CS 744

Design and Engineering of Computing Systems

Autumn 2026

Course Overview

CS 744, Autumn 2026

Lecture #0

instructor details

- **Puru** (Purushottam Kulkarni)
  - ~~Sir Puru, Puru Sir, Sir, *Sir*, …~~
  - puru@cse.iitb.ac.in
  - http://www.cse.iitb.ac.in/~puru

- Kanwal Rekhi Building, KR 304
  - Open-door policy
  - Office hours: Wed 10am to 11am

about CS744

www.cse.iitb.ac.in/~puru/courses/autumn2026/

Meeting times

Slot 5, Wed. & Fri. 8am to 9.25 am

Venue: CS103

TAs

debo, prince, monil, rajas, yash, gaurav

Mailing lists, announcements, submissions via **moodle**

pre-requisites

- PG students of CSE

  Not your first course/exposure to operating systems and computer networks

- **Not open**
  - for CSE UG students
  - for CSE PG students who have already completed CS695

- No audit offering

- If do you not meet above criteria but still want to take course
  - Meet me

scope of course

What goes into the design and engineering of computing systems?

Multiple intersecting and overlapping topics in –

- Operating Systems
- Computer Networks
- Virtualization and containerization
- Distributed and networked systems
- Performance analysis

The course will take a ***bottom up*** approach, cover building blocks and important concepts from different topics,provide examples of systems and discuss performance measurement and analysis of computing systems

Hands-on learning
Develop an understanding of *Systems* issues/under-the-hood topics

4 main topics

Operating Systems

Virtualization and Containerization

Networked Systems

Distributed Systems

Advanced topics (Paper reading)

content

No **single** textbook

- ***Dive into Systems***
  Suzanne J. Matthews, Tia Newhall, and Kevin C. Webb
- ***Computer Systems: A Programmer's Perspective***
  Randal E. Bryant and David R. O'Hallaron
- ***Operating Systems: Three Easy Pieces***
  Remzi H. Arpaci-Dusseau and Andrea C. Arpaci-Dusseau
- ***Virtual Machines: Versatile Platforms for Systems and Processes***
  James E. Smith, Ravi Nair
- ***The Linux Programming Interface***
  Michael Kerrisk

- Several ***online*** references

course components

- In-class teaching
- In-lab hands-on sessions

- Take-home programming assignments/exercises
  - ~4 assignments
  - 1 project (?)

- Lab exams (~3)
- Written exams (2+)

- All exam components – 20% to 30% each

a note about assignments

- non-trivial component of the course
- needs continuous and consistent effort
  - design, system building, experimentation, demos, report, …
- 4+

- 1 : x rule
  - **1** is the amount of time you plan for
  - **x** is the amount of time it takes to do a complete/decent/good job
  - **x ≥ 3+** in most cases

things to remember

- This course is a ***two-way*** street
- cut-copy-paste is not your friend
- **GenAI is not you!**
  GenAI is learning when you use it, literally!
- Start early!
- *Systems* for all, all for *Systems*