



National Institute of Technology Silchar

(An Institute of National Importance by MHRD, Govt. of India)

Silchar, Assam – 788 010

NITS SUPERCOMPUTING CENTRE

(Centre of Excellence in High Performance Computing)

WINTER TRAINING PROGRAM ON “HIGH PERFORMANCE COMPUTING”

01 Dec - 30 Dec, 2015

Venue: Central Computer Centre (CCC), NIT Silchar

Course Contents:

Module 1: Introduction to UNIX operating systems

Main Topics

- *System Concepts*
- *Startup Scripts*
- *Linux Boot Process*
- *Distros in Linux*
- *Installation of Linux*
- *Working in Linux*

Module 2: Linux HPC Architecture

- *Architecture of Unix like Operating System and HPC*
- *Cluster Types*
- *Infiniband Interconnects Architecture*
- *Process Management*
- *Memory Management*
- *File System Management*

Module 3: HPC Cluster Configuration

- *Disk Partition*
- *Controlling and managing Services*
- *Repository Configuration*
- *Network Configuration*
- *Setting up of NFS, DNS, NIS, DHCP, FTP, NTP*
- *Mellanox OFED Configuration*
- *Performance Tuning and system hardening*
- *Building Rocks HPC Cluster*
- *Configuring Ganglia and monitoring Cluster*
- *NIT HPC System Specifications*

Module 4: Linux Cluster administration, Network troubleshooting and advanced Shell Scripting

- *Wireshark and Tcp dump*
- *PXE Boot Installation*
- *Configuring, compiling, linking software packages*
- *Data management (quotas, purging, archival)*
- *Green computing*
- *Grid and Cloud Computing*
- *Shell Scripting*
 - *Introduction To bash CLI*
 - *Debugging & Redirection of Scripts*
 - *Control Structure, Loop*
 - *Variable & String*
 - *Conditional Statement*
 - *Regular Expression*

- Automate Tasks using Bash Script

Module 5: Optimization, Profiling and Debugging

- Uniprocessor Optimization techniques for serial application.
- Debugging of serial code using gdb debugger.
- Profiling of serial application using gprof.
- Hands on programs on debugging and profiling.

Module 6: Parallel Programming

- Parallel Programming using OpenMP API
 - Work sharing construct.
 - Synchronization constructs.
 - Hands on programs on OpenMP.
- Parallel Programming using MPI library.
 - Point to point communication.
 - Collective Communication.
 - Hands on programs on MPI
- MPI-OpenMP Hands on Programs

Module 7: Coprocessor Programming

- Intel Xeon Phi
 - Study of Intel xeon Phi architecture
 - Programming model of Intel xeon phi
 - ❖ Native
 - ❖ Offload
 - ❖ Symmetric
 - Porting and benchmarking of parallel application on Intel xeon phi Coprocessor.
- Cuda Programming basics.
 - Hands on Programs on NVIDIA.

Module 8: Porting and benchmarking of parallel Application.

- Hands on Programs on Intel mkl library.
- Study of any parallel application from any scientific domain.(e.g.lammps application from molecular dynamics)
- Porting and benchmarking of parallel application (lammps) on NITS supercomputing System.
- Hands on session on Porting of parallel application.

Contact Details:

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Course Registration:

Registration fees of **Rs. 8000** INR for Students, **Rs. 10000** INR for Faculty/Persons from academia and **Rs. 15000** INR for Industry Personnel. (Early bird registration: Rs. 5000 for Students, Rs. 8000 for Faculty and Rs. 12000 for Industry Personnel on before 15th Nov 2015)

Accommodation:

Limited accommodations may be arranged on twin shared basis at Institute Guest House subject to availability on self-payment basis as per Guest House Room tariff.

Mode of Payment:

- Demand Draft should be made in favor of “**Director NIT Silchar**” payable at SBI NIT Silchar branch (Branch Code-7061).
- For Online payment: In favor of Director NIT Silchar, A/C No.010521277057, IFSC Code-SBIN0007061, MICR Code-788002004.

(The scanned copy of Registration form along with payment receipt should be sent over coordinator's email in advance)

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REGISTRATION FORM

Full Name: _____

Father's Name: _____

Address:- _____

College/Institute/Organization Affiliated:

Category: Student / Faculty (please Tick in the applicable field)

Department/Branch:.....

Year/Semester:.....

Email id:_____

Contact Number:-_____

Area of Interest:.....

DD No._____ Date of Payment: _____

Or

For online payment through internet banking payment receipt should be enclosed.

Date:

(Signature)

Place:

