiwon Kim: https://kjw6855.github.io/
  - Shilong Lei: https://markshilong.github.io/

Prerequisites

Programming

- C, C++, Python, and Bash
  - All assignments will require a combination of the above
- Understanding of Linux operating systems
  - User-space, kernel-space
- Strong background in data structures and algorithms

Grading

Overall structure

- Class participation: 5%
- Assignments: 45%
- Mid-term: 20%
- Final exam: 30%

Grading

Assignments

- Groups: 5 students per group
  - = 5 is desirable; > 5 not allowed; < 5 allowed but not recommended
- Assignment submissions should always be per-group
  - Every submission involves a single PDF document on Brightspace
  - Code must be attached as a Github link within the PDF, and pasting the relevant pieces within the PDF
- Grading is per-group
  - Grading will be based on PDF submission, code, and oral questions
  - We will randomly select one student and ask questions orally e.g., “explain this part of the code” → repeated 5 times, and the grading depends on the average performance

Grading

Mid-term and Final exam

- In-person, paper & pen format
  - Open book
  - Use of Tablets/Laptops/Phones not allowed
- All questions will be Multiple-choice format
- Potentially negative marking for wrong answers

Policies

Late Submissions

- Grace period: 3 days for the entire semester
- After the grace period, 25% off for every 24 hours late, rounded up

Policies

Contact

- Email: Please add all three TA's email addresses in the recipient list
  - Please do not send emails directly to the instructor

Policies

Use of AI

- **You can use AI tools**
  - ChatGPT, Copilot, Claude, Perplexity, DeepSeek…. any tool you like
  - We expect you to use AI tools, including the AI tutor on the textbook's website
- There are no restrictions on the use of AI in assignment submissions
- Explicitly acknowledge the tools used and the nature of use e.g., generating full or part of the code, polishing or fully generated descriptions/writing in the PDF submission
  - Use of AI is not penalized
  - Lack of acknowledgements → Much deeper and hard questions during grading

Policies

Use of AI

- You can use AI tools **but please** make sure you are learning the fundamentals. Grading depends on:
  - Your ability to build functional tools, debug & understand code
  - What you learn (questions during grading sessions)
    - It is great if AI can speedup the process, but cannot be a replacement

Academic Integrity & Honor Code

- You are responsible for reading the pages linked below and will be held accountable for their contents
- Integrity:
  - http://spaf.cerias.purdue.edu/integrity.html
  - http://spaf.cerias.purdue.edu/cpolicy.html
- Honor code:
  - https://www.purdue.edu/odos/osrr/honor-pledge/index.php
  - *"As a boilermaker pursuing academic excellence, I pledge to be honest and true in all that I do. Accountable together - we are Purdue."*

Course Topics

1. Introduction and OSI architecture
2. Network Latencies, Packet Switching, and Circuit Switching
3. Application layer, including HTTP and DNS
4. Transport layer: TCP, UDP, and congestion control
5. IP layer: Addressing, subnets, NAT, and routing protocols
6. Multi Commodity Flows: Max flow and Concurrent flow, ECMP and Load balancing
7. MAC layer: Forwarding, and medium access
8. Datacenter Networks Introduction
9. Network Topologies
10. DNN Training and Collective Communication
11. Kernel bypass, and RDMA
12. Network Buffering
13. Datacenter Congestion Control
14. Back to circuit switching: Photonic Interconnects
15. Wireless Networks (Optional)
16. Satellite Networks (Optional)

Assignments

Overview

- https://stygianet.cs.purdue.edu/courses/2026springcs536.html
- Assignment 1: Ping experiments
- Assignment 2: Socket programming and TCP socket statistics
- Assignment 3: Building a kernel module / NS3 implementation
- Assignment 4: Optimization problem on network topologies
- Assignment 5: Torch/MPI allreduce and broadcast algorithms

- Lectures or PSOs will not teach/cover the tools/frameworks used in the assignments
  - Students are expected to learn by themselves
  - Web search, online materials, LLMs are all allowed and encouraged for use

Textbook and Resources

First part of the course (~pre-spring break)

- Computer Networking A Top-Down Approach, 9th edition Published by Pearson (June 20, 2025) © 2026.
  - Authors: James F. Kurose, Keith Ross
- (Optional) Network Algorithmics: An Interdisciplinary Approach to Designing Fast Networked Devices
  - Author: George Varghese

Textbook and Resources

Second part of the course (~post-spring break)

- Research papers are the primary resources, accessible via digital libraries with Purdue login

Auditing

- Always welcome to join!
- Please check with the grad office yourselves and happy to approve audit requests
- Required: Attending classes and participating in discussions

Compute

- A basic laptop is sufficient for all assignments
  - Linux operating system
- CS machines are also accessible for general use
- Piazza: A poll will open regarding compute requirements
  - A VM may be available

THAT'S ALL FOLKS!

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