National Supercomputing Mission Sponsored
Faculty Development Program on
High Performance Computing s AI
8 - 13 April 2025

Summary Report

Faculty Development Program on High Performance Computing & AI

Date: 8–13 April 2025

Organized by: Department of Computer Engineering, SPIT, Mumbai

In Association With: C-DAC Pune & NSM Nodal Center, Walchand College of Engineering, Sangli

Sponsored by: National Supercomputing Mission

Objective

To provide faculty members with comprehensive exposure to High Performance Computing (HPC) and Artificial Intelligence (AI), through expert lectures, hands-on sessions, and interdisciplinary discussions.

Our Patron

Dr. B. N Chaudhari, Principal, SPIT
Dr. Uday A. Dabade, Director, WCE Sangli
Mr. Ashish Kuvelkar, Scientist G, C-DAC Pune

Convenor

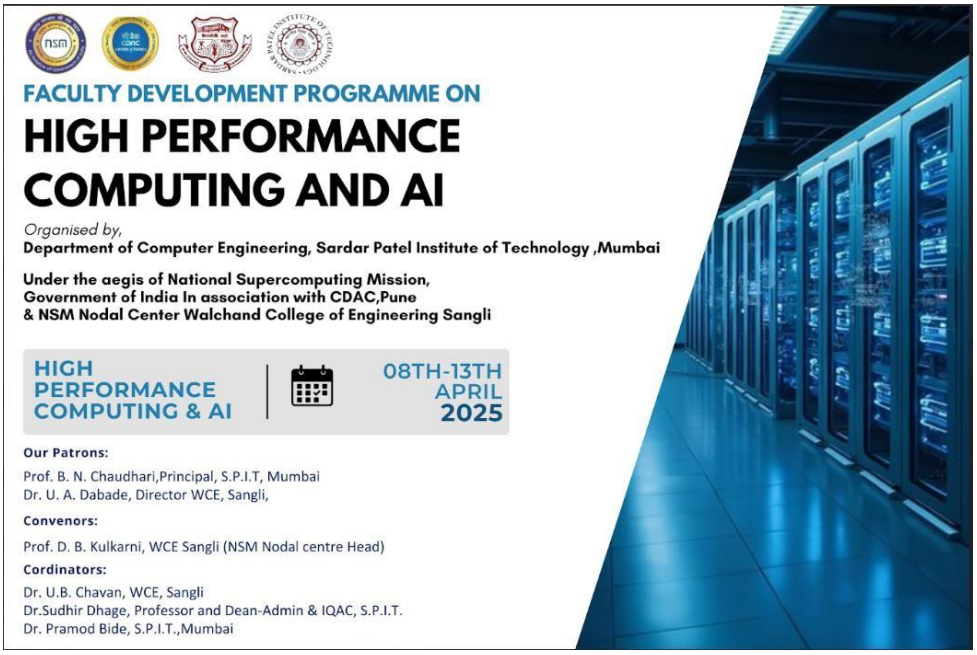
Dr. D. B. Kulkarni, WCE Sangli, NSM Nodal Centre Head

Coordinator

Dr. Umesh B. Chavan, WCE Sangli
Dr. Sudhir Dhage, Dean Administration and IQAC, SPIT
Dr. Pramod Bide, Assistant Professor, SPIT

Organizing committee

Dr. Kailas Devadkar (SPIT), Dr. Nataahsa Raul (SPIT), Dr. Rupali Sawant (SPIT), Prof. Sunil Ghane (SPIT), Prof. Abhijeet Salunke (SPIT)



Event Highlights

Inauguration & Dignitary Insights (Day 1)

- The event commenced with an inauguration ceremony and insightful speeches from eminent dignitaries, including representatives from C-DAC Pune, SPIT Mumbai, and Walchand College of Engineering.
- Day 1 set the tone with foundational sessions on **Parallel and Multicore Architectures** and **OpenMP**, concluding with a hands-on lab session.

Program Highlights with Speaker Details

Day 1 – April 8, 2025 (Online)

- **Inaugural Session**:
  - **Mr. Ashish Kuvelkar**, Scientist G, C-DAC Pune, opened the session with his expert insights into India's supercomputing initiatives and the objectives of the National Supercomputing Mission.
  - **Dr. Dinesh B. Kulkarni**, Professor at Walchand College of Engineering, shared his experiences in the field of Parallel Processing and High-Performance Computing, highlighting global collaborations and academic contributions.
  - **Dr. Uday A. Dabade**, Director, WCE Sangli, spoke about the institution's dedication to research excellence and capacity-building in advanced computing technologies.
  - **Dr. B. N. Chaudhari**, Principal, SPIT Mumbai, brought a wealth of academic leadership into perspective, emphasizing the importance of national capability in HPC and AI.
  - The FDP Coordinators, **Dr. Umesh Chavan**, **Dr. Sudhir Dhage**, and **Dr. Pramod Bide**, also addressed the gathering, outlining the schedule and goals of the program.

- **Technical Sessions**:
  - **Session 1:** Introduction to Parallel and Multicore Architectures
    Speaker: Dr. Sudhir Dhage (Dean Administration and IQAC, SPIT)
    Dr. Dhage delivered an enlightening session on the foundational principles of parallel computing and multicore systems. His expertise in areas such as AI, ML, and Parallel Processing set the tone for an intellectually stimulating day.
  - **Session 2:** OpenMP
    Speakers: Dr. Umesh B. Chavan (Assistant Professor, WCE) & Miss Aprupa Pawar (Assistant Professor, WCE)
    This session provided an in-depth understanding of the OpenMP framework. The speakers effectively bridged theory and application, making complex HPC concepts accessible to the audience.
  - **Lab Session:** OpenMP Demo and Q&A
    Conducted by: Prof. Aprupa Pawar & Dr. Umesh Chavan
    The day concluded with a practical lab session focusing on OpenMP, which included a hands-on demo, and an interactive Q&A. Participants actively engaged with the content and clarified their doubts.

Day 2 – April 9, 2025 (Online)

- **Session 1**: *CUDA*
  Speaker: Dr. Jitendra V. Tembhurne, Assistant Professor, IIIT Nagpur
  Dr. Tembhurne opened the day with a comprehensive session centered around CUDA and its pivotal role in accelerating High-Performance Computing and Artificial Intelligence. Drawing on over 15 years of experience, he illuminated how GPU-based parallel computing is transforming fields like Deep Learning, Quantum Computing, and Information Security. His session blended theoretical depth with practical demonstrations of CUDA-powered applications, while his dynamic presentation and real-world research examples kept the audience fully engaged.

- **Session 2:** Practical Aspects of HPC using OpenMP
  Speakers: Dr. Umesh B. Chavan (Assistant Professor, Walchand College of Engineering)
  The evening session focused on hands-on learning and practical applications of High-Performance Computing through the use of OpenMP. Dr. Chavan brought in academic and industry perspectives. Along with that he also contributed with practical demonstrations and simplified explanations that made complex concepts accessible to all participants. Their collaborative teaching style created an engaging and productive learning environment.

Day 3 – April 10, 2025 (Online)

- **Session 1**: *MPI (Message Passing Interface)*
  Speaker: Dr. K. B. Manwade, Professor, Hirasugar Institute of Technology, Karnataka
  Dr. Manwade conducted a detailed and insightful session on MPI, highlighting its significance in parallel computing environments. His explanation of distributed systems, algorithm design, and practical use-cases of MPI offered participants a solid foundation in high-performance computing. His deep academic experience and well-structured delivery added great value to the session.

- **Session 2**: *Machine Learning*
  Speaker: Dr. Lov Kumar, Assistant Professor, NIT Kurukshetra
  Dr. Kumar presented an engaging session focused on the integration of Machine Learning with Software Engineering and High-Performance Computing. He highlighted practical applications through real-world research projects, including intelligent malware detection systems and robust AI model evaluation techniques. Participants valued his clear explanations of complex ML concepts and his ability to link them with current trends and innovations in the software and AI landscape.

- **Session 3**: *Hands-on Lab on MPI*
  Speaker: Dr. K. B. Manwade
  The day concluded with a practical lab session on MPI conducted once again by Dr. Manwade.
  Participants had the opportunity to implement and experiment with the concepts discussed earlier, reinforcing their learning through real-time examples and exercises.

Day 4 – April 11, 2025 (Offline)

- **Session 1**: *NEP Implementation*
  Speaker: Prof. B. N. Chaudhari, Principal, SPIT
  Prof. Chaudhari, a distinguished academician with over 36 years of experience, shared valuable insights on the implementation of the National Education Policy (NEP) in engineering education. Drawing from his extensive contributions—ranging from establishing Centers of Excellence to influencing national-level

academic reforms—he emphasized the transformative potential of NEP in fostering multidisciplinary learning, research innovation, and holistic student development. His vision and experience greatly inspired the participants

- **Session 2**: *Performance Measure in Parallel Computing.*
  Speaker: Dr. Amit D. Joshi, Assistant Professor, COEP Technological University
  Dr. Joshi delivered an informative session covering areas like Parallel and Distributed Computing, GPU Architectures, and High-Performance Computing. His structured delivery and practical examples captivated the audience, making complex technical content highly accessible.

- **Session 3**: *OpenMP and MPI Hands-On*
  Speaker: Dr. Pramod Bide, Assistant Professor, SPIT
  Dr. Bide led a hands-on session focused on parallel programming using OpenMP and MPI, guiding participants through foundational concepts and practical implementations. With 14 years of academic and research experience, he shared real-world insights into parallel computing techniques and their applications in data-intensive fields. His interactive approach and emphasis on performance optimization kept participants actively engaged throughout the session.

Day 5 – April 12, 2025 (Offline)

- **Session 1**: *HPC and AI: How are they related?*
  Speaker: Dr. Shitala Prasad, Assistant Professor, IIT Goa
  Dr. Prasad delivered a comprehensive session drawing from his vast experience in Deep Learning, Computer Vision, Biometrics, and AI for Industrial Applications. He highlighted his research across interdisciplinary areas such as Underwater Vision and Soft Behavior Analysis, offering insightful discussions that merged theory with practical applications. With prior research positions at NTU Singapore and the University of Caen Normandie, his global perspective added immense value to the session. Participants gained an understanding of current trends in AI and computer vision research.

- **Session 2**: *Implementing HPC into curriculum*
  Speaker: Dr. Dinesh B. Kulkarni, Professor, Walchand College of Engineering
  Dr. Kulkarni, with over three decades of academic and research experience, presented an expert session focused on Implementation of HPC in Academic Curriculum. He shared real-world insights from his collaborations in Canada, Austria, the USA, and India, underlining the significance of international academic cooperation in the field of HPC.

- **Session 3**: *MPI*
  Speaker: Dr. Rushikesh Joshi, Professor, IIT Bombay
  A highly respected academician, Prof. Joshi delivered a captivating session on HPC Programs, with emphasis on program structures, meta-modeling, concurrency, and design abstraction. His ability to inter-weave theoretical computing models with creative thinking resonated deeply with the participants. He also briefly shared his interests in music, writing, and art, showcasing a unique blend of technical and artistic excellence.

Valedictory Session

The valedictory session marked the formal conclusion of the week-long FDP and was graced by the presence of:

- **Dr. Sudhir Dhage,** Dean Administration and IQAC, SPIT
- **Dr. Dinesh B. Kulkarni,** Professor, WCE
- **Mr. Ashish Kuwelkar**, Scientist G, CDAC

The session, **coordinated by Dr. Pramod Bide**, began with the formal **felicitation of the guests**. Dr. Bide then presented a detailed **summary of the FDP**, capturing its academic highlights and participant engagement.

Selected participants were invited to share **feedback and reflections**, expressing appreciation for the quality of sessions, diversity of topics, and interactive learning environment.

Following this, dignitaries on the dais shared their **closing remarks**, emphasizing the importance of such initiatives in strengthening the national HPC and AI landscape.

Tokens of appreciation were presented to the FDP **coordinators**, and a **memento was awarded to the Guest of Honour** in acknowledgment of their support.

The event concluded with a **vote of thanks by Dr. Pramod Bide** and the **National Anthem**, marking a dignified end to a highly impactful program.

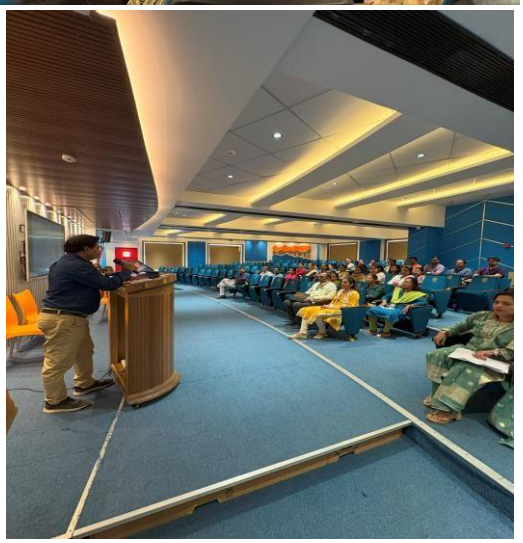
Day 6 – April 13, 2025 (Online)

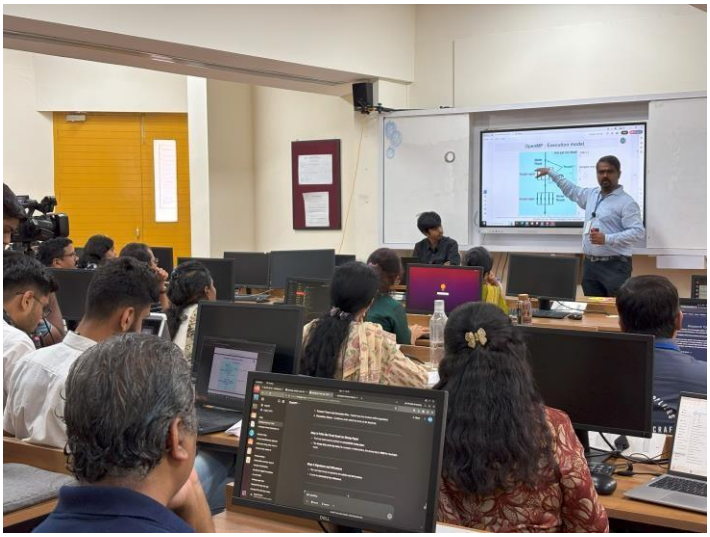
- **Final Technical Session**: *Fundamentals of Accelerated Computing with CUDA*
  Speaker: Dr. Nilesh Pikle, IIIT Nagpur
  Dr. Pikle, a distinguished academician with more than 15 years of experience in teaching and research, led a dynamic session focused on **accelerated computing using CUDA**. His expertise in areas such as Deep Learning, Quantum Computing, and Information Security was evident throughout the session. Participants gained a clear understanding of CUDA programming fundamentals, GPU architecture, and their relevance in High Performance Computing. The hands-on aspects and detailed conceptual clarity provided during the session enabled participants to **successfully claim NVIDIA Certification** for "Fundamentals of Accelerated Computing with CUDA". The speaker's contributions were well appreciated for being both intellectually enriching and practically valuable.

Outcomes & Impact

- Enhanced conceptual and practical knowledge of HPC and AI tools like OpenMP, MPI, and CUDA.
- Exposure to real-world applications and interdisciplinary research from premier institutes.
- Strengthened faculty capabilities for teaching and research in emerging computing domains.

Photo Gallery



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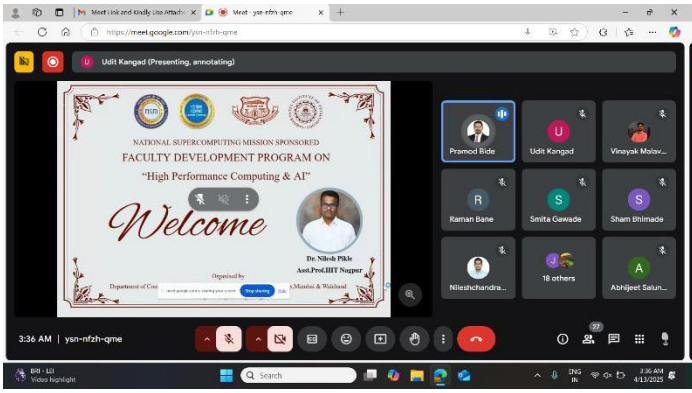
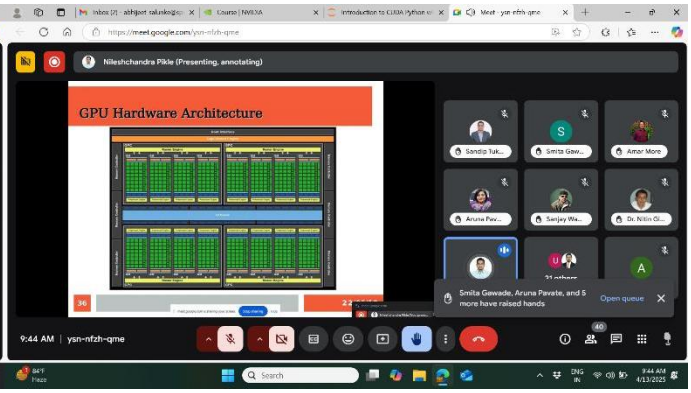
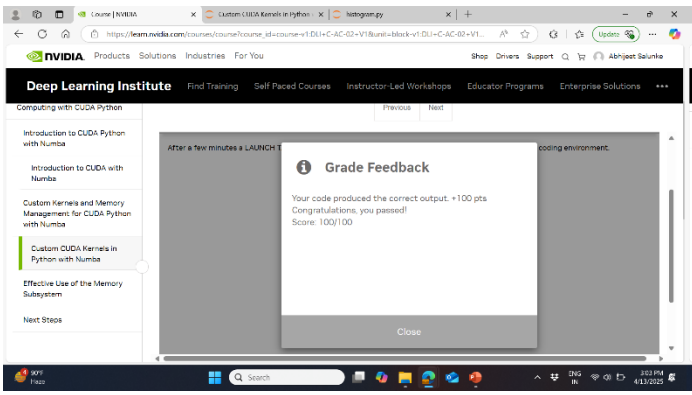
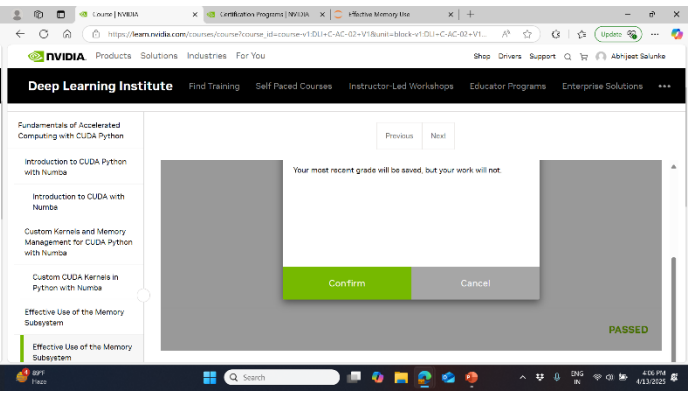
Purpose
Parallel and Distributed Computing
Inter-Process Communication/IPC Communicati
Protocol
Abstractions for communication
Standardized/Portable way through libraries,
Multi-language implementation:
C, C++, Fortran as well in early days

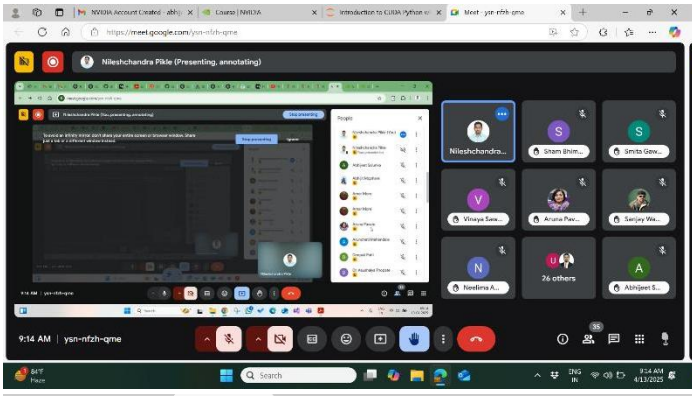

Dr. D.B. Kulkarni
Assistant Professor, WCE
Dr. Ashish Kurwilkar
Scientist G, CDAC

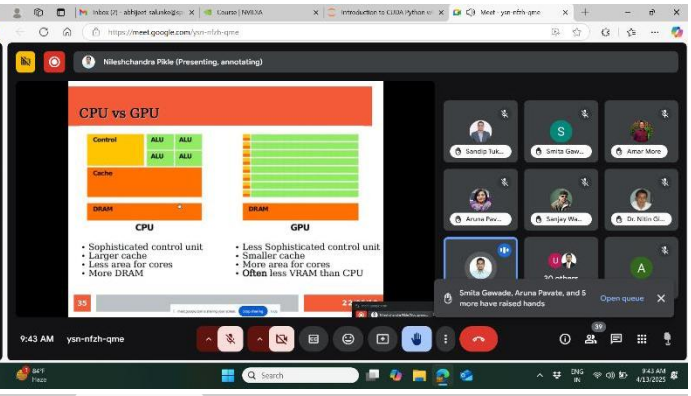

Udit Kangad (Presenting, annotating)
NATIONAL SUPERCOMPUTING MISSION SPONSORED
FACULTY DEVELOPMENT PROGRAM ON
"High Performance Computing & AI"
Welcome
Dr. Nilesh Pikle
Asst.Prof,IIIT Nagpur
Pramod Bide
Udit Kangad
Vinayak Malav...
Raman Bane
Smita Gawade
Sham Bhimade
Nileshchandra...
18 others
Abhijeet Salun...
3:36 AM | ysn-nfzh-qme

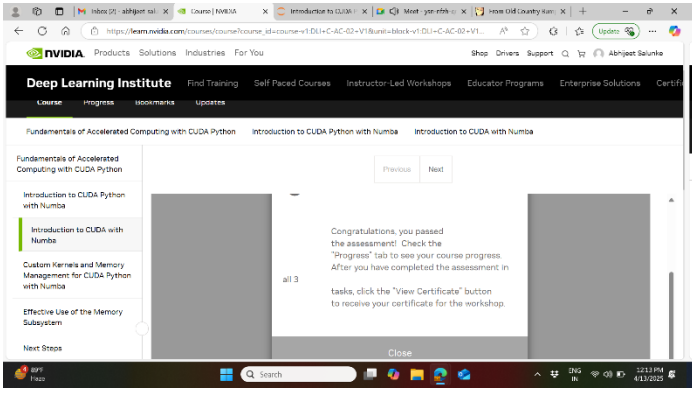

Nileshchandra Pikle (Presenting, annotating)
GPU Hardware Architecture
Smita Gawade, Aruna Pavate, and 5 more have raised hands
Open queue
9:44 AM | ysn-nfzh-qme

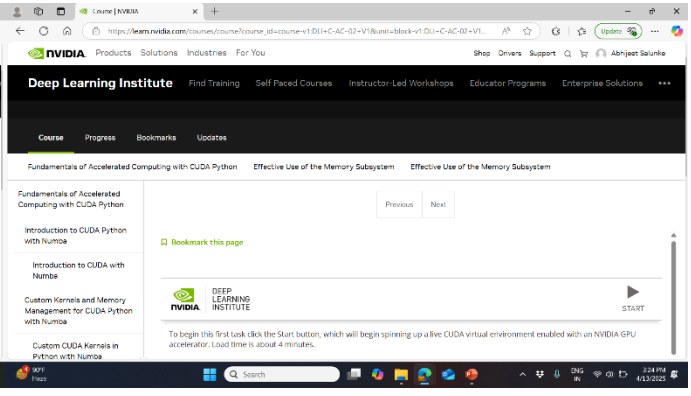

Deep Learning Institute
Grade Feedback
Your code produced the correct output. +100 pts
Congratulations, you passed!
Score: 100/100
Close


Deep Learning Institute
Your most recent grade will be saved, but your work will not.
Confirm
Cancel
PASSED


Nileshchandra Pikle (Presenting, annotating)
26 others
9:14 AM | ysn-nfzh-qme

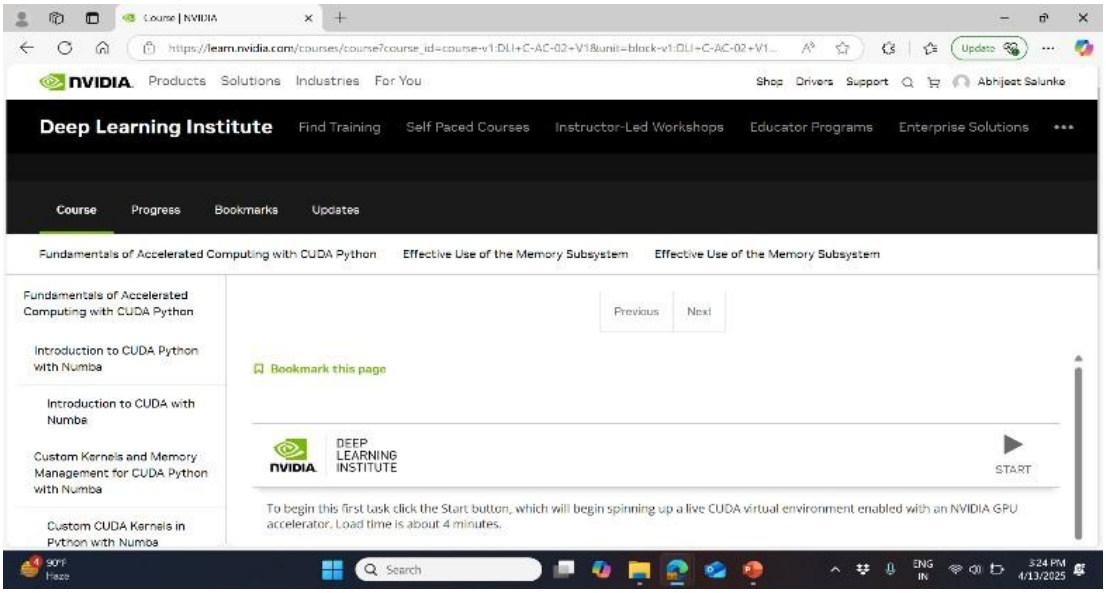

Nileshchandra Pikle (Presenting, annotating)
CPU vs GPU
CPU
GPU
• Sophisticated control unit
• Larger cache
• Less area for cores
• More DRAM
• Less Sophisticated control unit
• Smaller cache
• More area for cores
• Often less VRAM than CPU
Smita Gawade, Aruna Pavate, and 5 more have raised hands
Open queue
9:43 AM ysn-nfzh-qme

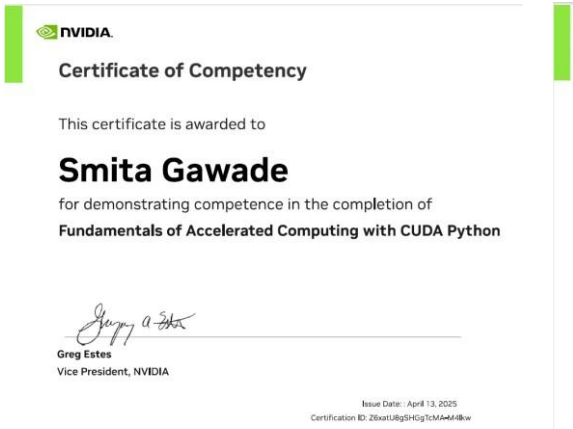

Deep Learning Institute
Congratulations, you passed the assessment! Check the "Progress" tab to see your course progress.
After you have completed the assessment in
all 3
tasks, click the "View Certificate" button to receive your certificate for the workshop.
Close


Deep Learning Institute
Course
Progress
Bookmarks
Updates
Bookmark this page
DEEP LEARNING INSTITUTE
START
To begin this first task click the Start button, which will begin spinning up a live CUDA virtual environment enabled with an NVIDIA GPU accelerator. Load time is about 4 minutes.

Nvidia Certification

On 6th Day, Dr. Nilesh Pickle delivered his hands-on session. The hands-on aspects and detailed conceptual clarity provided during the session enabled **35 participants** to **successfully claim NVIDIA Certification** for "Fundamentals of Accelerated Computing with CUDA". The Nvidia presented participants with digital certificates.





Overall feedback of NSM HPC and AI FDP

Participating Institutes