The higher education scenario in the country is transforming at a rapid pace. MHRD’s new National Education Policy (NEP) document proposes to address the various issues related to the quality education and incorporating innovation and research in education so as to make India a knowledge superpower. The need of the hour is to equip our students with the necessary skills and knowledge so as to eliminate the shortage of trained manpower in science and technology. In this context, effective deployment, widespread use and integration of Virtual Labs into the curricula cannot be emphasized enough. Virtual Labs provides an opportunity to both students and teachers to augment the learning experience. The Virtual Labs consortium is delighted that, with the help of 720+ Nodal Centers, we are trying to strengthen the learning ecosystem for science and technology education. Suggestions to improve the Virtual Labs experience are most welcome.
Quality of Engineering Education in India is a matter of concern for academicians, industries, and regulatory authorities. Limited exposure to industrial world, lack of experienced faculty members, and ineffective laboratory facilities in institutes add to this problem. The "Integrated Technologies Olympiad" is a step towards bridging the gap between demands from industries and existing vocational curriculum. The competition has been designed after an elaborate discussion with industry partners and academicians.

Every year in collaboration with "A Four Technologies" and "Rotary Clubs", College of Engineering Pune (COEP) conducts "Integrated Technologies Olympiad". The InTech Olympiad is a brainchild of few enthusiasts who believe in collaborative and problem-based learning. AICTE New Delhi promotes this event by circulating the flyer to all engineering colleges in the country. There are five phases of participation of students form all branches across the country.

Phase I: Registrations.
Phase II: Psychometric and Aptitude test.
Phase III: Test on "Core discipline".
Phase IV: Group project mentored by industry and academia (This is a live project by industry based on their current issues in the factory) The selection is based on the performance in phase II and III
Phase V: Submission of the project and grand finale at COEP.

We conduct webinars for the students who are finally selected for the project phase. One exclusive webinar is delivered on "Virtual Labs". The tests are based on experiments in virtual labs and online. Every year more than 15,000 students participate in this event and those groups (These are interdisciplinary groups from different parts of country working together using "Virtual Space" provided by COEP).

For more details please visit https://portal.coepvlab.ac.in/InTechOlympiad/welcome
A State-Level Workshop on Virtual Labs was organized successfully on 06th April 2019 at “Swami Keshvanand Institute of Technology, Management & Gramothan, Jaipur” for faculty members of 10 different Engineering & Polytechnic Institutes from respective disciplines (ECE, ME, CE, CSE & EE) by Virtual Labs team, IIT Delhi. Virtual Labs mentors for this workshop were Mr. Ashish Ranjan, Mr. Ashish Mudgil & Mr. Prateek Sharma. Total of 41 faculty members attended the workshop.

Another State-Level Workshop on Virtual Labs was organized successfully on 18th April 2019 at “Technology Education & Research Integrated Institutions (TERII), Kurukshetra” for faculty members of 08 different Engineering & Polytechnic Institutes from respective disciplines (ECE, ME, CE, Bio-Tech, CSE & EE) by Virtual Labs team, IIT Delhi. Total of 33 faculty members attended the workshop. Mr. Tanmay Tarun Das, Mr. Ashish Ranian, Mr. Ashish Mudgil & Mr. Prateek Sharma were mentors of this workshop.

First Workshop on Digital Initiatives in Higher Education was jointly organized by Ministry of Human Resource Development, Government of India and Chancellor’s Secretariat, Raj Bhawan Bihar at Mauraya Hotel Patna on 11-12th April 2019. H.E Sri Lal Ji Tandon, the Governor cum Chancellor, University of Bihar was the Chief-guest of the event. Shri Vivek Kumar Singh Principal Secretary to H.E. the Governor of Bihar, Dr. N. Saravana Kumar, Joint Secretary (ICC & TEL), MHRD, Govt. of India, Prof. R.C Sobti, Consultant, Higher Education, Raj Bhavan, Govt. of Bihar, Shri R.K. Mahajan, Additional Chief Secretary Higher Education, Govt. of Bihar, Shri Subhash Sharma, Development Commissioner, Govt. of Bihar and Vice-Chancellor/Principal of twenty HEIs of Bihar were present at the event day. On each day, three representatives from each of twenty Higher Educational Institutes (total 60 participants) have participated. It was a good opportunity to introduce and get HEIs of Bihar to adopt the digital initiatives and ensure enrolment of HEIs in the initiative. Virtual Lab project was represented by IIT Delhi at the event and Vice-Chancellor/Principal of total six HEIs have submitted their EOI forms to become nodal centers of Virtual Labs.
Date: Feb 6-11, 2019
Venue: Maharashtra Institute of Technology Aurangabad
Participants: 84 (21 Faculty + 63 Students)
Resource Persons:
Prof. T S Khatavkar, Prof. M C Nagoshe, Mr. Piyush Malpure & Mr. Parth Parikh
- PVG’s COET, Pune
Dr. Abhilasha D Mishra, Dr. Smita L. Kasar
- MIT, Aurangabad
Prof. Nitin Bhate
- MSU-FTE, Baroda
Dr. Jyoti Pareek
- Gujarat University, Ahmedabad
Dr. Naveen Padmas
- D.Y. Patil University, Navi Mumbai
DEVELOPMENT BOOTCAMP

Date: June 10-20, 2019
Venue: IIT Roorkee
Participants: 21
Resource Persons:
  - Prof. R S Anand – IIT Roorkee
  - Mr. Jasbir Singh – IIT Roorkee
  - Mr. Abhilash Sundriyal – IIT Roorkee
  - Mr. Rajeev Kumar – IIT Roorkee
  - Ms. Priyanshi Agarwal – IIT Roorkee
  - Mr. Amit Kumar Sharma – IIT Roorkee
  - Mr. Chetan – IIT Roorkee

- 1st Development BootCamp organized by IIT Roorkee.
- 21 Participants from 06-institutes have participated in the event.
- 07-new experiments have been developed.

• Swarnnim Institute of Technology, Gandhinagar
• Pacific Institute of Technology, Udaipur
• Maharishi Markandeshwar University, Mullana
• Government Engineering College, Bikaner
• Sharda University, Greater Noida
• Seemant Institute of Technology, Pithoragarh

Images from the “Development BootCamp” at IIT Roorkee
NEW LAB DEVELOPMENT

The new labs are being developed in the 3rd Phase of the project. All consortium members are contributing in this phase. There are various nodal centers across the country who have joined their hands with the consortium for new content creation. The three peer reviews of the newly developed content are being done parallelly. The list of the labs/experiments developed and reviewed so far is given below.

### LABS/EXPERIMENTS UNDER DEVELOPMENT

- Environmental Engineering 1
- Environmental Engineering 2
- Fluid Machinery
- Mining Geology
- Marine Structures Lab
- Transportation Engineering
- Introduction to PHP
- Database Lab
- Computer Graphics
- Computer Networks
- Computer Networking and Security
- Natural Language Processing
- Machine Learning Lab
- 8051 Microcontroller
- Digital Applications
- Digital Logic Design
- Digital Electronics
- Electrical Machines (Simulation)
- Numerical Methods
- Dynamics of Machines
- Machine Tools
- Engineering Physics
- Basics of Physics Lab
- Polymer Processing Technology
- Zoology Lab
- Biomechanics Lab
- Molecular Biology 2
- Biomedical Instrumentation
- Bacterial Cell Structures
- Object Oriented Programming with C++
- Operating System
- Web Application Develop. using Java Tech.
- System Software
- Software Engineering
- Computer Network Lab
- Basics of Computer Network Lab
- Engineering Graphics Lab
- Power Electronics
- Network Theory
- Space Communication Lab
- Integrated Circuits
- Signals & Systems
- Virtual Forensic Ballistics Lab
- Fingerprint Lab
- Forensic Serology Lab
- Analysis and Synthesis of Mechanism
- Material Testing Lab
- 3D Printing Lab
- Strength of Materials
- Mechanical Measurement
- Process Loop Components
- Theory of Machine
- Fluid Mechanics
- Refrigeration and Air Conditioning
- Molecular Biology 1
- Material Testing
- Physical Sciences
- Polychem lab
- Study of Earthworm
- Invertebrate Mountings Lab 1
Virtual Lab consortium has put all the possible efforts to make the labs popular among the student community across the country. The activities in a glimpse are as follows:
MORADABAD INSTITUTE OF TECHNOLOGY
MORADABAD
Organizing workshop on
“VIRTUAL-LABS”
Conducted By IIT Delhi
An Initiative of Ministry of Human Resource Development under the
National Mission on Education through ICT
Organised by:
MORADABAD INSTITUTE OF TECHNOLOGY, MORADABAD
on 21st February, 2019

Two Days Workshop on “Virtual Laboratory”
Jointly Organised by
Indian Institute of Technology, Bhilai
And
Indian Institute of Technology, Guwahati

This is to certify that IIT Bhilai and IIT Guwahati has jointly organized a two-day workshop
on virtual labs during 24th and 25th March 2019 in IIT Bhilai. The workshop was attended by
300 students and 200 faculty members from engineering institutes of Chhattisgarh. 30
experiments were demonstrated and in addition, 20 experiments were performed in the
hands-on session by the participants.

Dr. Santosh Biswas
Dept. Of CSE, IIT Guwahati
Dr. Sanjib Sanonjpy
Convener, Institute’s Innovation Council, IIT Bhilai
Nodal centers are the incredible part of the project since the beginning. The nodal centers provide us the platform to interact with the student community and give the necessary infrastructure to give them hands-on experience. They are contributing to the project in multiple ways. The nodal centers are organizing various events like workshop, Faculty Development Programme and BootCamp etc. Now, they are helping in new content creation under Virtual Labs project (Phase III).

**PVG’s College of Engineering & Technology, Pune**

Prof. (Mrs) Tanuja S. Khatakar  
(Regional Centre Coordinator)

Prof. Manish Nagoshe  
(Regional Technical Coordinator)

Prof. Minal Apsangi  
(Nodal Centre Coordinator)

- Establishment Year 2015
- Best Nodal Center Overall Performance
- 1st RNC of IIT Bombay
- 1st Private Un-aided Engineering Institute to develop Virtual Labs
- 54-experiments approved and hosted
- BootCamp organized 03
- Total NCs under supervision 21

**The Northcap University, Gurgaon**

Dr. Neeraj Kr. Shukla  
(Nodal Centre Coordinator)

- Establishment Year 2012
- Best Nodal Center Overall Performance
- 1st RNC of IIT Delhi
- 1st Private University of NCR-region to formally include Virtual Labs in syllabus
- Organizing regular workshops since establishment
- Helped in popularizing Virtual Labs at the stage of field-trials.

**Siddaganga Institute of Technology, Tumakuru**

Dr. K. C. Narasimhamurthy  
(Nodal Centre Coordinator)

- Establishment Year 2018
- Included Virtual Labs in their curriculum
- Conducted 6-weeks Internship programme on development of Remote lab system
- Developed and using remote lab system for Analog Electronic Circuit
- Conducted a Webinar Series on Remote Lab systems for Virtual Academy of IUCEE in Oct-Nov 2018
- Presented six papers at 16th International Conference of Remote

**Maharashtra Institute of Technology, Aurangabad**

Dr. Abhilasha Mishra  
(Regional Centre Coordinator)

Prof. Preeti Mishra  
(Nodal Centre Coordinator)

- Establishment Year 2016
- 3rd RNC of IIT Bombay
- 1st Private Un-aided Engineering Institute in the Maharashtra region to organize National BootCamp
- 04-Virtual Labs approved and hosted
- BootCamp organized 01
- Total NCs under supervision 07
- Contributed 7 Peer Reviewers for VlabsDev

**Dronacharya College of Engineering & Technology, Farukhnagar**

Ms. Megha Goel  
(Nodal Centre Coordinator)

- Establishment Year 2014
- 2nd Nodal Center of IIT Delhi
- 1st Private Un-aided Engineering Institute in the NCR-region to develop a Virtual Lab
- Formally include Virtual Labs in syllabus
- Organized a State-level awareness workshop on Virtual Labs

**St. Joseph Engineering College, Mangaluru**

Mr. Ravikantha Prabhu  
(Nodal Centre Coordinator)

- Establishment Year 2016
- Formally include Virtual Labs in Mission Educational Social Responsibilities (ESR)
- Conducted regular workshops for different disciplines
- “Awareness Workshop” conducted for Diploma and ITI colleges in the vicinity
- More than two thousand students are undergone Virtual Lab sessions
- Awareness done by posters, brochures and display boards

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www.vlab.co.in
Tula’s Institute, The Engineering and Management College, Dehradun

Dr. Sunil Semwal  
(Nodal Centre Coordinator)

- Establishment Year 2015
- Best Nodal Center Overall Performance
- 1st Private institute of Uttarakhand-region to formally include Virtual Labs in syllabus
- Organizing regular workshops since establishment
- More than one thousand students have undergone Virtual Lab sessions

Dream Institute of Technology, Kolkata

Dr. Dipankar Sarkar  
(Nodal Centre Coordinator)

- Establishment Year 2012
- Encourages faculty and students to learn and use the labs
- Helped in testing the labs during development phase
- Popularized Virtual Labs during Annual Technical Fest.

Pranveer Institute of Technology, Kanpur

Dr. Aparna Dixit  
(Nodal Centre Coordinator)

- Establishment Year 2015
- 1st nodal center of IIT Kanpur to develop Virtual Lab (02)
- Conducted regular workshops for different disciplines
  "Awareness Workshop" conducted for other nearby colleges
- Provide a separate space & budget for Virtual lab development
- Encourage other colleges to become a nodal center

Rajkiya Engineering College, Banda

Dr. Ashutosh Tiwari  
(Nodal Centre Coordinator)

- Establishment Year 2018
- 2nd nodal center of IIT Kanpur to develop Virtual Lab (01)
- Conducted regular workshops for different disciplines
  "Awareness Workshop" conducted for other nearby colleges
- Provide a separate space & budget for Virtual lab development
- Encourage other colleges to become a nodal center

Bankura Unnayani Institute of Engineering, Bankura

Mr. Aloke Kumar Roy  
(Nodal Centre Coordinator)

- Establishment Year 2017
- Conducted regular workshops for different disciplines
- Encourages faculty and students to learn and use the labs
- Helped in testing the labs during development phase

College of Engineering Roorkee

Mr. Abhishek Verma  
(Nodal Centre Coordinator)

- Establishment Year 2015
- Best Nodal Center Outreach activities
- Organized FDP and Student activity programme of one-week duration
- Organizing regular workshops since establishment
- More than two thousand students have undergone Virtual Lab sessions

IIT Roorkee

IIT Kharagpur

IIT Kanpur

www.vlab.co.in
Bengal College of Engineering and Technology, Durgapur

Sk. Abdul Rahim
(Nodal Centre Coordinator)

- Establishment Year
- Best Nodal Center Overall Performance
- Organizing regular workshops since establishment
- “Awareness Workshop” conducted for other nearby colleges
- Actively using Virtual Labs in teaching and examination are taken formally based on these labs under MAKAUT
- Encourage other colleges to become a nodal center

COE Pune

Mauli Group of Institutions, College of Engineering and Technology, Shegaon

Prof. Nilesh M. Verulkar
(Nodal Centre Coordinator)

- Establishment Year 2018
- Best Nodal Center Overall Performance
- Appointed “Department-wise Coordinator” to make Virtual Labs more popular
- Organizing regular workshops since establishment
- More than one thousand students are undergone Virtual Lab sessions

DEI Agra

Hindustan College of Science and Technology, Mathura

Prof. Rajeev K Upadhyay
(Nodal Centre Coordinator)

- Establishment Year 2015
- Best Nodal Center Overall Performance
- Organizing regular workshops since establishment
- Encourage other colleges to become a nodal center
VIRTUAL LABS IN NEWS

KL G S I T gets Virtual Labs nodal centre

A nodal centre of Virtual Labs was inaugurated at KL G S I T in the presence of Union Minister in Education of MHRD Dr. Ramesh Pokhriyal ‘Nishad’.

Speaking on the occasion, DBK research scholar Sricharanra Eswar said virtual laboratories are becoming an integral part of science and technical education as they enable students to discover and work with key concepts.

With the rapid growth of information and communication technologies (ICT), virtual laboratories are being used as an alternative to the physical or real laboratories. Virtual laboratories have been developed in a number of engineering and scientific disciplines using a variety of simulation technologies, he said. While he detailed on the importance of virtual labs, he said such laboratories can be used ‘anytime, anywhere, and for online learning’. They are also increasingly being used to supplement the traditional learning modes. ‘The logistics of setting up a real laboratory is a problem in particular when dealing with a large number of students, so virtual laboratories can help with this. Training in terms of operation and human support are also high. Virtual labs are more suited to handle a large number of students.

IIT-Bhilai hosts 2-day workshop on Virtual labs programmes for engineering colleges

The core idea of this workshop is to involve faculty members and students from the engineering colleges of the state in the Virtual Labs programme. With the support of MHRD and IIT Bhilai, the JNTUH, VNR VJIET, GITAM University, and SPARRC, the workshop was held on March 26 and 27.

The workshop focused on the importance of virtual laboratories in engineering education. The Virtual Labs were designed to provide a platform for students to experiment with real-world scenarios, allowing them to gain practical skills and knowledge.

The workshop emphasized the role of virtual laboratories in enhancing the learning experience, especially for students in remote or underprivileged areas. It also highlighted the benefits of virtual laboratories in reducing the need for physical infrastructure and materials.

IIT Bhilai workshop on Virtual Labs for engineering faculty, teachers

The IIT Bhilai workshop on Virtual Labs for engineering faculty, teachers was held on March 26 and 27. The aim of the workshop was to provide training and support for faculty members from various engineering colleges.

The workshop covered topics such as the latest developments in Virtual Labs technology, best practices for integrating Virtual Labs into the curriculum, and strategies for effectively using Virtual Labs to enhance student learning.

Participants were given hands-on experience with various Virtual Labs platforms and tools, allowing them to gain a deeper understanding of how Virtual Labs can be utilized in their teaching.

The workshop also provided an opportunity for faculty members to network and share ideas, fostering a collaborative learning environment.

Virtual Labs

An MHRD Govt. of India Initiative

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