POORNIMA
COLLEGE OF ENGINEERING

Approved by AICTE
Affiliated to Rajasthan Technical University, Kota
Recognized by UGC under Section 2(f) of the UGC Act, 1956

2.3.1.5 Center of Excellences _2023-24

ISI-6, RIICO Institutional Area, Sitapura, Jaipur-302022 (Rajasthan)
• Phone: +91-9829255102, +91-9414728922 • E-mail: principal.pce@poornima.org
• Website: www.pce.poornima.org

OFFICE OF THE DEAN ACADEMIC AFFAIRS
RAJASTHAN TECHNICAL UNIVERSITY
AKELGARH, RAWATBHATA ROAD, KOTA-324010
Ph-0744- 2473015, website : www.rtu.ac.in, email : dean.academic@rtu.ac.in

RTU/Acad./F(17)14/2021/ 3646 **Date: 28.06.2021**

To
Principal/Director
Poornima College of Engineering
ITS-1, IT Park, EPIP Sitapura
Jaipur-302028

Sub: Recognition of Centre of Excellence in **Artificial Intelligence and Big Data.**
Ref.: 1. University letter no. RTU/F(17)Acad./2020/1414-15, dtd. 30.09.2020.
2. Your proposal dtd. 23.04.2021.

Sir

With reference to University call for proposals for establishment of Centre of Excellence, your application for recognition of Centre of Excellence in the area of **Artificial Intelligence and Big Data** was considered. On the recommendation of Expert Evaluation Team and subsequent approval of 68th Board of Inspection vide agenda no. 66.3, University has recognised the Centre of Excellence in the area of **Artificial Intelligence and Big Data** at your institute.

The modalities of operation for Centre of Excellence shall be communicated in due course of time.

Yours sincerely

(Prof. D.K. Palwalia)
Dean, Academic Affairs

Vision: To be the leading research institute in the Area of AI & Big Data in the stateof Rajasthan and upliftment of other institutions and their stakeholders.

Objectives of setting up RTU COE in AI & Big Data:

1. To impart knowledge about AI & Big Data to the students and the faculty from the institutions across Rajasthan.
2. To make the resources available to advanced learners and researchers for developing solution to any societal, industrial and environmental applications using AI & Big Data.
3. To create project-based learning environment in and around the institute across the state of Rajasthan.

Physical Resources Available

1. Artificial Intelligence Lab I:

This lab is established in the year 2017 in a space of 1500 Square Feet having:

Hardware: Lenovo Think Station P310, Microsoft Windows 10 Pro, Intel(R) Core (TM) i5- 6400CPU @ 2.70GHz, 2712 MHz, Core(s), 4 Logical Processor(s) and Memory (RAM) 8.00GB **[72 Nos.]**

Software: All open-source AI & Big Data tools with an access to virtual processing and software resources.

IBM Tools & Access- Cognos, BI, Bluemix

2. Artificial Intelligence Lab II:

This lab is also established in the year 2017 in a space of 600 Square Feet having:

Hardware: Lenovo Think Station P310, Microsoft Windows 10 Pro, Intel(R) Core (TM) i5-6400CPU @ 2.70GHz, 2712 Mhz, Core(s), 4 Logical Processor(s) and

Memory (RAM) 8.00GB. **[42 Nos.]**

Raspberry Pi Model 3, with case and NOOBS on Micro SD 16 GB Card, Sensors and otheraccessories. **[50 Nos]**

Software: All open-source AI & Big Data tools with an access to virtual processing and software resources.

IBM Tools & Access- Cognos, BI, Bluemix.

3. **Training and Learning Provisions:**

- Well-furnished meeting room with TV screen for video conferencing.
- Furnished Training room with Projector, Screen, White Board and furniture.
- Working and learning space furnished with tables, chairs, power plugs and internet connectivity.

Virtual Resources

1. **In collaboration with IBM**

Artificial Intelligence Lab I and II were established in the year 2017 when Poornima Collegesigned MoU with IBM to train students and faculty in the area of Cloud Computing and IoT.Since 2017 students and faculty members are being trained in following three areas;

a. Internet of Things (IOT) Lab for Application Development & Deployment using IBMBlueMix;
b. Cloud Computing Lab for App Development & Deployment for Cloud using IBMBlueMix;
c. Business Intelligence Lab for Learning Business Intelligence using IBM Cognos BI;
d. Participant are able to use the IBM software in the lab for their non- commercial research interests;
e. Participant receive the printed course material
f. Participant have access to various IBM online forums for additional study material

and resources to interact with experts & participate in discussions;

g. Participants receive certification from IBM at the completion of the course;

h. IBM Experts provide real world challenges for project experience & also mentor theparticipants through the various phases of these projects.

Application Development and Deployment for Cloud using IBM Bluemix:

Built on Cloud Foundry open-source technology, Bluemix makes application development easier with Platform as a Service (PaaS). Bluemix also provides prebuilt Mobile Backend asa Service (MBaaS) capabilities.

Learning Business Intelligence using IBM Cognos:

BI Module 1: IBM Cognos Insight: Analyze and Share Module 2: IBM Cognos Business Intelligence Advance.

IoT Application Development and Deployment using IBM BlueMix:

All the students of II, III- and IV-year's students of all disciplines are opting for any one optionevery year and are being trained.

2. In Collaboration with Microsoft:

MoU has been signed with Celebal Technologies Jaipur in January 2020 to get access toMicrosoft processing resources and tools.

Celebal Technology Jaipur is in general collaborating with Poornima College of Engineeringfrom 2018 in terms of training and hiring the students.

Microsoft resources available to the students and faculty are;

- Virtual Machines, Azure Tools and Services
- 5TB Blob Storage, Azure Credits for Azure services, AI/ML/DL Tools access
- High End Virtual Machines and Azure Credits with latest Data Science,AI and Deep Learning Tools
- Learning of multiple aspects and languages like: Big Data, Chatbots,Enterprise Integration, Python, Databricks, Power BI, Power Apps

- 5TB Blob Storage
- Microsoft Azure Certifications by faculty and students
- App Service Plan
- Application Insight
- SQL Database
- Azure Data Factory
- SQL Server
- Azure Database for MySQL
- Web App Bot
- App Service
- Azure Synapse
- Azure Consumption: 60,000 Units for year 2021

3. SAP: MoU with SAP University Alliance

Poornima College of Engineering has signed MoU with SAP University alliance in January2021 for utilizing SAP online resources to train faculty and students.

Training resources are as under;

- Overview of SAP's vision of the Intelligent Enterprise
- Basic concepts of an ERP solution based on S/4HANA system
- SAP Fiori User Interface to interact with the S/4HANA system
- Case studies provided to understand various business processes.
- Business simulation games for SAP S/4 HANA
- Help improve knowledge of business processes

- Dynamic environment where it accelerates time, simulates interactions with businesspartners, & automates administrative tasks execution to understand how ERP systemsare effective at managing business processes.
- Faculty training is in progress and soon we are going start student training on SAP.

Research Facilities

S. No	Name of Equipment/ Software	Laboratory	Quantity	Cost	Bill no. & Date
1	Raspberry Pi Model 3, with case	IOT Lab (COE)	30 Pcs.	114,000.00	116 31-10-2017
2	**Operating System:** Microsoft Windows 10 Pro Lenovo Think Station P310, Intel(R) Core (TM) i5-6400 CPU @ 2.70GHz, 2712 Mhz, Core(s), 4 Logical Processor(s) **Memory (RAM):** 8.00 GB **HDD**: 1 TB	IOT Lab (COE)	42	1919400.00	BDCS/16-17/1594 BDCS/16-17/1595 (2285000 Rs for 50 PCs)
3	**GPU Server:** Dell Power Edge R 750 Server CLX 4208 2P 8C/16T 2.1G 11M 9.6GT 85W 3647 R1 32GB 2933MHz DDR4 RAM NVIDIA A100 40GB Passive card	Computer Vision Lab (COE)	1	19,48521.00	Voucher No. 58
4	**Higher Configuration Desktop with Graphic Card** Intel Core i7 10700 F X 2 Cooler Master Cabinet SMPS 600-watt Cooler Motherboard Gigabyte	Computer Vision Lab (COE)	2	2,12,457.62	BDCS/5573/21-22

	B560M DS3H AC X 2 RAM 16 GB DDR4 2656 8TB HDD Seagate 500 GB SSD Graphic card 8gb 3050 Gaming RTX				
5	**FujiFilm-FX-X-100V S-EE Digital Rangefinder Camera**	Computer Vision Lab (COE)	1	1,06,245.76	BDCS/5573/21-22
6	**BASLER ACE GIGE Camera**	Computer Vision Lab (COE)	1	1,40,000.00	BDCS/5573/21-22
7	**Einscan Pro 2X 2020 + Solid Edge Software, Multifunctional 3D Scanner**	AI & Big Data Lab (COE)	1	713,900	IN21-22-088 30-03-2022

Library Resources

We have subscription to following library resources those are being used by the faculty and students while doing projects and R&D in AI and Big Data.

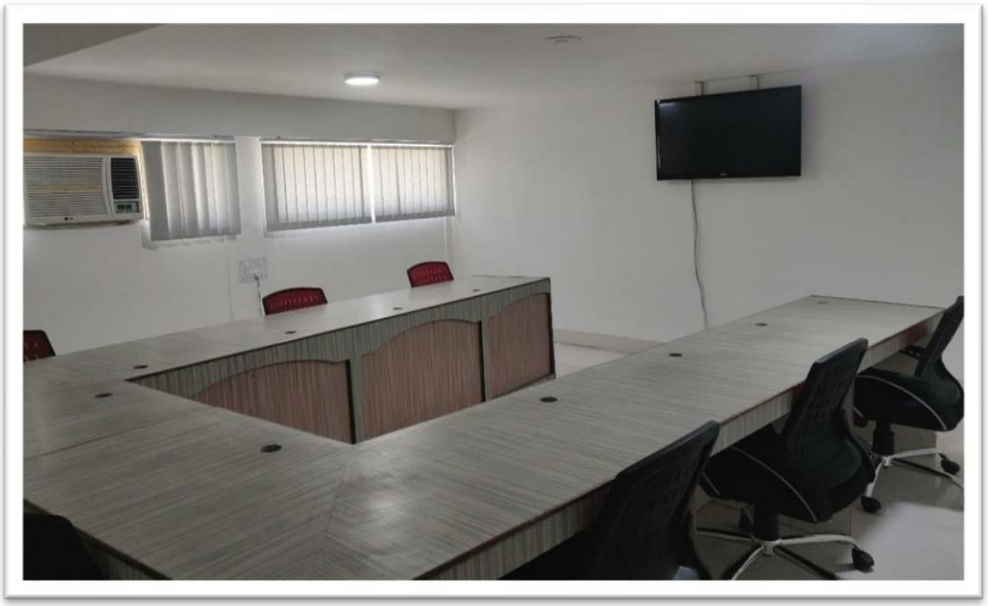
- IEEE IEL Online full subscription
- DELNET
- ASME for Mechanical Engineering
- J-Gate
- Scopus
- Turnitin Plagiarism check software

INFRASTRUCTURE PICS

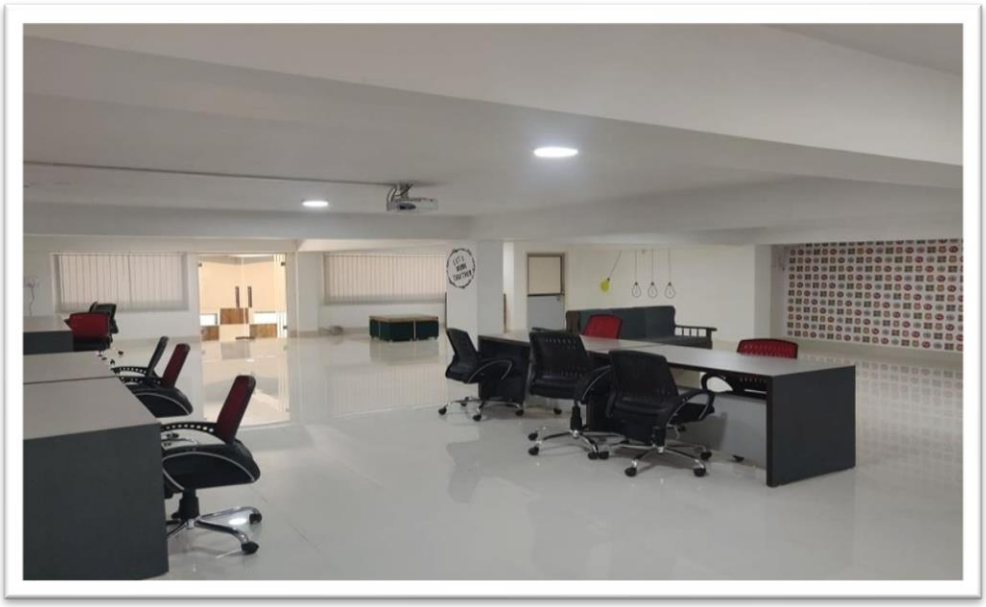
AI Lab 1

AI Lab 2

Centre First Floor Entry



Meeting Room



Working Space

Reference Section

Digital Rangefinder Camera & DSLR Cameras:

3D Scanner AI & Big Data Lab (COE)

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4.1.1 Center of Excellence in Advance Wireless Communication

OFFICE OF THE DEAN ACADEMIC AFFAIRS
RAJASTHAN TECHNICAL UNIVERSITY
AKELGARH, RAWATBHATA ROAD, KOTA-324010
Ph-0744- 2473015, website : www.rtu.ac.in, email : dean.academic@rtu.ac.in

RTU/Acad./F(17)14/2023/ 1034-35 **Date: 23.05.2023**

Principal/Director
Poornima College of Engineering
ISI-6, RIICO Institutional Area, Sitapura
Jaipur-302022

Sub: Recognition of Centre of Excellence in **Advanced Wireless Communication Lab.**
Ref.: Your proposal dtd. 23.03.2022.

With reference to University call for proposals for establishment of Centre of Excellence, your application for recognition of Centre of Excellence in the area of **Advanced Wireless Communication Lab** was considered. On the recommendation of Expert Evaluation Team and subsequent approval of 75th Board of Inspection vide agenda no. 75.3.1, University recognise the Centre of Excellence in the area of **Advanced Wireless Communication Lab** at your institute from session 2022-23.

Further, BOI has not approved the COE proposal for Advanced Manufacturing Lab.

Sd/-
(**Prof. D.K. Palwalia**)
Dean, Academic Affairs

C.C.to:
PS to HVC

(**Diwakar Joshi**)
Dy. Registrar, A/A

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Vision and Mission of COE:

Vision: To be the leading research institute in the Area of Advanced Wireless Communication in the state of Rajasthan and upliftment of other institutions and their stakeholders.

Mission:

1. To offer state of the art education of global standards through innovative methods of teaching and learning with practical orientation aiming to prepare the students for successful careers and to provide required technological services.
2. To pursue high quality contemporary research in advance wireless communication technologies and its applications.
3. To empower students by imparting quality education in Communication Engineering for better employability and preparing them to be competent in dealing with industrial and societal challenges.
4. To expose its students to an advanced technology spectrum in order to prepare them for diverse and competitive career paths.
5. To develop innovative & simple instructional materials to drive the concepts into the minds of students.
6. To promote research culture by infusing scientific temper in the students and guiding them towards R&D activities.

Objective and Relevance of the COE

1. To impart knowledge about Advanced Wireless Communication to the students and the faculty from the institutions across Rajasthan.
2. To make the resources available to advanced learners and researchers for developing solution to any societal, industrial and environmental applications using Wireless Communication.
3. To create project based learning environment in and around the institute across the state of Rajasthan.

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Detail of the National/International Institutes. Industries involved in the Centre of Excellence

International Institute:

- Universiti Teknologi Mara, Malaysia
- RI Instruments and Innovation Pvt. Ltd., Uttarakhand and RINZTECH, New Zealand

National Institute:

- IIT Indore
- IIT Dharwad
- MNIT, Jaipur
- Siemens Centre of Excellence, NIT, Kurukshetra
- Government Engineering College, Dahod

Industries:

- Elektrolites Pvt. Ltd., Jaipur
- VVDN Technologies Pvt. Ltd., Manesar
- Research for Resurgence Foundation, India
- SAP
- IBM
- Celebal Technologies
- Latashri 3D Creations, Jaipur
- Latashri 3D Creation (3D Printer), Jaipur

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INFRASTRUCTURAL FACILITIES

Major Equipment's accessories exclusive for COE

S. No.	Name of Equipment	Specification	Make	Quantity	Total Cost
1	SENSE- nut	• Microcontroller with integrated 802.15.4 transceiver. • Variety of sensors: Environment, Meteorological, Air & water quality etc. • Modular design having Gateways, Radios & sensors devices.	SENSE-nut ProLab	1	4,72,000/-
	USB Gateway Module	• USB to Asynchronous serial data transfer interface. • USB protocol handled by the device (No USB specific programming required). • Data Transfer rate 115200 baud • 128 byte receive buffer and 256 byte transmit buffer			
	Radio Module:	• 32-bit RISC JN 5168 Microcontroller • 1-32MHz clock speed • 256KB flash, 32KB RAM, 4KB EEPROM • 2.4 GHz IEEE 802.15.4 compliant transceiver			

		• 128-bit AES security processor • Time of Flight engine for ranging • Integrated PCB antenna • Rx current 17mA, Tx current 15mA • 2V to 3.6V battery operation • Controllable transmission power (-32 to +2.5 dBm)			
	Wi-Fi Gateway Module:	• Low-power Wi-Fi networking module • Integrated SPI-serial flash for software • Broadcom BCM43362 single band 2.4GHz IEEE 802.11b/g/n 1x1 Wi-Fi transceiver • Includes support for all Wi-Fi security modes including Open, WEP, WPA,WPA2-PSK • Integrated 1MB Flash memory and 128kB SRAM • Operational Temperature Range: -30°C to +85°C • Wi-Fi Power save : 0.77mA • Active receive : 6.9mA @ 1Mbit/s • Active transmit : 12.5mA @ 1Mbit/s			

	TL Sensor Module	• Temperature Range -25 C to 80 C with12 bit resolution, • Light Range 3 to 64k lux with16 bit resolution, Excellent IR/UV rejection • 1.5uA shutdown current			
	HTP Sensor Module	• The humidity sensor provides digital output with a 14-bit resolution (0.04% RH) • Pressure sensor outputs the barometric pressure in 24-bit resolution • Hardware interrupts in order to update the microcontroller about any critical events			
	Extender Module	• Connect external sensors and devices. • Debug hardware/checking output on DIOs and other ports • Access ADC, SPI, UART, I2C, and PWM generators			
2	Advanced Fiber Optic Communication Trainer - Model - FOL-A-P	• Fiber Optic Transmitter: Two wavelength (660nm and 950nm) • Fiber Optic Receiver : 2 types (PIN Photo Diode, Photo Transistor detector) • On board functional generator N.A. measurement	Falcon	2	94,400/-
3	Power Meter	A Power Meter is one of the most useful and simple	RY-PM3008	1	35400/-

		instruments to measure electrical power when no deeper analysis of the measured data is required. It measures the voltage (V) and current (A) and derives from these the most important power results.			
4	ENA Vector Analyzer	Analyzer need to measure S-parameters, the right mix of speed and performance gives you an edge. Key sight ENA vector network analyzers provide affordable measurement integrity to help you transform a deeper understanding into a better design. The full contents of the kit include: • C6713 DSP Development Board with 512K Flash and 16MB SDRAM • C6713 DSK Code Composer Studio™ IDE including the Fast Simulators and access to Analysis Toolkit on Update Advisor.	Keysight Technology	1	8,37,800/-
5	Antenna Trainer Kit	The Antenna Training System also comes with Motorized Antenna Unit (Model Amitech 2261A) to automate the recording of the radiation pattern of the antennas. The Motorized Unit consists of a Microcontroller based	Amitech	1	2,14,200/-

		system for Capturing, Displaying and Printing of radiation pattern. The system capture signal at an interval of 1degree rotation using stepper motor and radiation pattern is displayed on PC. The Windows based Software is supplied in CD Rom. The PC Communication is via RS232 port. It used with Amitech.			
6	Radar Trainer Kit	Trainer is useful classroom training equipment provided with different types of accessories for experimentation, and a Windows based software for observation and calculation of different parameters. On-board Test points are provided, which enable students to observe the signals on an Oscilloscope or a PC.The trainer is capable of measuring the Speed of Object, Frequency of Vibrations and RPM of any fan. Students can also study the properties of different types of materials like Metal, Acrylic, Teflon, Bakelite, etc.	NVIS	1	53,404/-
7	Satellite Trainer Kit	• Simultaneous Communication of three	Scientech	1	80,106/-

		different signals at each up-linking frequency • 2414-2468 MHz PLL microwave operation			
8	GPS Trainer Kit	Nvis GPS module MC20GPS is an extension module for Nvis Microcontroller development platforms. The module has been designed for students and practicing engineers to gain invaluable practical experience on the principle and applications of microcontroller & GPS Module. The objective is to have a clear understanding of how GPS module is interfaced and controlled with microcontroller. It has various terminals for connection to external real world applications. Nvis GPS module will provide a basic understanding of the GPS fundamentals, Satellites & Design aspects of GPS receiver by actually connecting to the Satellite by GPS antenna.MC20GPS, GPS module for Embedded Platforms is an ideal platform to enhance education, training, skills & development among our young minds.	Scientech	1	40,258/-

9	CDMA DSSS Trainer Kit	The Wireless mobile communication systems provide access to the capabilities of the global network at any time, irrespective of the location or mobility of the user. The Direct Sequence Spread Spectrum (DS-SS) technique, incorporated into CDMA can accommodate large number of users in one radio channel depending on the voice activity level.	Scientech	1	1,44,602/-
10	Microwave Test Bench	• Gunn Power Supply: • Gunn Oscillator: • Isolator: • PIN modulator: • Variable attenuator: • Detector Mount: • SWR meter:	Scientech / NVIS	8	5,49,326/-
11	Digital Storage Oscilloscope	30Mhz	Keysight	8	1,86,900/-
12	Spectrum Analyzer	9Khz-6.2Ghz	Scientech/ CADDO	2	3,39,675/-
13	FPGA Trainer Kit	VLSI Trainer	Scientech / NVIS	10	1,49,347/-

14	Digital Signal Processing Development	• Up to 600 MHz high performance black fin processor
		• Two 16 bit MAC
		  • Two 40 bit ALU
		  • Four 8 bit video ALU
		  • 40 bit shifter
		• Advanced debug, trace and performance monitoring
		• Wide range of operating voltages
		• Qualified for automotive application
		• Programmable on chip voltage regulator
		• Up to 148 k byte of on chip memory
		• On chip PLL capable of 0.5 to 64 frequency multiplication core timer
			Scientech	10	3,38,000/-

15	Advance MIC Trainer kit	• Frequency Range : 2.2 - 3GHz continuously variable • Modulating Frequency : 100Hz to 5kHz AM square wave, FM triangular wave • Output Level Variation : 10 - 20 dB • Impedance : 50V Min RF level : 5mW	Scientech	2	2,53,151/-
16	RF/ Microwave Circuit Board	Cover the 5 parameter measurement up to 5 band (ENA)	Scientech	1	2,36,000/-

17	Logic Analyzer Kit	32-channel logic analyzer with 256K memory	Scientech	1	58,744/-
18	Fiber Optic Trainer Kit	Fiber-Optic Trainer, Single Channel and Dual Channel	Scientech	9	1,71,179/-
				Total Cost	42,54,492/-

Major Software and IT structure for COE

S. No.	Name of Equipment	Research Application	Total Cost
1	CST MW Software 2020 (20 Users)	CST Studio Suite® is a high-performance 3D EM analysis software package for designing, analyzing and optimizing electromagnetic (EM) components and systems. Electromagnetic field solvers for applications across the EM spectrum are contained within a single user interface in CST Studio Suite.	1,53,400/-
2	Optical Communication Software (2 Users)	Opti-System Ver. 16	6,90,300/-
3.	SENSE- nut interface Software	Wireless Sensors Network	Mention in Above table

Virtual Resources

In collaboration with Celebal Technologies

- The industry-connect which will enable students to increase their literacy technical skill & supervisory skill. Enhancing the personality development aspect of an individual through soft skills, Learning modules of various latest technologies, through the technical curriculum specially designed for Computer, Electronics & Communication Engineering, students by subject matter expert (SMEs) of Celebal Technologies, through Workshops, Guest Lectures, SDP'S etc. Access to learning content from Microsoft & Pluralsight.
- Consultancy support from Celebal Technology on how the quality of infrastructure for

different technical labs can be increased and brought to the level of industry acceptance.

- Onsite resources for carrying out FDP training activities on Wireless Communication by Microsoft trainers
- Ecosystem level support in Hackathons/ events NKN and/ or 50mbps / higher internet connectivity

In collaboration with Elektrolites Pvt. Ltd.

- Seek mutual advice and support in planning and executing Programs promoting Excellence in respective areas of research and industrial solutions.
- Encourage students and faculties of PCE and Scientific staff of Eletrolites pvt. Ltd to visit the either institute for short duration for getting research inputs and guidance upon recommendation from the research guides and directors from Elekrolites pvt ltd.
- Encourage joint research activities and project for students.
- Industry and institution interaction will give an insight into the latest development of the industries.
- The industrial Training and exposure provided to the students will build confidence and prepare the students to have smooth transition from academic to working career.

In collaboration with VVDN Technologies

- Giving a chance to the faculty (Trainers) to have an interaction with SMEs of VVDN Technologies to enhance their employability by learning latest technologies and giving them actual industry flavour of today.
- VVDN Technology would help the best students from different Branches that have been enrolled in their learning modules with the recruitment aspect on merit basis.
- The subject matter experts can be made available to train the faculty of the college on certain new industry practices.
- Industrial visit would be organized for the students of Poornima College of Engineering.
- Aiming to bridge the academia-industry gap “VVDN Technologies”. It would help a college come up with a Centre of Excellence on varied topics.

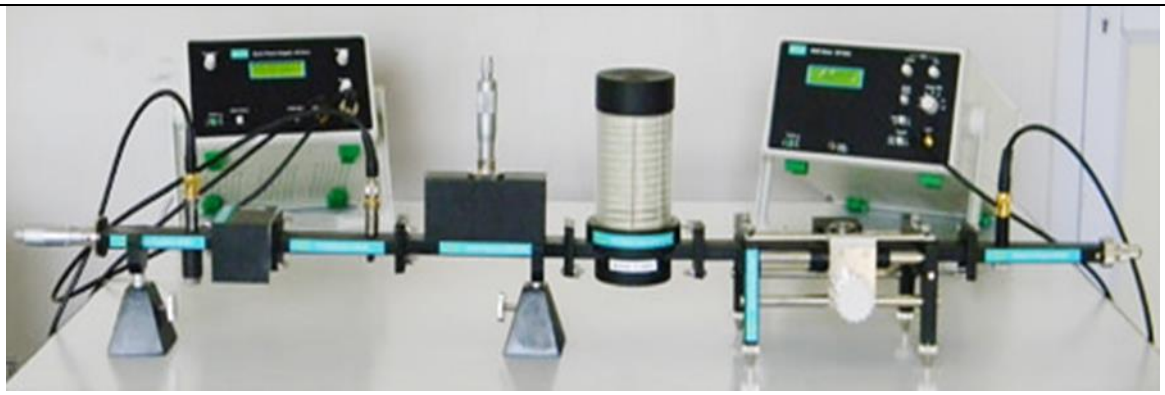
Library Resources

We have subscription to following library resources those are being used by the faculty and students while doing projects and R&D in Advance Wireless Communication

- IEEE IEL Online full subscription

- DELNET
- J-Gate
- SCOPUS
- Turnitin Plagiarism check software

Glimpses of Infrastructure of Centre of Excellence

<table>
<tr><td colspan="2">  </td></tr>
<tr><td colspan="2">Microwave Test Bench</td></tr>
<tr><td>  </td><td> 
</td></tr>
<tr><td>Power Meter</td><td>ENA Vector Analyser</td></tr>
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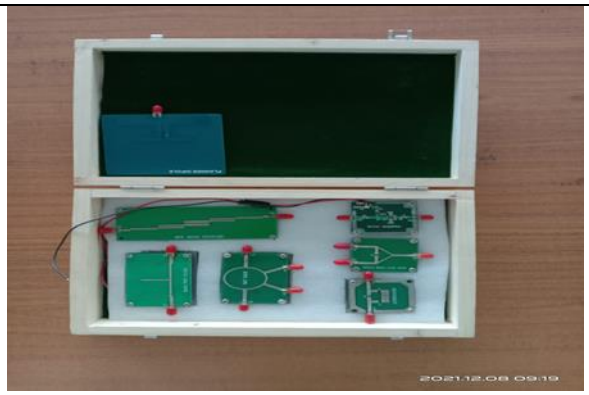
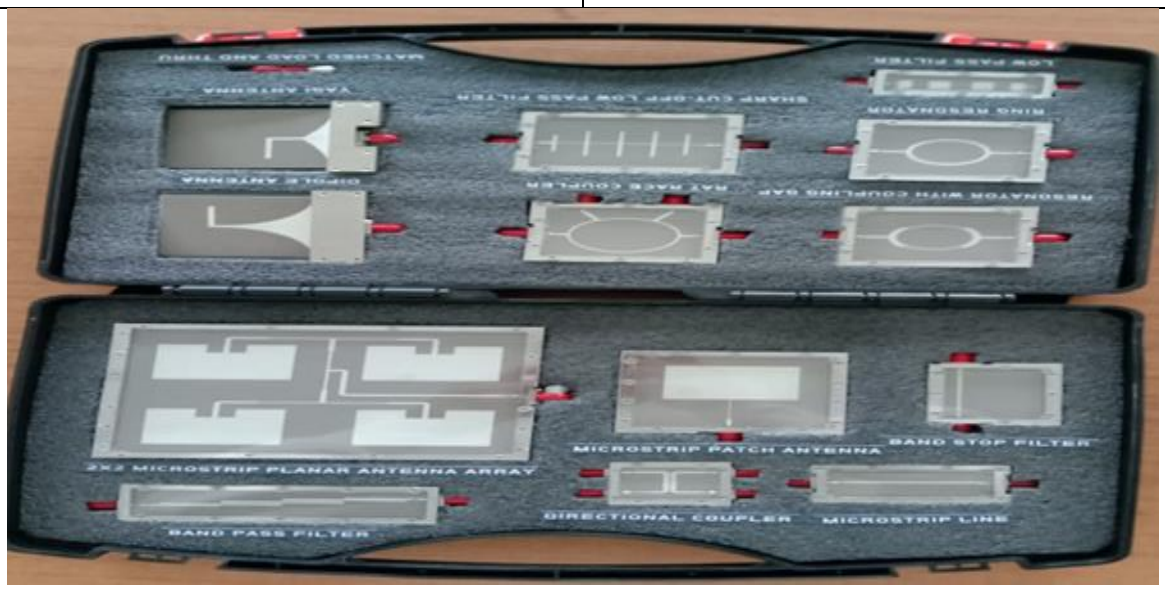
Radar Trainer Kit

Satellite Communication Trainer Kit



Microwave Patch Antenna



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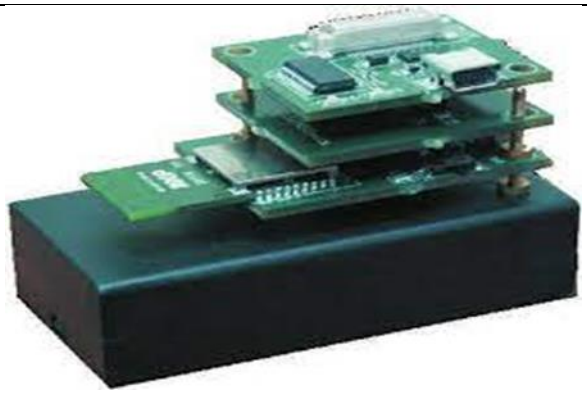
Microwave Patch Antenna Kit Setup

Advanced Optical fiber Trainer Kit



SensNut Module

SensNut Module

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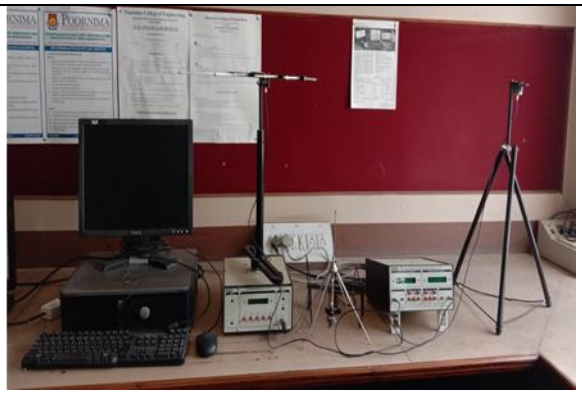
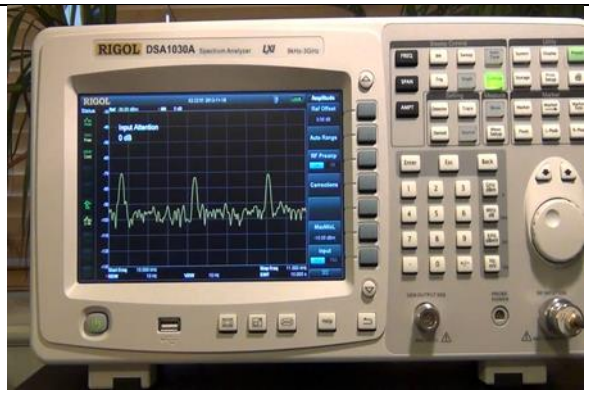
	
Antenna Trainer Kit	GPS Trainer Kit
	
Digital Storage Oscilloscope	Rigol Spectrum Analyzer
	

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Glimps of of Centre of Excellence

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4.1.1 Center of Excellence in Advanced Manufacturing

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Vision and Mission of proposed COE:

Vision: To become a forward-thinking and cutting-edge research center dedicated to promoting research in the areas of advanced manufacturing in order to provide better trainings and research solutions to industries and researchers especially in the State of Rajasthan.

Mission: To establish cutting-edge research facilities in advanced manufacturing processes and three dimensional printing in order to give practical solutions to meet technological advances.

Objective and Relevance of the proposed COE

1. To foster ideas, research, and end user product development for both researchers and industries.
2. To build cutting-edge research facilities in the areas of advanced manufacturing in order to resolve industries problems.
3. To encourage international collaboration between Local NGOs, industries, academia, and government bodies.
4. To ensure that Graduate, Postgraduate, and local artisans can participate in research and internship programs, as well as training and entrepreneurship.
5. To encourage women and physical disabled persons to work as a researchers and entrepreneurs in the field of advanced manufacturing and three dimensional printing.

Centre of Excellence Functions

1. Student projects with beyond syllabus concept – project every semester
2. Faculty members pursuing research projects, sponsored research and other works in advance manufacturing utilizing existing resources.
3. Conducting Workshops, Seminars, FDPs, Trainings for the Students and Faculty members.
4. Collaborative research work with emerging industries.
5. To provide research solutions to the research scholars as well industries.
6. To conduct Skill based training programs for students and industry technical persons.

7. To provide Summer Internship for in/out side Students and research scholars
8. To provide research facility to the faculties in summer/winter vacations.

Technical Novelty and Utility

This centre will allow the students, faculty members and researchers to work in advanced manufacturing laboratory and to work with latest cutting edge and to enhance their project/research development.

- Synthesize of advanced polymers based composites.
- Machining of difficult to cut materials using laser cutter.
- Design and fabrication of parts for defence, biomedical, electronic and jewellery industries using 3D printer.
- Characterization and surface quality measurement of manufactured miniaturize parts.
- Joining of dissimilar metals.
- Development of in-house hybrid machines.

Detail of the National/International Institutes. Industries involved in the Centre of Excellence

International Institute:

- Centre for Advanced Manufacturing at Adama Science & Technology University Ethiopia

National Institute:

- MNIT, Jaipur
- CIPET Jaipur
- MSME Jaipur
- NIT Kurukshetra

Industries:

- Jaipur Foot, Jaipur
- Tarun International Ltd. Jaipur

- BOSCH, Jaipur
- HUMBOT Pvt. LTD. Jaipur
- TechnoHub, Jaipur
- Latashri 3D Creation (3D Printer), Jaipur

INFRASTRUCTURAL FACILITIES

Major Equipment exclusive for COE

Name	Quantity	Specifications	
3D Printer	2	Make	L3D Creation
Electronic Balance Machine	1	Make	Wesner
Digital Microscope	1	Make	ISM- Pro
Lathe	3	Make	MACPOWER Industries Rajkot (Gujrat)
		Model No.	
		Type	Engine lathe
		Bed Length	3.5 Feet
		Power Supply	AC 3-Phase /415 V/ 50Hz/1.9 AMP
		Power	1.0 Horse Power (H.P.)
		Speed	1440 rpm
		Distance between live center and dead center	24 inch
		Diameter of chuck	8 inch
		Diameter of job, which can be held in the chuck	6 inch

		Height of the center above the top of the bed	6 inch
		Range of spindle speed	150-780 RPM
Lathe	1	Make	MACPOWER Industries Rajkot (Gujrat)
		Model No.	
		Type	Engine Lathe
		Bed Length	4 Feet
		Power Supply	AC 3-Phase /415 V/ 50Hz/3.5 AMP
		Power	1.5 Horse Power (H. P.)
		Speed	1440 rpm
		Distance between live center and dead center	30 inch
		Diameter of chuck	8 inch
		Diameter of job, which can be held in the chuck	6 inch
		Height of the center above the top of the bed	6 inch
		Range of spindle speeds	150-780 RPM
Lathe	1	Make	Sadguru (SELECT) Industries Rajkot (Gujrat)
		Type	Engine Lathe
		Power Supply	AC 3-Phase /415 V/

			50Hz/2.2 AMP
		Motor	Three (03) phase
		Motor Power	1 Horse Power (H. P.)
		Speed	1440 RPM
		Distance between live center and dead center	42 inch
		Diameter of chuck	6 inch
		Diameter of job, which can be held in the chuck	4 inch
		Height of the center above the top of the bed	7 inch
		Range of spindle speeds	150- 780 RPM
Lathe	1	Make	MACPOWER Industries Rajkot (Gujrat)
		Model No	
		Type	Gear Lathe
		Bed Length	4 Feet
		Power Supply	AC 3-Phase /415 V/ 50Hz/3.5 AMP
		Power	2.0 Horse Power (H. P.)
		Speed	1440 rpm
		Distance between live center and dead center	24 inch

		Diameter of chuck	8 inch
		Diameter of job, which can be held in the chuck	6 inch
		Height of the center above the top of the bed	6 inch
		Range of spindle speeds	80 – 900 RPM
Capstan Lathe (CLATHE)	1	Make	HERBERT
		Model No.	2D
		Collet Capacity	20 mm
		Max. distance between spindle nose to turret face	11 inch
Sharper	1	Make	ANOOP Rajkot (Gujrat)
		Model No.	A-1
		Power Supply	AC 3-Phase /415 V/ 50Hz
		Speed	1440rpm
		Motor Power	1.5 Horse Power (H. P.)
		Length, breadth and depth of the bed.	39 inch X 9 inch X 2 inch
		Maximum axial travel of the Ram	18 inch
		Maximum length of the stroke	18 inch

		Vertical travel of tool post slide	4 inch
Milling	1	Make	Gajjar Machine Tool (Gujrat)
		Model No.	GUA-1,CODE NO.-532
		Power Supply	AC 3-Phase /415 V/ 50Hz
		Speed	2700 rpm
		Working Surface	1050 x 250 mm
		Number of T-Slots	3
		Width of T-Slots	15 mm
		Pitch of T-Slots	62 mm
		Number of Spindle Speed	6
		Range of spindle speed	50, 85, 110, 240, 350,525 RPM
		Floor Space	600 mm x 925 mm
		Height	1500 mm
		Coolant Tank Capacity	20 Litre
Power Hack Saw	1	Make	MMT
		Power Supply	AC 3-Phase /415 V/ 50Hz/1.9 AMP
		Motor Power	1H.P.
		Speed	1440 rpm

Power Hack Saw		Max. Size of materials that can be cut	170 mm.
		Stroke length	6 inch
		No. of speed strokes	1
Arc welding (AW)	1	Make	HEEREX
		Power Supply	AC 3-Phase / 50Hz
		Current	35 to 300 AMP
		Voltage	380-440 V
		Welding Current	20-400 AMP
		Welding voltage	65 - 75 V DC (Open circuit voltage)
		Maximum Rated	17 KVA
		Dimension (mm)	550X280X545mm
		Weight	33 Kgs
Spot Welding	1	Make	Vijay Electricals
		Model	28913
		Frequency	50 - 60 Hz
		Input Power	25 kVA
		Electrodes Length	200 mm
TIG Welding (TW)	1	Make	ELECTRA KOKO TAWA
		Current	200AMP.
		TIG Welding Current	4 - 400 Amps
Submerge Arc Welding	1	Make	Electro Koko Tawa
		Power Supply	AC 3-Phase / 415 V/ 50Hz

		Welding Current	150 to 1200 Amps
		Open Circuit Voltage	72 Volts (DC)
		Welding Voltage	20 to 46 Volts DC
Sensitive Drilling	1	Make	MUNISH
		Motor Power	1HP
		Speed	1440rpm
		Power Supply	AC 3-Phase / 6AMP/220 V/50Hz
Radial Drilling	1	Make	NATIONAL ENGINEERING
		Model No.	
		Power Supply	AC 3-Phase / 415 V/1.9 AMP/50Hz
		Motor Power	1 Horse Power (H. P.)
		Speed	1440 rpm
Bench Gridding (BG)	1	Make	PERFECT
		Power Supply	AC 3-Phase / 440 V/0.8 AMP/50Hz
		Wheel Diameter	200 mm
		Motor Power	0.5 Horse Power (H. P.)
		Speed	2880 rpm
ELECTRIC FURNANCE HORIZONTAL (EFH)	1	Working Temperature up to 950°	

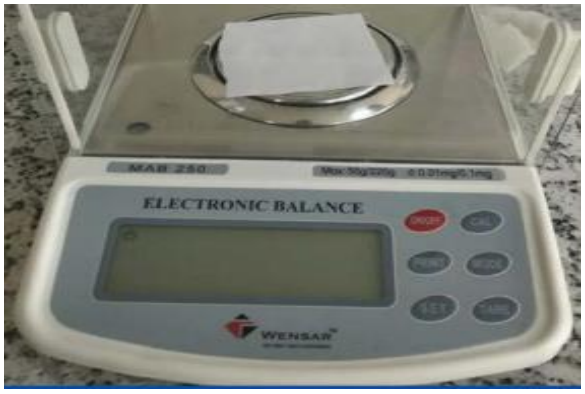
Electric Furnace Vertical (EFV)	1	Working Temperature up to 950°	
Rapid Moisture Tester (RMT)	1	Make	Versatile Equipment's Pvt. Ltd.
		Model No.	V/M 060211
		The instrument specifies moisture on wet/weight basis and easily convertible to dry weight basis.	
Sand Rammer	1	Make	Versatile Equipment's Pvt. Ltd.
		Model No.	V/R 060302
		The Sand Rammer can be used to prepare a standard sand specimen diameter	50mm x Height 50mm
Sieve Shaker	1	Make	Versatile Equipment's Pvt. Ltd.
		Model No.	VGH 060302
Clay Washer	1	Make	Versatile Equipment's Pvt. Ltd.
		Model No.	VCW 060206
Permeability Meter (PM)	1	Make	Versatile Equipment's Pvt. Ltd.
		Model No.	V/P 060303
Universal Testing Machine for Foundry Shop (UTMF)	1	Make	Engineering Models and Equipment's

		Model No.	Adi Artech O/P 3.13, 500Kg
Core and Mould Hardness Tester (C&M HT)	1	Make	Engineering Models and Equipment's
PROFILE PROJECTOR (PP)	1	Make	METZER-M
MONOCHROMATIC AND OPTICAL FLATE (M&OF)	1	Make	PRISMS INDIA
COMBINATION SET (300 MM) (CS)		Make	MITUTOYO
		Model No.	180-907
FILLER GAUGE (FG)		Make	MITUTOYO
		Model No.	184-304
MICROMETER OUTSIDE (0.25mm) (M0-1)	1	Make	MITUTOYO
		Model No.	103-101
MICROMETER OUTSIDE RANGE (25-50) (M0-2)	1	Make	MITUTOYO
		Model No.	103-138
SMALL BORE GAUGE WITH DIAL RANGE (8-10 MM) (SBG-1)	1	Make	CHINA
SMALL BORE GAUGE WITH DIAL (10-18 MM) (SBG-2)		Make	CHINA
SMALL BORE GAUGE WITH DIAL (18-36) (SBG-3)	1	Make	CHINA
TELESCOPIC GAUGE (TG)	1	Make	INSIZE

DIAL GAUGE (DG)	1	Make	ASAHI
MAGNETIC STAND (MS)	1	Make	MITUTOYO
THERMOMETER	1	Make	WORK ZONE
		Model No.	MT-14A
		Range	50 -1500 $_{o}$C
DIAL VERNIER CALIPER RANGE-150 MM (VC-1)	1	Make	MITUTOYO
		Model No.	505-671
		Size	150 mm
		Accuracy/ Least Count	0.02 mm
		Display Type	Dial
DIGITAL VERNIER CALIPER RANGE-300 MM (VC-2)	1	Make	MITUTOYO
		Model No.	500-193
		Size	300
		Accuracy/ Least Count	0.02 mm
		Display Type	Digital
ORDINARY VERNIER CALIPER RANGE-150 MM (VC-3)	1	Make	MITUTOYO
		Size	150 mm
		Accuracy/ Least Count	0.02 mm
		Display Type	Analog
ORDINARY VERNIER CALIPER RANGE-300 MM (VC-4)	1	Make	MITUTOYO
VERNIER HEIGHT GAUGE (0-300 MM) (VHG-1)	1	Make	MITUTOYO
		Model No.	514-103
		Size	300 mm
		Accuracy/ Least Count	0.02 mm

		Display Type	ANALOG
DEPTH GAUGE MICROMETER (DGM)	1	Make	MITUTOYO
		Model No.	129-111
		Base size	16 X 64 mm
		Range	10-100 mm
		Rod size	4 mm
UNIVERSAL BEVEL PROTECTOR (UBP)	1	Make	CHINA
		Model No.	
		Blade Length	150 X 300 mm
PLANE SNAP GAUGE (PSG)	1	Make	Indian
SINE BAR (SB)	1	Make	OMEGA
		Model No.	604
		Size	200 mm
		Model No.	
INSIDE MICROMETER (IM)		Make	MITUTOYO
		Model No.	141-205
		Size	20 mm
GEAR TOOTH VERNIER	1	Make	ALEN
WIRE GAUGE AND SHEET GAUGE (W&S G)	1	Make	KRISTEEL
		Model No.	1505
ANGLE PLATE (AP)	1	Make	INDIAN
OXYGEN CYLINDER (OC)	1	Make	INDIAN

ACETYLENE CYLINDER (AC)	1	Make	INDIAN
DRILL TOOL DYNOMOMETER (DTD)	1	Make	INDIAN
MILLING TOOL DYNOMOMETER (MTD)	1	Make	INDIAN



Images of Digital Microscope, 3D Printer, Balance machine and surface roughness tester

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IT infrastructure for COE

S. No.	PC Brand	Modal No.	PC Serial No.	Processor	RAM	Hard Disk	MAC
1	Lenovo	Lenovo	PC0B3BCC	i3-4170 cpu@3.70 GHz	4GB	500GB	F4-4D-30-52-9E-86
2	Lenovo	Lenovo	PC0C1ZQ9	i3-4170 cpu@3.70 GHz	4GB	500GB	F4-4D-30-57-0A-59
3	Lenovo	Lenovo	PC0B3BFW	i3-4170 cpu@3.70 GHz	4GB	500GB	F4-4D-30-52-9E-D5
4	Lenovo	Lenovo	PC0B3BB5	i3-4170 cpu@3.70 GHz	4GB	500GB	F4-4D-30-52-A0-3E
5	Lenovo	Lenovo	PC0B3BBC	i3-4170 cpu@3.70 GHz	4GB	500GB	F4-4D-30-52-9B-03
6	Lenovo	Lenovo	PC0B3AFD	i3-4170 cpu@3.70 GHz	4GB	500GB	F4-4D-30-51-B6-64
7	Lenovo	Lenovo	PC07DHWV	i3-4170 cpu@3.70 GHz	4GB	500GB	B8-AE-ED-D8-E2-F6
8	Lenovo	Lenovo	PC0B3BH9	i3-4170 cpu@3.70 GHz	4GB	500GB	F4-4D-30-52-9E-D0
9	Lenovo	Lenovo	PC0B3B6J	i3-4170 cpu@3.70 GHz	4GB	500GB	F4-4D-30-52-9B-01
10	Lenovo	Lenovo	PC0BUHXZ	i3-4170 cpu@3.70 GHz	4GB	500GB	F4-4D-30-55-5D-B4

11	Lenovo	Lenovo	PC07DHZL	i3-4170 cpu@3.70 GHz	4GB	500GB	B8-AE-ED-D4-04-A6
12	Lenovo	Lenovo	PC0B3BEQ	i3-4170 cpu@3.70 GHz	4GB	500GB	F4-4D-30-52-9B-43
13	Lenovo	Lenovo	PG00QMZF	i3-4170 cpu@3.70 GHz	4GB	500GB	F4-4D-30-59-6D-99
14	Lenovo	Lenovo	PG00QN2H	i3-4170 cpu@3.70 GHz	4GB	500GB	00-01-6C-D6-09-1B
15	Lenovo	Lenovo	PC0BUHXT	i3-4170 cpu@3.70 GHz	4GB	500GB	F4-4D-30-55-5D-A7
16	Lenovo	Lenovo	PG00QMZ0	i3-4170 cpu@3.70 GHz	4GB	500GB	00-01-6C-D6-0F-5F
17	Lenovo	Lenovo	PC0BUHXW	i3-4170 cpu@3.70 GHz	4GB	500GB	F4-4D-30-55-5A-FB
18	Lenovo	Lenovo	PG00QNKK	i3-4170 cpu@3.70 GHz	4GB	500GB	00-01-6C-D4-FC-3D
19	Lenovo	Lenovo	PC07DJ1Y	i3-4170 cpu@3.70 GHz	4GB	500GB	B8-AE-ED-D4-04-C7
20	Lenovo	Lenovo	PG00QNKC	i3-4170 cpu@3.70 GHz	4GB	500GB	00-01-6C-D4-FC-25
21	Lenovo	Lenovo	PG00QNJY	i3-4170 cpu@3.70 GHz	4GB	500GB	00-01-6C-D4-FC-2B

22	Lenovo	Lenovo	PC0B3BFV	i3-4170 cpu@3.70 GHz	4GB	500GB	F4-4D-30-52-9D-3F
23	Lenovo	Lenovo	PG00QMZC	i3-4170 cpu@3.70 GHz	4GB	500GB	00-01-6C-D6-0A-0C
24	Dell	Dell	OPTIPLEX360	Intel care 2Duecpu E7400@2.80GHz	2 GB		00-23-AE-86-EE-15

Items	Functions	Cost
PROJECTOR , PANASONIC	Presentation, Training	26250
PRINTER, 2900 CANNON	Documentation	9145
SCANNER, CANNON	Documentation	2375

List of Consumables

S. No.	Item	Quantity	Total Cost
1	MS Steel rod	100	6558
2	Copper Rod	10	9500
3	Brass Rod	10	6200
4	Aluminum Rod	10	4500
5	Cast Nylon Rod	10	2750
6	Aluminum Sheet	5	2500
7	Emery Paper	50	1500
8	Single point cutting tool	5	1250

9	Milling Cutter	5	1250
10	Consumable and non-consumable electrodes	5 packets	2000
11	3D printer material (PLA)	5 spool	6000
12	Drilling bit	10	1000

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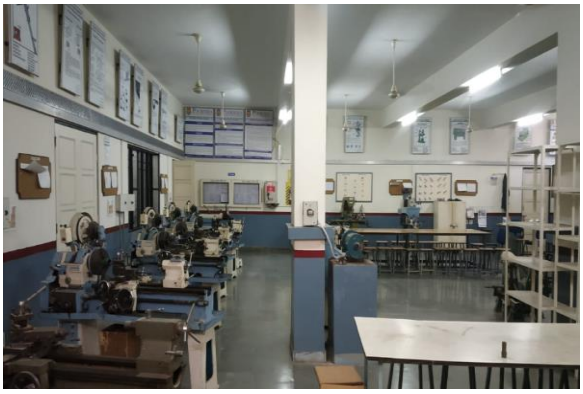
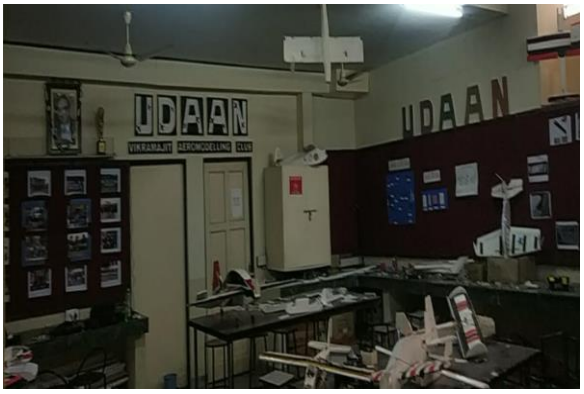
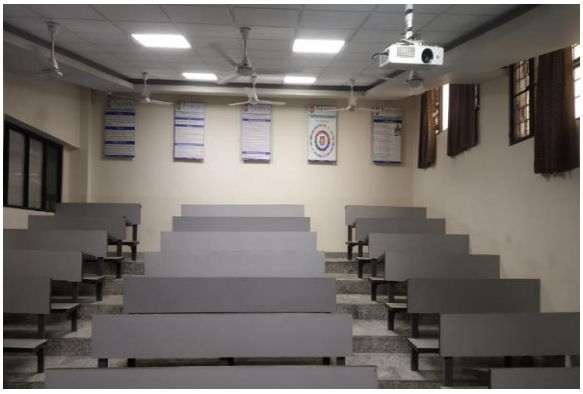
Glimpses of Infrastructure of Centre of Excellence



Production Lab

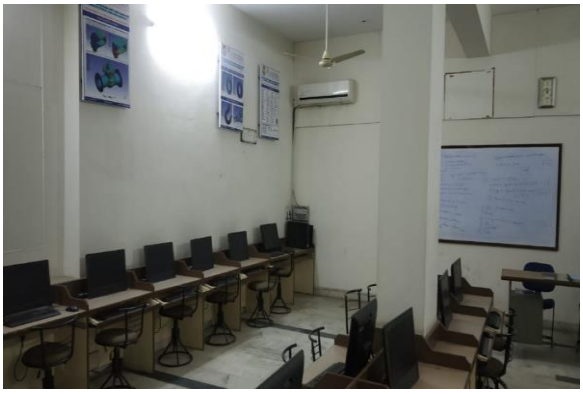


Aero-modeling Lab



Lecture Theatre

3D Printer



Computer Lab

TIG Welding Setup

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4.1.1 Center of Excellence for Geoinformatics

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ABOUT THE CoE

Poornima College of Engineering started a Center of Excellence (CoE) for GEOINFORMATICS that focuses on research, development, education, and practical applications related to geoinformatics. Geoinformatics is an interdisciplinary field that combines geographic information systems (GIS), remote sensing, geospatial analysis, and other technologies to acquire, manage, analyze, and visualize geographic and spatial data.

An effort called the Center of Excellence for Geoinformatics aims to advance research, education, and support services for geospatial applications. Its core initiatives are focused on employing a collaborative and community-driven approach to raise knowledge, understanding, appreciation, and implementation of geospatial solutions.

The research, outreach, and consulting efforts of the Center are concentrated on many elements of Geoinformation technology and systems. The center's research initiatives take the shape of funded projects by domestic and international funding organizations and community development initiatives. The center for the promotion of multidisciplinary research for sustainable development is affiliated with faculty members from all of the institute's departments, including Electronics & Telecommunication Engineering, Computer Engineering, and Information Technology.

Vision and Mission of proposed COE:

Vision: To be a Global Centre of Excellence for Geoinformatics in Academic, Research, Government support and Industrial Training.

Mission: To be a leading Centre of Excellence in Geoinformatics Research of international repute for the investigation of multidisciplinary areas.

To enhance the knowledge based on research, education and information transfer by using the advanced approach.

To organize trainings/workshop/social activity for capacity building in Geoinformatics.

To provide academic support to undergraduate/post-graduate/ PhD program in the discipline of Geoinformatics.

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Objective and Relevance of the proposed COE

1. ICT and geospatial knowledge co-creation and sharing based on Geoinformatics principles.
2. To enhance quality of life and create proactive local communities, integrate and employ geospatial solutions and open-source principles.
3. Offer deployment and consulting services for geospatial solutions based on BIG data, AI and Machine Learning.
4. Strengthening capacity via awareness campaigns, instruction, workshops, teacher training sessions, consultations, displays, and outreach initiatives.
5. Use cutting-edge geospatial software to meet various needs for monitoring and evaluation (M&E).

Centre of Excellence Aims

Research: Conduct cutting-edge research in the field of geoinformatics, exploring new methodologies, technologies, and applications to address various spatial challenges and problems. Education: Offer training programs, workshops, and courses to educate professionals, students, and the public about geoinformatics principles, tools, and techniques.

Application Development: Develop practical applications, software tools, and solutions that leverage geoinformatics to address real-world issues in sectors like urban planning, environmental monitoring, agriculture, disaster management, and more.

Data Management: Focus on the collection, management, and analysis of geospatial data, including satellite imagery, aerial photographs, geographic databases, and other spatial datasets. Collaboration: Foster collaborations with academia, government agencies, industries, and other stakeholders to advance geoinformatics research and applications.

Policy and Decision Support: Provide expertise to policymakers and decision-makers by utilizing geoinformatics data and analyses to make informed choices related to land use, resource

management, infrastructure planning, and more.

Innovation: Drive innovation by pushing the boundaries of geoinformatics technology and its integration with emerging fields such as artificial intelligence, machine learning, and big data analytics.

This center will play a vital role in advancing the understanding and application of geoinformatics in various domains. It will contribute to scientific advancements, support sustainable development, and enhance decision-making processes by providing valuable geospatial insights.

FUTURE COMMITMENT

- Patent
- Publications in reputed journals (SCI/WOS & SCOPUS Indexed)
- Collaborative research work with International and National Organization
- External Funded Projects
- Presenting research outcome in National and International conferences
- Conducting workshop/seminar/ training program. Capacity Building

INFRASTRUCTURAL FACILITIES

IT infrastructure for COE

S. No.	PC Brand	Modal No.	PC Serial No.	Processor	RAM	Hard Disk	MAC
1	Lenovo	Lenovo Think Centre E63z	P900JQP9	Intel ® Core ™ i3-4005U CPU @ 1.70GHz	4GB	500 GB	00-25-AB-7D-70-20

2	Lenovo	Lenovo Think Centre E63z	P900JQPB	Intel ® Core ™ i3-4005U CPU @ 1.70GHz	4GB	500 GB	00-25-AB-7D-6D-DB
3	Lenovo	Lenovo Think Centre E63z	P900JQSX	Intel ® Core ™ i3-4005U CPU @ 1.70GHz	4GB	500 GB	00-25-AB-7D-6F-8A
4	Lenovo	Lenovo Think Centre E63z	P900JQPY	Intel ® Core ™ i3-4005U CPU @ 1.70GHz	4GB	500 GB	00-25-AB-7D-7A-14
5	Lenovo	Lenovo Think Centre E63z	P900JQQW	Intel ® Core ™ i3-4005U CPU @ 1.70GHz	4GB	500 GB	00-25-AB-7D-75-16
6	Lenovo	Lenovo Think Centre E63z	P900JQSW	Intel ® Core ™ i3-4005U CPU @ 1.70GHz	4GB	500 GB	00-25-AB-7D-6F-B4
7	Lenovo	Lenovo Think Centre E63z	P900JQQ8	Intel ® Core ™ i3-4005U CPU @ 1.70GHz	4GB	500 GB	00-25-AB-7D-7A-4F
8	Lenovo	Lenovo Think Centre E63z	P900JQQ1	Intel ® Core ™ i3-4005U CPU @ 1.70GHz	4GB	500 GB	00-25-AB-7D-78-06
9	Lenovo	Lenovo Think Centre E63z	P900JQNY	Intel ® Core ™ i3-4005U CPU @ 1.70GHz	4GB	500 GB	00-25-AB-7D-6E-5E
10	Lenovo	Lenovo Think Centre E63z	P900JQNX	Intel ® Core ™ i3-4005U CPU @ 1.70GHz	4GB	500 GB	00-25-AB-7D-70-F4
11	Lenovo	Lenovo Think Centre E63z	P900JQSN	Intel ® Core ™ i3-4005U CPU @ 1.70GHz	4GB	500 GB	00-25-AB-7D-7A-2F
12	Lenovo	Lenovo Think Centre E63z	P900JQPL	Intel ® Core ™ i3-4005U CPU @ 1.70GHz	4GB	500 GB	00-25-AB-7D-7A-6F

13	Lenovo	Lenovo Think Centre E63z	P900JQSA	Intel ® Core ™ i3-4005U CPU @ 1.70GHz	4GB	500 GB	00-25-AB-7D-7A-52
14	Lenovo	Lenovo Think Centre E63z	P900JQPX	Intel ® Core ™ i3-4005U CPU @ 1.70GHz	4GB	500 GB	00-25-AB-7D-6E-47
15	Lenovo	Lenovo Think Centre E63z	P900JQT6	Intel ® Core ™ i3-4005U CPU @ 1.70GHz	4GB	500 GB	00-25-AB-7D-7A-08
16	Lenovo	Lenovo Think Centre E63z	P900JQT9	Intel ® Core ™ i3-4005U CPU @ 1.70GHz	4GB	500 GB	00-25-AB-7D-77-DB
17	Lenovo	Lenovo Think Centre E63z	P900JQPH	Intel ® Core ™ i3-4005U CPU @ 1.70GHz	4GB	500 GB	00-25-AB-7D-6E-97
18	Lenovo	Lenovo Think Centre E63z	P900JQR1	Intel ® Core ™ i3-4005U CPU @ 1.70GHz	4GB	500 GB	00-25-AB-7D-6D-E0
19	Lenovo	Lenovo Think Centre E63z	P900JQPF	Intel ® Core ™ i3-4005U CPU @ 1.70GHz	4GB	500 GB	00-25-AB-7D-70-17
20	Lenovo	Lenovo Think Centre E63z	P900JQTY	Intel ® Core ™ i3-4005U CPU @ 1.70GHz	4GB	500 GB	00-25-AB-7D-70-0A
21	Lenovo	Lenovo Think Centre E63z	P900JQSV	Intel ® Core ™ i3-4005U CPU @ 1.70GHz	4GB	500 GB	00-25-AB-7D-79-AC
22	Lenovo	Lenovo Think Centre E63z	P900JQQL	Intel ® Core ™ i3-4005U CPU @ 1.70GHz	4GB	500 GB	00-25-AB-7L-79-AC
23	Lenovo	Lenovo Think Centre E63z	P900JQQD	Intel ® Core ™ i3-4005U CPU @ 1.70GHz	4GB	500 GB	00-25-AB-7D-6F-8D

24	Lenovo	Lenovo Think Centre E63z	P900JQQB	Intel ® Core ™ i3-4005U CPU @ 1.70GHz	4GB	500 GB	00-25-AB-7D-7C-C4
25	Lenovo	Lenovo Think Centre E63z	P900JQQ2	Intel ® Core ™ i3-4005U CPU @ 1.70GHz	4GB	500 GB	00-25-AB-7D-79-FA
26	Lenovo	Lenovo Think Centre E63z	P900JQSG	Intel ® Core ™ i3-4005U CPU @ 1.70GHz	4GB	500 GB	00-25-AB-7D-6F-84
27	Lenovo	Lenovo Think Centre E63z	P900JQRV	Intel ® Core ™ i3-4005U CPU @ 1.70GHz	4GB	500 GB	00-25-AB-7D-70-0D
28	Lenovo	Lenovo Think Centre E63z	P900JQRB	Intel ® Core ™ i3-4005U CPU @ 1.70GHz	4GB	500 GB	00-25-AB-7D-7C-6B
29	Lenovo	Lenovo Think Centre E63z	P900JQPW	Intel ® Core ™ i3-4005U CPU @ 1.70GHz	4GB	500 GB	00-25-AB-7D-6D-FF
30	Lenovo	Lenovo Think Centre E63z	P900JQNW	Intel ® Core ™ i3-4005U CPU @ 1.70GHz	4GB	500 GB	00-25-AB-7D-70-D6
31	Lenovo	Lenovo Think Centre E63z	P900JQTL	Intel ® Core ™ i3-4005U CPU @ 1.70GHz	4GB	500 GB	00-25-AB-7D-79-B0
32	Lenovo	Lenovo Think Centre E63z	P900JQPR	Intel ® Core ™ i3-4005U CPU @ 1.70GHz	4GB	500 GB	00-25-AB-7D-6E-4E
33	Lenovo	Lenovo Think Centre E63z	P900JQQQ	Intel ® Core ™ i3-4005U CPU @ 1.70GHz	4GB	500 GB	00-25-AB-7D-71-01
34	Lenovo	Lenovo Think Centre E63z	P900JQP4	Intel ® Core ™ i3-4005U CPU @ 1.70GHz	4GB	500 GB	00-25-AB-7D-70-E5

35	Lenovo	Lenovo Think Centre E63z	P900JQRA	Intel ® Core ™ i3-4005U CPU @ 1.70GHz	4GB	500 GB	00-25-AB-7D-70-F5
36	Lenovo	Lenovo Think Centre E63z	P900JQPK	Intel ® Core ™ i3-4005U CPU @ 1.70GHz	4GB	500 GB	00-25-AB-7D-7C-93
37	Lenovo	Lenovo Think Centre A10	L90MA04	Intel ® Core ™ i3-2120 CPU @ 3.30GHz	4GB	260 GB	AC-FD-CE-84-B7-FA
38	Lenovo	Lenovo Think Centre E63z	P900JQPJ	Intel ® Core ™ i3-4005U CPU @ 1.70GHz	4GB	500 GB	F8-0F-41-2E-51-CC

Items	Functions
PROJECTOR, PANASONIC	Presentation, Training
Computer Cabinet (DELL OPTIPLEX 360, Intel ® Core ™ 2 Duo CPU E7400 @2.80 GHz, RAM 1GB, HDD 160GB, MAC 00-23-AE-87-12-B6) for Projector	Documentation

LIST OF SOFTWARE

S. No.	Item	Quantity	Total Cost
1	QGIS 3.12	20	0 (Open Source)
2	SAGA 8	10	0 (Open Source)
3	SketchUp Desktop 2024.0	20	0 (Open Source)

EXISTING FACILITY/SUPPORT FROM LAB

The Instruments/ equipment and software from the following labs will be used-

- Computer Aided Design Lab
- Concrete & Material Testing Lab

- Geo-Mechanics & Environmental Engineering lab
- Artificial Intelligence lab
- Existing facilities in the Poornima College of Engineering
- Permanent Equipment and Software
- Desktop and CPU with advanced configuration
- Software available: QGIS, AUTO-CAD
- Handheld GPS
- Water quality testing equipment

TEAM MEMBERS

Multi-disciplinary research team are involved from various department at Poornima College of Engineering.

- Dr. Pran N. Dadhich is the Coordinator of the Centre along with the relevant experts from the following Department of PCE as Members.
- Department of Civil Engineering
- Department of Computer Science and Engineering
- Poornima Innovation Incubation Cell
- Research and Development Cell
- Intellectual Property Right Cell

- CoE – Artificial Intelligence and Big Data
- CoE – Automobile and e-Vehicle
- CoE – Advanced Wireless Communication

Glimpses of Infrastructure of Centre of Excellence

POORNIMA
COLLEGE OF ENGINEERING

Report - Hands on Training in Digital Image Processing & its Applications

NAME OF ACTIVITY: Workshop on Hands on Training in Digital Image Processing & its Applications

DATE & DURATION: May 14-16, 2024

ORGANIZED BY: Department of Civil Engineering

RESOURCE PERSON: Dr. Pran Nath Dadhich

DATE: 14/05/2024 to 16/05/2024

OBJECTIVE:

• Train the participants with the theoretical concepts of the digital image processing techniques with main emphasize to remote sensing applications.

• Understanding of various state-of-art techniques in image processing.

• Training on the development of pattern recognition and digital image analysis algorithms.

• Knowledge and hands-on training of software for image analysis.

•Training of the students with recent developments in digital image processing in industries.

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CIRCULAR

Workshop on Hands on Training in Digital Image Processing & its Applications

HOD CIVIL PCE <hodcivil.pce@poornima.org> Wed, 8 May, 13:59 (8 days ago)

to PCE-

Dear Students,

The Department of Civil Engineering is organizing a Workshop on **Hands on Training in Digital Image Processing & its Applications** from May 14-16, 2024.

The focus of the workshop will be: Digital Image, Representation of Digital Image, RGB Color Image, Image Enhancement Techniques and the Concept of Histogram and Application of Image Processing.

It is informed to register for this workshop through the below google form link.
https://forms.gle/wuULNCm87FVbw2XX8

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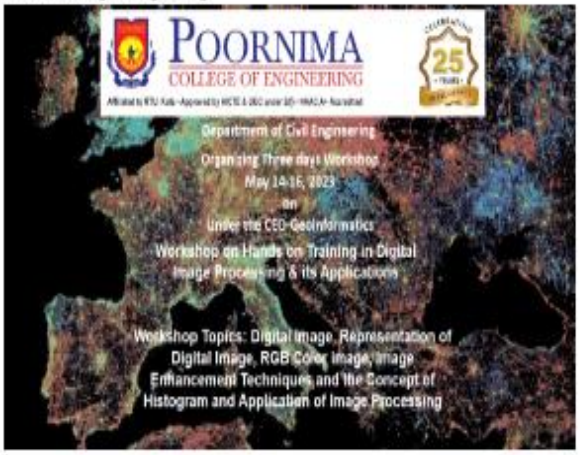
Thanks and Regards

Pran N. Dadhich (D. Eng.)
Department of Civil Engineering
Poornima College of Engineering



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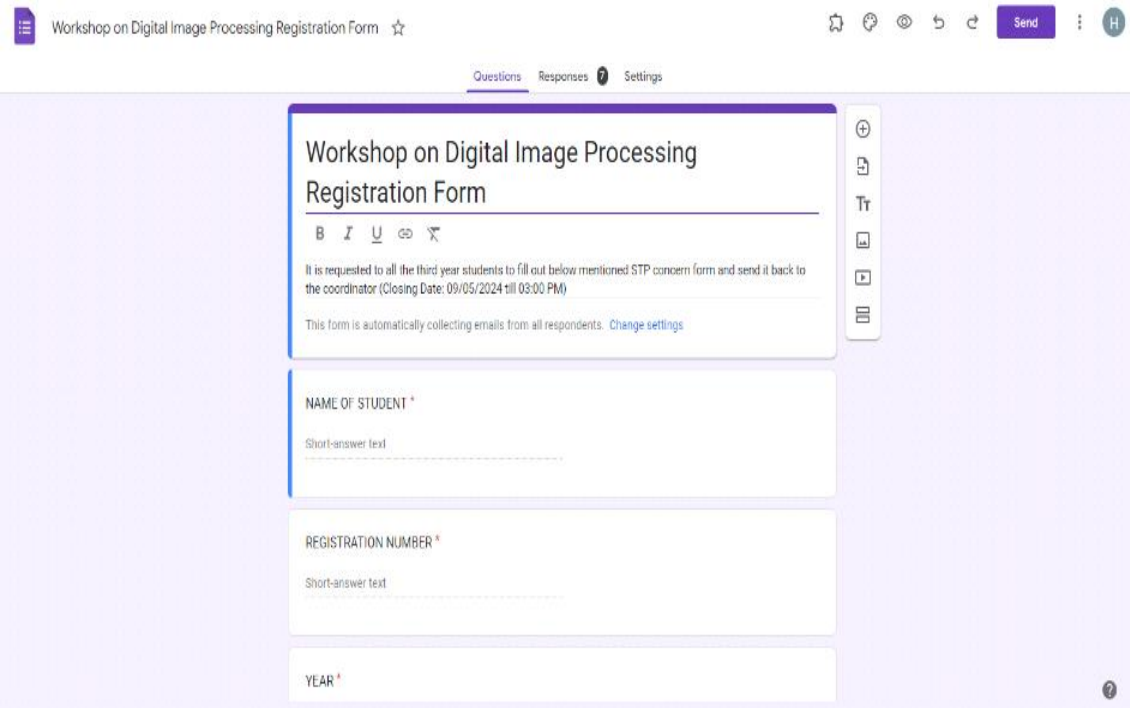
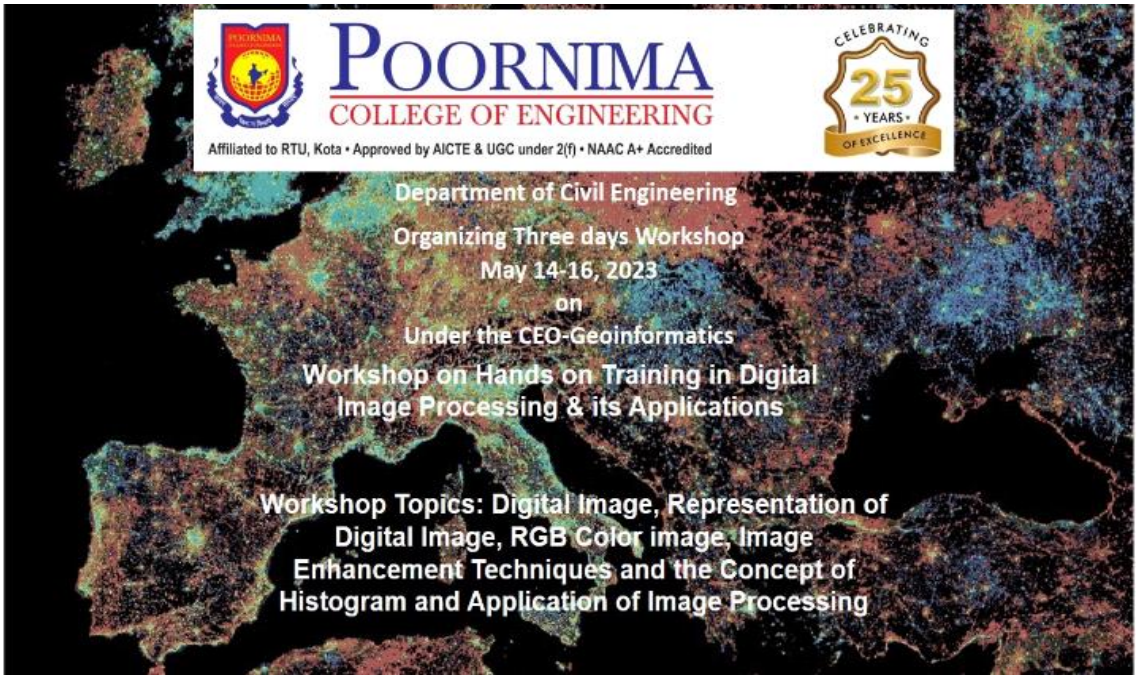
Google Form for Registration:



BROCHURE:



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INTRODUCTION:

In this workshop, we'll delve into the intricate world of digital image processing, a pivotal component of remote sensing technology. From satellite imagery capturing the Earth's surface to drones surveying inaccessible terrains, remote sensing platforms provide us with a wealth of data that holds immense potential for scientific research, environmental monitoring, urban planning, agriculture, disaster management, and much more.

Throughout our session, we'll unravel the complexities of digital image processing techniques tailored for remote sensing applications. We'll explore how algorithms and software tools transform raw sensor data into meaningful insights, enhancing our understanding of natural phenomena and human activities on a global scale.

Through hands-on demonstrations, case studies, and interactive discussions, we aim to equip you with the knowledge and tools needed to navigate the dynamic landscape of digital image processing in remote sensing.

Session Overview:

Date	Day	Topics Covered
14/05/2024	TUESDAY	• Basic of Satellite Images • Digital Image Concepts • Representation of Digital Image • Acquiring Satellite Images using Bhoonidhi portal of ISRO
15/05/2024	WEDNESDAY	• Introduction to Erdas imagine software • RGB Color images • Image Enhancement Techniques and the Concept of Histogram technique. • Image enhancement through the PAN merge.
16/05/2024	THURSDAY	• Basic concepts of Image classification • Image Interpretation Keys/ Elements • Image Classification Methods- Supervised and Unsupervised • Analysis and Discussion of classified satellite image

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Day: 1

DATE: 14/05/2024, (Tuesday)

Basics of Satellite Images:

- Satellite images are captured by satellites orbiting the Earth.
- They provide valuable information about the Earth's surface.
- Used in various fields like cartography, environmental monitoring, and urban planning.

Digital Image Concepts:

- Digital images are composed of pixels, each representing a small portion of the image.
- Image resolution determines the level of detail in an image.
- Color depth refers to the number of colors that can be represented in an image.

Representation of Digital Images:

- Digital images are represented using matrices of numerical values.
- Grayscale images have one matrix representing brightness values.
- Color images have multiple matrices representing color channels (e.g., red, green, blue).

4. Acquiring satellite images using Bhunidhi portal of ISRO

The Bhunidhi portal, developed by the Indian Space Research Organisation (ISRO), provides access to satellite imagery for various applications. This step-by-step guide explains how to download satellite images using the Bhunidhi portal.

Step 1: Accessing the Bhunidhi Portal

Open your web browser and navigate to the Bhunidhi portal website (URL: [insert URL]).

Log in to the portal using your credentials. If you don't have an account, sign up for one to access the features.

Step 2: Searching for Satellite Images

Once logged in, navigate to the search interface or dashboard.

Specify your search criteria, such as location, date range, satellite sensor, and image resolution.

Step 3: Viewing Image Results

After entering your search parameters, click on the "Search" or "Submit" button.

The portal will display a list of satellite images matching your search criteria.

Preview the images to ensure they meet your requirements.

Step 4: Selecting Images for Download

Select the satellite images you wish to download by clicking on them or checking the respective checkboxes.

You can choose multiple images for download if needed.

Step 5: Downloading Images

After selecting the desired images, locate the download option (usually represented by a download icon or button).

Click on the download option to initiate the download process.

Depending on the file size and your internet connection speed, the download may take some time.

Step 6: Post-Download Processing (Optional)

Once the images are downloaded, you can use image processing software to analyze and manipulate them as needed.

Perform tasks such as image enhancement, classification, and georeferencing to extract valuable information from the images.

Day: 2

DATE: 15/05/2024, (Wednesday)

- ## Introduction to Erdas Imagine Software

Erdas Imagine is a powerful remote sensing and image processing software widely used for analyzing and interpreting satellite and aerial imagery. This brief overview introduces the basic functionalities of Erdas Imagine software and explores the concept of RGB color images commonly used in remote sensing applications.

Erdas Imagine Software:

Erdas Imagine is a comprehensive software suite developed by Hexagon Geospatial for remote sensing, spatial analysis, and image processing.

It offers a wide range of tools and capabilities for handling various types of satellite, aerial, and drone imagery.

Users can perform tasks such as image interpretation, classification, mosaicking, and change detection.

Introduction to RGB Color Images:

RGB (Red, Green, Blue) color images are a common type of digital image representation where each pixel is defined by three color channels: red, green, and blue.

These color channels are combined to create a full-color image where each pixel's color is a mixture of red, green, and blue intensities.

RGB color images closely resemble how the human eye perceives color, making them intuitive and widely used in various applications.

Key Features of Erdas Imagine for RGB Color Images:

Importing and Displaying Images:

Erdas Imagine allows users to import satellite, aerial, and other imagery in various formats such as GeoTIFF, JPEG, and ERDAS IMAGINE (.img) format.

Once imported, users can visualize the images in the software's display window, enabling easy exploration and interpretation.

Color Enhancement and Adjustment:

Users can perform color enhancement and adjustment techniques to improve the visual quality of RGB images.

This includes adjusting brightness, contrast, and color balance to enhance image clarity and highlight specific features.

Image Analysis and Classification:

Erdas Imagine offers tools for image analysis and classification, allowing users to identify and classify objects within RGB images.

Classification techniques can be applied to separate land cover types, vegetation, water bodies, and built-up areas based on their spectral signatures.

Image Fusion and Integration:

Users can fuse or integrate multiple RGB images with other spectral bands or datasets to create composite images with enhanced information content.

Image fusion techniques combine the strengths of different sensors or image sources to generate high-quality, multispectral imagery.

Day: 3

DATE: 16/05/2024, (Thursday)

Basic Concepts of Image Classification:

Image classification is the process of categorizing pixels within an image into thematic classes or categories based on their spectral characteristics.

Key concepts include spectral resolution (the number of bands), spatial resolution (the size of pixel), and thematic resolution (the number of classes).

Image Interpretation Keys/Elements:

Image interpretation involves analysing the visual characteristics of satellite imagery to identify features and land cover types.

Elements of image interpretation include tone/colour, texture, pattern, shape, size, shadow, and association.

Image Classification Methods - Supervised and Unsupervised:

Supervised classification involves training a classifier using a set of known, labelled samples to classify pixels into predefined classes.

Unsupervised classification groups pixels based on their spectral similarity without prior knowledge of class labels, often resulting in clusters of similar spectral signatures.

Analysis and Discussion of Classified Satellite Image:

Once a satellite image is classified, the results are typically analysed and interpreted to extract meaningful information.

Analysis involves assessing the accuracy of the classification, identifying areas of interest, and evaluating changes over time.

Discussion may include insights gained from the classification results, implications for land use planning or environmental monitoring, and recommendations for further analysis or actions.

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PHOTOGRAPHS:

CONCLUSION:

The three-day workshop on digital image processing and its applications has been a transformative journey, providing participants with a comprehensive understanding of the fundamental concepts and practical techniques in this dynamic field. Throughout the workshop, attendees delved into a diverse range of topics, including image acquisition, enhancement, classification, and analysis, gaining valuable insights into the potential applications across various domains.

Participants have not only acquired theoretical knowledge but also honed their practical skills through hands-on sessions and real-world case studies. By exploring cutting-edge tools and software platforms, such as Erdas Imagine and ENVI, attendees have developed proficiency in processing and interpreting digital imagery, paving the way for innovative solutions in research, industry, and academia.

Moreover, the workshop fostered a collaborative environment where participants engaged in fruitful discussions, shared experiences, and exchanged ideas.

In essence, the three-day workshop has been a catalyst for professional growth, collaboration, and innovation, empowering participants to unlock the full potential of digital image processing and make meaningful contributions to society. As they return to their endeavors, they carry with them

the tools and inspiration to embark on a transformative journey in the realm of digital imagery and its applications.

Sample Certificate

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Affiliated to RTU, Kota • Approved by AICTE & UGC under 2(f) • NAAC A+ Accredited
CELEBRATING 25 YEARS OF EXCELLENCE

DEEPARTMENT OF CIVIL ENGINEERING

C. No. – 2023-24/CE/WVI-008

CERTIFICATE OF PARTICIPATION

This is to certify that

Mr. NITIN KUMAR

REG. No. - PCE21CE024

Poornima College of Engineering, Jaipur

has participated in the workshop on **Hands on Training in Digital Image Processing & its Applications** held from 14-16 May 2024.

Dr. Mahesh Bundele
Principal and Director,
Poornima College of
Engineering, Jaipur

Dr. Pankaj Dhemla
Vice Principal,
Poornima College of
Engineering, Jaipur

Dr. Pran Nath Dadhich
Head, Dept. of Civil Engg.
Poornima College of
Engineering, Jaipur

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DEEPARTMENT OF CIVIL ENGINEERING

C. No. – 2023-24/CE/WVI-005

CERTIFICATE OF PARTICIPATION

This is to certify that

Ms. SHILPA BANSAL

REG. No. - PCE21CE038

Poornima College of Engineering, Jaipur

has participated in the workshop on **Hands on Training in Digital Image Processing & its Applications** held from 14-16 May 2024.

Dr. Mahesh Bundele
Principal and Director,
Poornima College of
Engineering, Jaipur

Dr. Pankaj Dhemla
Vice Principal,
Poornima College of
Engineering, Jaipur

Dr. Pran Nath Dadhich
Head, Dept. of Civil Engg.
Poornima College of
Engineering, Jaipur

ATTENDANCE SHEET

Poornima College of Engineering				
Department of Civil Engineering				
Workshop on Digital Image Processing and Its Applications				
Registration No.	Participant Name	Sign 14/05/2024	Sign 15/05/2024	Sign 16/05/2024
PCE21CE047	Astha Sethadi	[signature]	[signature]	[signature]
PCE21CE041	Sudhir	[signature]	[signature]	[signature]
PCE21CE042	Sujata	[signature]	[signature]	[signature]
PCE21CE039	Shivani Verma	[signature]	[signature]	[signature]
PCE21CE043	Tanmay Bangst	[signature]	[signature]	[signature]
PCE21CE040	Heetesh [illegible]	[signature]	[signature]	[signature]
PCE21CE045	Tilak Raj [illegible]	[signature]	[signature]	[signature]
PCE21CE034	Ravi Kumar Sharma	[signature]	[signature]	[signature]
PCE21CE046	Vijay Kumar	[signature]	[signature]	[signature]
PCE21CE504	Rahul Singh	[signature]	[signature]	[signature]
PCE21CE006	Akash Dhaka	[signature]	[signature]	[signature]
PCE21CE010	Devansh Meena	[signature]	[signature]	[signature]
PCE21CE028	Naveen Singh	[signature]	[signature]	[signature]
PCE21CE002	Aashish Chauhan	[signature]	[signature]	[signature]
PCE22CE703	Kashif mani	[signature]	[signature]	[signature]
PCE22CE705	Wasim Ali	[signature]	[signature]	[signature]
PCE21CE035	Ravi Meena	[signature]	[signature]	
PCE21CE044	Tejas Rataval	[signature]	[signature]	[signature]
PCE21CE028	Raghav Kumar Sharma	[signature]	[signature]	[signature]
PCE21CE503	[illegible] Kumar	[signature]	[signature]	[signature]
PCE21CE038	Surbhi Bansal	[signature]	[signature]	[signature]
PCE21CE014	Nitin Kumar	[signature]	[signature]	[signature]
PCE21CE026	Pritam Chaschar	[signature]	[signature]	
PCE21CE014	Gaurish Gaur	[signature]	[signature]	[signature]
PCE21CE005	Aditya Meena	[signature]	[signature]	
PCE21CE010	Shreyash Sharma	[signature]	[signature]	[signature]
PCE21CE033	Kamlendra Singh	[signature]	[signature]	
PCE21CE501.	Atish Chauhan	[signature]	[signature]	
PIE21IE003	Abhishek.	[signature]	[signature]	[signature]
PCE21CE011	Devanshu		[signature]	
PCE21CE015	Himanshu		[signature]	[signature]
PCE21CE019	Manish		Manish	
PCE22CE705	Wasim Ali			
PCE21CE012	Farez Khokar	Farez	[signature]	[signature]
PCE21CE037	Rohit Chaudhary	[signature]	[signature]	[signature]
PCE21CE035	Ravi Meena			
[illegible]	Naveen Singh	[signature]	Naveen	[signature]

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FEEDBACK

FEEDBACK ANALYSIS (2023-24)							
S.No.	Attributes	Total Feed Back					100
1	Did the session meet its objectives?	Outstanding	Excellent	Good	Average	Satisfactory	Remark
		77.21	10.91	8.29	1.20	0.00	
2	Did you find the contents useful?	Outstanding	Excellent	Good	Average	Satisfactory	Remark
		75.88	14.19	7.92	1.11	0.00	
3	Did it help students to enhance their skills or learnings?	Outstanding	Excellent	Good	Average	Satisfactory	Remark
		73.29	16.11	6.49	1.20	0.00	
4	Did you receive uninterrupted Connectivity in case of online sessions?	Outstanding	Excellent	Good	Average	Satisfactory	Remark
		71.20	18.59	5.19	1.32	0.00	
5		Outstanding	Excellent	Good	Average	Satisfactory	Remark

	How do you rate this session overall?	**72.29**	**18.52**	**6.99**	**1.00**	**0.00**	
Overall Remark:- These kind of sessions should be conducted in the future for more awareness.							