



Next-Gen Computer Architecture

An online certificate course offered by the Department of CSE, IIT Hyderabad and sponsored by Intel.

Starting from February 2025.



Interested to know how a software executes on a processor? Want to know the internal design of a processor? Interested in pursuing an industry or research career in processor design?

We are happy to offer a certificate course (in online mode) on **Computer Architecture**, primarily sponsored by **Intel** with a very nominal fee from participants. This course is designed to introduce the basic concepts of computer architecture with practical exercises and prepare you for pursuing a career in the Computer Architecture field in industry, research labs, or academia.

Registration date extended till 20th February 2025

Why enroll in this course?

- In this course, Computer Architecture will be taught with practical examples and exercises. A participant will gain the following benefits from this course:
 - Preparation for internships/jobs in various processor/semiconductor design companies like Intel.
 - Exposure to recent research aspects and motivation for higher studies in this domain. The course will provide a starting point for research in Computer Architecture. We will mentor the top performing and motivated participants to do further research after completing the course.
 - Preparation with concepts for competitive exams like GATE.
- Live teaching and doubt clearing sessions unlike pre-recorded online courses.
- The top performers of this course can attend a partially-funded one-week offline workshop at IITH and could be considered for internships at IITH in this field.
- The course exposes participants to several tools and simulators to experiment with processors and memories.
- A certificate will be issued to all the participants scoring more than the passing marks during the assessment process.

Who can enroll?

- **[Students]** - Any student who has a basic knowledge of C/C++ and data structures can enroll for this course. The course will be beneficial for both UG and PG students.
- **[Faculty]** - Any faculty member who wants to develop his/her skills on Computer Architecture for academic purposes or who is searching for a starting point to do further research in this domain.
- **[Industry people/Freelancers]** - Any Industry person (or anyone) who wants to gather more practical knowledge or refresh their basic concepts about Computer Architecture.

Course Structure:

This is a 40 hours course spanning 10-12 weeks, with a tentative week-wise content as follows:

1. **Basic introduction:** What is computer, performance metrics, etc. –1 week
2. **ISA:** Basic RISC-V instructions, instruction encoding. –2 weeks
3. **Digital design:** Introduction to basic digital blocks used for processor design. –1 week
4. **CPU design:** single-cycle, pipelining, hazards, datapath, etc. –2 weeks
5. **Caches and memory:** Cache overview, organization, replacement policies. –2 weeks
6. **IO system:** IO devices, MMIO, polling, interrupts, etc. –1 week
7. **Advanced topics:** branch prediction, prefetching, multi-core, coherence. –2 weeks
8. **Wrap-up.** –1 week

The course is equivalent to a 3-credit course of IIT Hyderabad.

Assessment/Evaluation Plan:

- Regular assignments
- Regular quizzes
- Final exam

Teaching Plans:

- The classes will be online in late evening (6 pm-7.30 pm). Two classes of 1.5 hours per week.
- All the communications will be through Google classroom (or equivalent platform).
- Additional tutorial classes of 1-hour will be conducted on a regular basis to give a demo of various simulation tools. Tutorial classes will also be conducted to clear doubts.
- A portal will be created for posting your queries related to the course anytime. We will reply to your queries.

How to enroll?

To enroll for this course you need to follow these steps:

- **[Fee payment]** - The course is primarily sponsored by Intel and we are charging a very nominal fee from participants.
 - The fee is 1500/- for students, 2000/- for faculty members, and 5000/- for industry/others.
 - For women participants, the registration fee is 20% lower (1200/- for students, 1600/- for faculty members, and 4000/- for industry/others).
 - **All fee payments will attract an 18% GST**
 - Please click on [this link](#) and pay the fees.
- **[Registration form]** - Please click on [this](#) google form for final registration after payment. Filling this registration form is compulsory for the course registration.

Important Dates:

- 20-Feb-2025 (registration ends)
- 28-Feb-2025 (classes start, tentative)
- 24-May-2025 (Final exam, tentative)
- 10-July-2025 (Offline workshop at IITH, tentative)

Course Coordinators:



Shirshendu Das,
Assistant Professor,
Department of CSE,
IIT Hyderabad.

shirshendu@cse.iith.ac.in

<https://sites.google.com/view/shirshendudas/home>



Rajesh Kedia
Assistant Professor,
Department of CSE,
IIT Hyderabad.

rkedia@cse.iith.ac.in

<https://people.iith.ac.in/rkedia/>

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