FDP Sponsored by National Supercomputing Mission (GOI)

High Performance Computing and AI

National Supercomputing Mission Sponsored Faculty Development Program on "High Performance Computing & AI".

Organised by,

Department of Computer Engineering, Yashwantrao Bhonsale Institute of Technology, Sawantwadi

&

Walchand College of Engineering, Sangli.

*Under the aegis of **National Supercomputing Mission, Government of India**, In association with **CDAC, Pune.***

Dates: 26,27,28 May (Online) and 29,30,31 May (Offline) 2025

Our Patrons:

Shri. Achyut Sawant Bhonsale, Exec. Chairman, Yashwantrao Bhonsale Education Society, Sawantwadi.
Prof. (Dr.) U. A. Dabade, Director WCE, Sangli.
Shri. Amol Chavan, Member, Admin. Council, WCE, Sangli.
Mr. Ashish Kuvelkar, Scientist 'G', CDAC, Pune

Convener: Prof. (Dr.) D. B. Kulkarni, WCE Sangli (NSM Nodal Centre Head).

Coordinators: **Dr. U.B. Chavan**, WCE, Sangli.
Dr. Raman R. Bane, YBIT, Sawantwadi.

About Host Institute

Located in the green and peaceful region of Konkan, Sindhudurg district, Maharashtra, Yashwantrao Bhonsale Institute of Technology (YBIT), Sawantwadi, offers a calm environment for technical education. Established in 2014 under the aegis of Shri Yashwantrao Bhonsale Education Society (SYBES), YBIT is located about 2.5 kilometers from Sawantwadi City, providing a peaceful environment for focused learning and academic excellence. The Institute boasts a sprawling 8.5-acre campus with state-of-the-art infrastructure. YBIT initially offered diploma programs in Civil, Mechanical, Electrical, and Computer Engineering, all accredited by NBA in 2019 and reaccredited in 2022, reflecting its commitment to quality education. In 2023–24, the institute expanded its offerings to degree-level programs in the same engineering disciplines, affiliated with the University of Mumbai and approved by AICTE, New Delhi and DTE. YBIT's mission is to nurture rural talent through technical education, emphasizing holistic development and lifelong learning. With dedicated faculty and a focus on practical skills, the institute aims to equip students with knowledge and competencies to excel in engineering and contribute meaningfully to society by applying their skills.

About Course

The program will introduce several parallel programming models, including Open Multiprocessing (OpenMP) for shared memory machines, Message Passing Interface (MPI) for distributed memory machines, and Compute Unified Device Architecture (CUDA), a parallel computing platform developed by NVIDIA for exploiting GPU. It will also include hands-on practice on these programming models. It is primarily intended for professors who presently teach or plan to teach HPC-related courses. Researchers who use or plan to use parallel programming are also welcome to attend. The program will also cover the role of High-Performance Computing (HPC) in AI, including how parallel programming accelerates deeplearning and large-scale AI model training.

About collaborators

Centre for Development of Advanced Computing (C-DAC) is implementing the National Super-computing Mission (NSM), a capacity building initiative of Ministry of Electronics and Information Technology (MeitY), Government of India.

Walchand College of Engineering, Sangli (WCE), established in 1947 with the lavish campus having state-of-the-art laboratories. WCE is one of the nodal center for conducting NSM activities. WCE is a state government aided oldest and autonomous premiere engineering institute in Maharashtra with a beautiful campus of over 90 acres. WCE offers UG, PG and PhD programs in engineering education . The institute has strong collaborations with premier R&D organizations and industries.

Course Objectives

•To introduce the fundamentals of parallel computing including parallel architectures, programming models and commonly used parallel programming constructs/libraries/languages.

• To deliver hands-on sessions to provide experience applying HPC tools on both CPU and GPU platforms.

• To educate faculties on Integrating HPC course into the curriculum.

Course Contents

• Understanding Multicore and Manycore architectures
• Shared Memory Parallelism with OpenMP
• CUDA Programming
• Distributed Memory Parallelism with MPI
• Parallel Computing Patterns: Reduction, Matrix multiplication, convolution etc.
• Profiling sequential and parallel codes
• Performance measures in Parallel Computing, HPC

Target Audience

The workshop is open for all faculty members, research scholars working in CSE, IT and Electronics Departments in Universities and Engineering Colleges in Mumbai ,Konkan, Kolhapur region of Maharashtra, Belagavi and Goa. Preference will be given to the applicants from nearby institutes of YBIT, Sawantwadi. The registration is on a 'first come first serve' basis.

Important Dates

Registration Open: 8th May 2025
Last Date of Registration: 20th May 2025

Course Duration: 26,27,28 May (Online) and 29,30,31 May (Offline) 2025
Mode : Offline from 9:00 AM to 11:00 AM
(at YBIT) 11.15 AM to 01.15 PM
2.30 PM to 4.30 PM
Online from 9:00 AM to 11:00 AM
11.15 AM to 01.15 PM
2.30 PM to 4.30 PM

Registration Fees: No registration fees, Refundable Deposit: Rs. 500/- for the shortlisted candidates,

Registration Link and QR Code:
https://forms.gle/z4bxUQzMLrzvmPJE8

Program benefits

• Interaction with eminent speakers from industry and academia
• nVIDIA Industry certifications of worth **~21,000/-**
• **FREE** Access to HPC resources during the FDP**.**
• Travelling Fare (max Rs. 2000), Food and accommodation will be provided in campus during offline sessions

Organizing Team and Speakers

Dr. R.K Joshi, Professor, CSE Dept., IIT Bombay
Dr. Sharad Sinha , Associate Professor, CSE Dept., IIT Goa
Mr. Ashish Kuvelkar, Scientist 'G' CDAC, Pune
Mrs. Shweta Das, Scientist 'C' CDAC, Pune
Dr. Shitala Prasad, Assistant Professor, CSE Dept., IIT Goa
Dr. D. B. Kulkarni, Head, NSM Nodal Centre WCE Sangli.
Dr. Umesh Chavan, IT Dept. , WCE, Sangli.
Mrs. Aprupa Pawar, CSE Dept. , WCE, Sangli.
Dr. Sudhir Dhage, Dean- Admin & IQAC, S.P.I.T., Mumbai
Dr. Raman R.Bane, Principal, YBIT, Sawantwadi
Dr. Amit Joshi, , Assistant Professor, CSE Dept., COEP,Pune
Dr. Nilesh Pikale, IIIT, Nagpur.
Dr. Karveer B. Manwade, Belagavi (KS)
Mr. Himanshu Sharma, Scientist 'C' CDAC, Pune.

Institute Level Support Team

- Mr.M.S.Khadilkar
- Mrs.Naik S.S.
- Mrs.Dhamne P.C.
- Mrs.Naik H.D.
- Mr.Prabhu S.G.
- Mr.Sawant V.R.
- Mrs.Jamsandekar M.J.
- Mrs.Sawant S.M.

Contact Details

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Yashwantrao Bhonsale Institute of Technology,
A/p Charate, Vazarwadi, Tal- Sawantwadi, Dist- Sindhudurg, Maharashtra, 416502

Day 1: 26/05/2025 (Monday) Online

Time	Activity
10:30 – 10:32	**Welcome of dignitaries by Dr. R. R. Bane, Coordinator of the FDP and Principal, YBIT**
10:32 – 10:36	**Introduction of the FDP by Dr. U. B. Chavan, Coordinator of the FDP, WCE Sangli**
10:36 – 10:40	**Address by Prof. (Dr.) D. B. Kulkarni, Professor, NSM Center Head, WCE Sangli.**
10:40 – 10:44	**Address by Dr. U. A. Dabade, Director, WCE Sangli**
10:44 – 10:48	**Address by Mr. Ashish Kuvelkar, Scientist G, CDAC Pune**
11:00 – 01:00	**Session 1 Introduction to Parallel Computing and Performance Metrics- Dr. Amit Joshi, COEP Pune**
01:00 – 02:00	**Lunch Break**
02:00 – 04:00	**Session 2 Shared vs. Distributed Memory Systems: CPU-GPU Architectures - Mr. Kartik Narayane, CDAC Pune**
04:15 – 06:15	**Session 3 Supercomputers in India and the World: PARAM, Fugaku, Frontier, etc. - Mr. Samir Shaikh, CDAC Pune.**

Day 2: 27/05/2025 (Tuesday) Online

09:00 – 11:00	**Session 4 Overview of High Performance Computing: Architecture, Applications & Trends - Prof. (Dr.) D. B. Kulkarni, WCE, Sangli.**
11:15 – 01:15	**Session 5 Convergence of HPC and AI : How are they related? Dr. Sharad Sinha IIT Goa.**

01:15 – 02:30	**Lunch Break**
02:30 – 04:30	**Session 6 Parallel Programming with OpenMP and MPI – Concepts & Use Cases- Mr. Kartik Narayane, CDAC Pune**

Day 3: 28/05/2025 (Wednesday) Online

09:00 – 11:00	**Session 7 Memory Hierarchy, Caching, and I/O Optimization in HPC Ms. Harsha Ugave /Mr. Swapnil Shinde, CDAC Pune.**
11:15 – 01:15	**Session 8 Profiling and Benchmarking Tools (e.g., gprof, Intel VTune, NVIDIA Nsight)- Mr. Himanshu Sharma, CDAC Pune**
01:15 – 02:30	**Lunch Break**
02:30 – 04:30	**Session 9 Hands-on: Profiling and Optimizing Parallel Code- Mr. Himanshu Sharma, CDAC Pune**

Day 4: 29/05/2025 (Thursday) Offline

Venue: [YBIT Seminar Hall and Computer Lab]

09:00 – 10:00	**Breakfast and Registration**
10:00 – 12:00	**Session 10 Computational Demands of AI: Deep Learning Models and Training Challenges, Dr. Shitala Prasad, IIT Goa**
01:00 – 03:00	**Session 11 Hands-on: Running a Deep Learning Model on GPU using Google Colab or TensorFlow, Dr. Shitala Prasad, IIT Goa**

03:00 – 03:15	**Lunch Break**
03:15 – 05:15	**Session 12 MPI- Dr. Rushikesh Joshi- Professor, Dept. of CSE,** IIT Bombay.

Day 5: 30/05/2025 (Friday) Offline

Venue: [YBIT Seminar Hall and Computer Lab]

09:00 – 11:00	**Session 13 MPI Prof. (Dr.) Karveer Manawade**
11:15 – 01:15	**Session 14 MPI Hands-on Prof. (Dr.) Karveer Manawade**
01:15 – 02:30	**Lunch Break**
02:30 – 04:30	**Session 15 OpenMP and Use of Deep Learning Server- Handson - Prof. (Dr.) Umesh Chavan and Prof. Aprupa Pawar, WCE, Sangli.**

Day 6: 31/05/2025 (Saturday) offline

Time	Activity
09:00 – 16:30	**GPU / CUDA Certification by Dr. Nilesh Pikle**
04.30- 05.00	**Valedictory Function**