

**TWO-DAY CAPACITY BUILDING WORKSHOP  
ON  
CONVERGENCE OF HPC AND AI  
FOR COLLEGE TEACHERS**



**Organized by  
Department of Computer Science & Engineering  
&  
Department of Computer Science  
under  
the ambit of IUST Cloud Project**

Sponsored by Higher Education Department, Govt. of J&K

#### 4. About High Performance Computing Cluster at IUST

High-performance computing refers to the capacity of a system to process an enormous amount of data and run complex models rapidly. HPC programs, therefore, require a huge compute power to process terabytes, petabytes, or even zettabytes of data in real-time.

High Performance Computing Cluster was installed in the Department of Computer Science and Engineering in the Year 2020 at an approximate investment of 3.5 Crore rupees and was officially commissioned for use in Research in year 2021.

The HPC facility at IUST is having two Storage Nodes, six Compute Nodes comprising of 3 GPU Nodes and 3 CPU Nodes each with dual Intel Xeon Gold 3.1G processor having 20 cores, GPUs are powered with NVIDIA TESLA V 100 Graphics Cards. The HPC Cluster at IUST consists of 240 CPU cores, 15,000 CUDA cores, storage of 160TB and has compute power of 2.976 TFLOPS.

#### 5. About Workshop

The theme of two-day capacity building workshop is to acquaint the college teachers of Jammu and Kashmir to the latest developments in the domain of Artificial Intelligence and further equip them with the skills of leveraging HPC to solve the challenging compute intense problems in the various domains of AI including Machine Learning, Deep Learning and Generative Learning. The main focus of the workshop is to provide practical oriented sessions on the HPC Cluster of IUST to create and train various AI models, further the participants will also be trained to access the HPC cluster remotely so that they can submit and execute their jobs remotely using their Laptops/Desktops.

#### 6. List Of Speakers

1. Prof. A. H. Moon (Dean Research, IUST/PI IUST Cloud Project)
2. Dr. Assif Assad (AP, Dept. of CSE/Co-PI IUST Cloud Project)
3. Dr. Muzafar Rasool (AP, Dept. of CS/Co-PI IUST Cloud Project)
4. Dr. Rayees Ahmad Dar (From Industry)
5. Mr. Sadaf Shafi (From Industry)

#### 7. Schedule

DAY 1				
1	Inauguration		11:00 am - 12:00 pm	TEQIP Auditorium (AB-III)
2	Introduction to AI, ML	Dr Muzafar Rasool (Dept of CS, AP)	12:00 pm- 12:30 pm	
3	Introduction to DL	Dr Assif Assad (Dept of CSE, AP)	12:30 pm - 01:00 pm	
4	LUNCH		01:00 pm - 02:00 pm	Faculty Lounge (AB-VID)
5	Introduction to HPC, Hands on Session on Execution of Jobs on HPC	Mr. Ajaz ul Haq (JRF, IUST Cloud)	02:00 pm - 03:00 pm	Programming Lab (AB-IV)
6	Hands On Session on Deep Learning	Mr Walid, Ms Nusrat & Ms Tabasum (Scholars of DOCS and CSE)	03:00 pm - 04:00 pm	
DAY 2				
1	Transformers and Attention Networks	Dr Rayees Ahmad Dar (Data Scientist)	11:00 am - 12:00 pm	Programming Lab (AB-IV)
2	Neural Style Transformer & GAN (Generative Adversarial Networks)	Mr Sadaf Shafi (From Industry)	12:00 pm - 01:00 pm	
3	LUNCH		01:00 pm - 02:00 pm	Faculty Lounge (AB-VID)
4	Hand on Session On Machine Learning	Abdul Hafiz Ahanger and Mr Irian Rasool (Scholars of DOCS & CSE)	02:00 pm - 03:00 pm	Programming Lab (AB-IV)
5	Hands On Session on Imbalanced Datasets	Abdul Basit Ahanger (Scholar DOCS) Sagib-Ul-Sabha (Scholar CSE)	03:00 pm - 04:00 pm	
6	Valedictory		04:00 pm - 04:30 pm	TEQIP Auditorium (AB-III)



## **1. IUST Cloud**

IUST-Cloud is a project funded by Higher Education Department, Government of Jammu and Kashmir to be developed at an estimated cost of Rs. 16 Crore.

IUST-Cloud, is a model for creating and sharing of resources across Higher Education Institutions (HEI's) by leveraging Cloud Technology which would address the following issues.

- Sharing of computational resources amongst HEI's
- Promoting e-learning

Cloud Technology broadly offers Three (03) Service models:

- Infrastructure as a Service (IaaS)
- Platform as a Service (PaaS)
- Software as a Service (SaaS)

Cloud solution is mostly based on Infrastructure as a Service (IaaS) and other delivery models solutions like Platform as a Service (PaaS) and Software as a Service (SaaS) are built on top of the basic Infrastructure as a Service.

The cloud solution worked out by IUST includes computers/modules which are necessary to provide infrastructure as a Service (IaaS) and then gradually the services would be upgraded to other delivery platforms like Platform as a Service (PaaS) and Software as a Service (SaaS).

## **Main features of the Project:**

- A centralized High Performance Computing Lab (HPC Lab) has already been established at *IUST Campus*, at an expenditure of Rs. 3.5 Crore. The facility is equipped with computing and networking infrastructure to enable HEI's to access the facility seamlessly with high degree of reliability and availability in a secure manner.
- The project has provisions to initially connect three (03) sites of HEI's to the HPC using *hub and spoke paradigm*.
- Initially three (03) HEI's shall be developed to have smart classroom equipped with necessary infrastructure including Desktop PCs, interactive boards, visualizers, projection system, lecture podium, network equipment (routers/switch), video conferencing facility, development of studio for recording Mooc's, multimedia centre, captive power (UPS).
- The facility shall support research activities amongst faculty and research scholars of IUST and designated colleges of HEI by providing them with high computing resources.
- It shall promote e-learning activities across multiple HEI's for capacity building of teachers and skilling of students.
- It shall leverage cloud technology for sharing and optimal utilization of HPC resources amongst multiple sites.
- The Cloud enablement of infrastructure has been built around server virtualization software with required security safeguards.
- The Cloud computing would offer on demand delivery of computing power, e-learning resources, database storage, application and other IT Resources over a secured
- The technology model would provide scalability to extend its reach to more number of HEI's located at remote sites as well, with elasticity to up/down resources required at any point of time.

## **2. About Department of Computer Science & Engineering**

The Department of Computer Science and Engineering was established in the year 2007 to provide technical skills and expertise in the fast growing field of computer engineering. The department is in a period of exciting growth, In short time span of its inception, the infrastructure of the department has developed tremendously. The department has state-of-the-art labs including High Performance Computing Lab, Embedded Systems and Robotics Lab, IOT Lab, Programming lab, Hardware and Networking Lab. The department has fetched research projects approximately worth 17 crore rupees from different funding agencies including DST , ICMR, AICTE , Higher Education Department Govt. of J & K. The department currently offers a Doctorate Programme and B.Tech in Computer Science and Engineering. Scores of our alumni have been placed in reputed MNS including Amazon, Oracle, IBM, Wipro, Infosys, Capgemini, Byju's.

## **3. About Department of Computer Science**

The department was established in the year 2006 with the objective of imparting quality education in the field of Computer Science. The Department is offering AICTE approved postgraduate program of Master of Computer Applications (MCA) and M.Sc. Information Technology program with the aim to develop core competence in Computer Applications and Information technology. The Department's research activities are funded by University and several Government organizations including the DST, ICMR. Several of our alumni hold important positions in the industry and academia worldwide. Students have been placed, both in India and abroad, in several leading national and international companies including Wipro, IBM, Oracle, and many more.