



Swami Keshvanand Institute of Technology,  
Management & Gramothan, Jaipur



A  
Report  
on  
One Week  
Faculty Development Program (FDP)  
on  
“Application of Artificial Intelligence in VLSI and  
Communication Technology”  
(AAIVCT-2022)

**7<sup>th</sup> – 11<sup>th</sup> March 2022**

**Organized by:**  
**Department of Electronics & Communication Engineering**

# Table of Content

<b>Particular(s)</b>	<b>Page No(s)</b>
1. Objective of the event	3
2. Budget Approval	4
3. Event Brochure	5
4. Schedule of the Event	6
5. List of Invited Guests and Speakers	7
6. Participants List	8-22
7. Screen shots of event	23-43
8. Sample Copy of E-Certificates	44
9. Feedback report	45-48
10. Media Coverage	49
11. Technical Report	50-51

## **1. Objective of the event**

The major objective of this FDP is to address faculty members and research scholars of different institutes about recent advancement and technical challenges in the field of communication and VLSI using Artificial intelligence (AI).

AI is one of the most rising masterworks in the world of technology and innovation that helps to make electronics more reliable and easy to use. It has also gained significant attention due to its widespread application in various domains including VLSI and communication technology.

## 2. Budget Approval



Swami Keshvanand Institute of Technology, Management & Gramothan, Jaipur

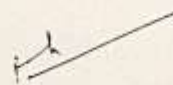
Department of Electronics and Communication Engineering

Date: 16 Aug 2021

### Note

Following proposals of online Conference/ FDP/ workshops are being submitted for your kind approval.

S.N.	Proposed Title:	Event Type	Name of Coordinator(s)	Tentative dates	Duration	Budget
1	International conference on Advancements in Nano and Communication Technologies	International Conference	Prof. Mukesh Arora/ Dr. PK Jain	24-26 February 2022	3 days	25000
2	Signal processing using Python & MATLAB	Workshop	Dr. Monika Mathur , Ms. Kiran Rathi, Mr. Harshal Nigam , Dr. Shabbi Jain,	17-21 January 2022	1 week	30000
3	Emerging Tools and Techniques in VLSI, MEMS and MOEMS	Workshop	Ms. Manju Choudhary, Namrata Saxena, Dr. Rakhsar Zafar, Dr. Swati Arora	22-27 November, 2021	1 week	30000
4	Student Workshop on IoT with Machine Learning & Artificial Intelligence	Workshop	Dr. Praveen Kumar Jain, Dr. Rakhsar Zafar, Mr. Ankit Agarwal, Ms. Pooja Choudhary	7-17 February 2022	2 week	56000
5	Application of VLSI in artificial intelligence	FDP	Mr. Vikas Pathak, Neera Jain, Rahul Pandey, Abhinandan Jain	13-18 December, 2021	1 week	30000
6	NBA Accreditation and Teaching - Learning Process in Engineering	FDP	Suman Sharma, Rajni Iliwal, Kiran Rathi, Mamta Jain	15-19 November, 2021	1 week	30000
7	Guest Lecture Series	-	-	Monthly	-	-

  
Principal, SKIT

  
Prof. Mukesh Arora/16.8.21  
HoD, ECE

### 3. Event Brochure



## Swami Keshvanand Institute of Technology, Management & Gramothan, Jaipur

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

organizing

One Week

Faculty Development Programme

on

## APPLICATION OF ARTIFICIAL INTELLIGENCE IN VLSI AND COMMUNICATION TECHNOLOGY

(AAIVCT-2022)

07-11 MARCH, 2022

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#### PATRON

*Sh. Surja Ram Meel, Chairman,  
SKIT*

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The major objective of this FDP is to address faculty members and research scholars of different institutes about recent advancement and technical challenges in the field of communication and VLSI using Artificial intelligence (AI). AI is one of the most rising masterworks in the world of technology and innovation that helps to make electronics more reliable and easy to use. It has also gained significant attention due to its widespread application in various domains including VLSI and communication technology.

#### CONTENTS OF THE FDP

- Ø Introduction to AI and its applications in real world
- Ø AI techniques in VLSI design automation
- Ø AI in Integrated Photonics
- Ø Machine Learning and Deep Learning
- Ø AI methods in Optical Networks
- Ø AI enabled intelligent 6G network
- Ø Hardware design methodology for AI
- Ø Machine Learning For Optical Communication System
- Ø Hand's on session on Lumerical FDTD and Xilinx Vivado EDA tool

#### RESOURCE PERSONS

The various sessions of this FDP will be taken by the eminent faculty from IITs, NITs, IIITs and research institutions.

#### REGISTRATION

Registration is open to students, faculty, industry persons, Scientists, Technologists, doctoral and postgraduate students, researchers, and industry personnel across India to augment them with state-of-the-art skills and knowledge in the area of VLSI, COMMUNICATION TECHNOLOGY AND ARTIFICIAL INTELLIGENCE.

- Participants will be admitted on a first-come-first-served basis.  
**There is no registration fee.**
- The registration is to be done by filling the Google form at link: <https://forms.gle/zkCUuxbJJx1o9kJs6>
- After the confirmation of registration, participants need to join the Whatsapp group with this link: <https://chat.whatsapp.com/F0qfC7IOzi9AzKhdoNewik>
- E-certificate will be provided to the participants who have attended the FDP with minimum 80% attendance and score minimum 60% marks in the quiz including feedback of FDP.

## 4. Schedule of the Event



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**One Week Faculty Development Programme on**  
**“Application of Artificial Intelligence on VLSI and Communication Technology”**  
**(AAIVCT-2022)**  
**(7<sup>th</sup> to 11<sup>th</sup> March, 2022)**

	Inaugural Session: 10:00 - 10:30	Expert Session: 12:30 - 2:00 PM
Monday, March 7, 2022	<p><b>Chief Guest: Prof. Ghanshyam Singh</b> Professor, Department of Electrical and Electronic Engineering University of Johannesburg, South Africa</p> <p><b>Expert Session : 10.30-11.30 AM</b> <b>Dr. Debabrata Sikdar</b> Assistant Professor, Department of Electronics and Electrical Engineering, IIT Guwahati <b>Title: Promises of Integrated Photonics Devices Technology with AI</b></p>	<p><b>Prof. Ghanshyam Singh</b> Professor, Department of Electrical and Electronic Engineering University of Johannesburg, South Africa <b>Title: Role of AI in 6G applications.</b></p>
<b>Date</b>	<b>Morning Session: 9.30 - 11:00 AM</b>	<b>Evening Session: 12:30 - 2:00 PM</b>
Tuesday, March 8, 2022	<p><b>Dr. Binod Kumar</b> Assistant Professor, Department of Electrical Engineering, IIT Jodhpur <b>Title: Hardware Design Methodologies for Artificial Intelligence</b></p>	<p><b>Dr. Jai Narayan Tripathi</b> Assistant Professor, Department of Electrical Engineering, IIT Jodhpur, <b>Title: Computational Intelligence for Designing VLSI Systems</b></p>
Wednesday, March 9, 2022	<p><b>Dr. Kuldeep Singh</b> Assistant Professor, Dept. of Electronics &amp; Comm. Engineering, MNIT, Jaipur <b>Title: Machine Learning for Cooperative Spectrum Sensing</b></p>	<p><b>Dr. Vikas Pathak, (Associate Professor</b> Department of Electronics and Communication Engineering, SKIT, Jaipur) <b>Mr. Ankur Sangal (Lead Application Engineer, CoreEL Technologies, New Delhi)</b> <b>Title: Xilinx Vivado Design flow using 7 series FPGA Architecture</b></p>
Thursday, March 10, 2022	<p><b>Dr. Satyasai Jagannath Nanda</b> Assistant Professor, Dept. of Electronics &amp; Comm. Engineering, MNIT, Jaipur <b>Title: Nature inspired optimization techniques and their application in communication engineering</b></p>	<p><b>Dr. Gaurav Kumar Bharti</b> Electrical Engineering Department, Chandigarh University, Chandigarh <b>Title: Hands-on session on "Simulation of different photonic sensor using FDTD platform</b></p>
Friday, March 11, 2022	<p><b>Dr. Rukhsar Zafar, Associate Professor</b> Dept. of Electronics &amp; Comm., SKIT, Jaipur <b>Title: Intelligent Nano Plasmonic</b></p>	<p><b>Dr. Ajay Khunteta, Associate Professor</b> Department of Electronics and Communication Engineering, RTU, Kota <b>Title: 5G communication and Role of AI in 5G</b> <b>Valedictory Session</b></p>

**COORDINATORS:**

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Mr. Rahul Pandey, ECE, SKIT  
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Registration Link: <https://forms.gle/zkCUuxb1Jx1o9kJo6>

WhatsApp Link: <https://chat.whatsapp.com/F0q8C7IQi9AzKhd0Newik>

## 5. List of Invited Guests and Speakers

S. No	Guest/Speakers	Name and Affiliation
1.	Chief guest of Inauguration	<b>Prof. Ghanshyam Singh</b> Professor, Department of Electrical and Electronic Engineering <b>University of Johannesburg, South Africa</b>
2.	Invited Speaker 1	<b>Dr. Debabrata Sikdar</b> Assistant Professor, Department of Electronics and Electrical Engineering, <b>IIT Guwahati</b>
3.	Invited Speaker 2	<b>Prof. Ghanshyam Singh</b> Professor, Department of Electrical and Electronic Engineering <b>University of Johannesburg, South Africa</b>
4.	Invited Speaker 3	<b>Dr. Binod Kumar</b> Assistant Professor, Department of Electrical Engineering, <b>IIT Jodhpur</b>
5.	Invited Speaker 4	<b>Dr. Jai Narayan Tripathi</b> Assistant Professor, Department of Electrical Engineering, <b>IIT Jodhpur</b>
6.	Invited Speaker 5	<b>Dr. Kuldeep Singh</b> Assistant Professor, Dept. of Electronics & Comm. Engineering, <b>MNIT, Jaipur</b>
7.	Invited Speaker 6	<b>Dr. Vikas Pathak</b> , (Associate Professor Department of Electronics and Communication Engineering, <b>SKIT,Jaipur</b> ) <b>Mr. Ankur Sangal</b> (Lead Application Engineer, <b>CoreEL Technologies</b> , New Delhi)
8.	Invited Speaker 7	<b>Dr. Satyasai Jagannath Nanda</b> Assistant Professor, Dept. of Electronics & Comm. Engineering, <b>MNIT, Jaipur</b>
9.	Invited Speaker 8	<b>Dr. Gaurav Kumar Bharti</b> Electrical Engineering Department, <b>Chandigarh University</b> , Chandigarh
10.	Invited Speaker 9	<b>Dr. Rukhsar Zafar</b> , Associate Professor Dept. of Electronics & Comm., <b>SKIT,Jaipur</b>
11.	Invited Speaker 10	<b>Dr. Ajay Khunteta</b> , Associate Professor Department of Electronics and Communication Engineering, <b>RTU, Kota</b>

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**A Report on One Week FDP on AAI VCT-2022**

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**A Report on One Week FDP on AIVCT-2022**

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**A Report on One Week FDP on AIVCT-2022**

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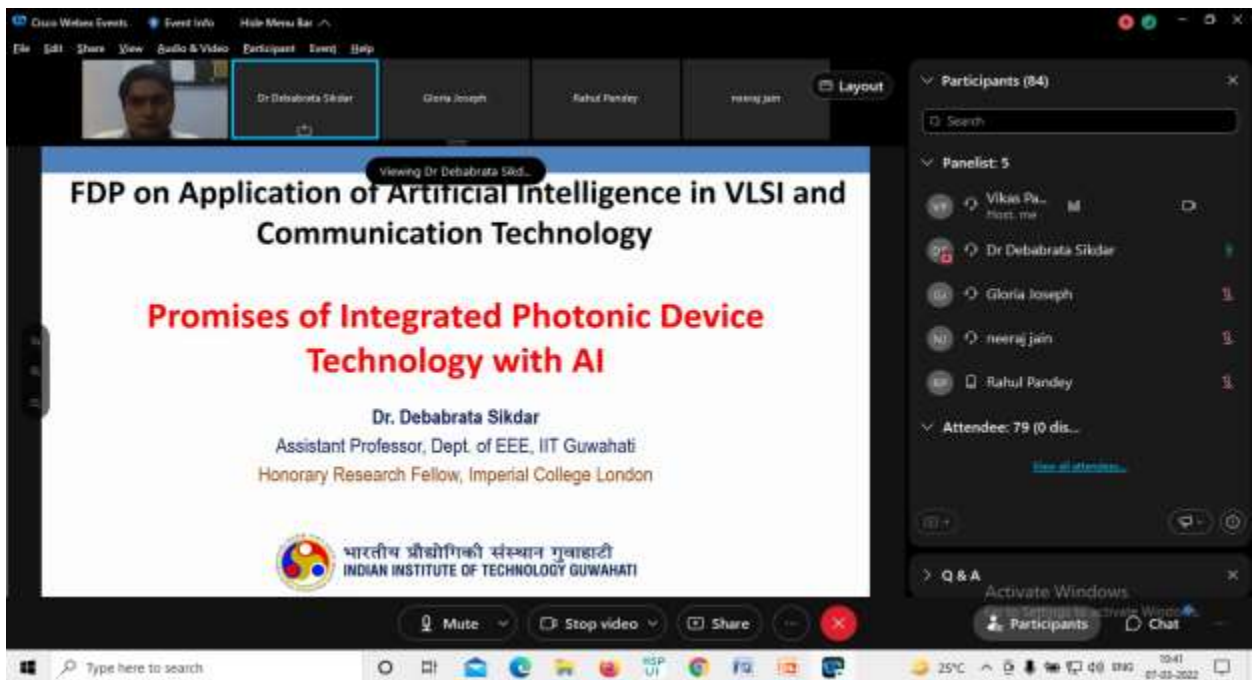
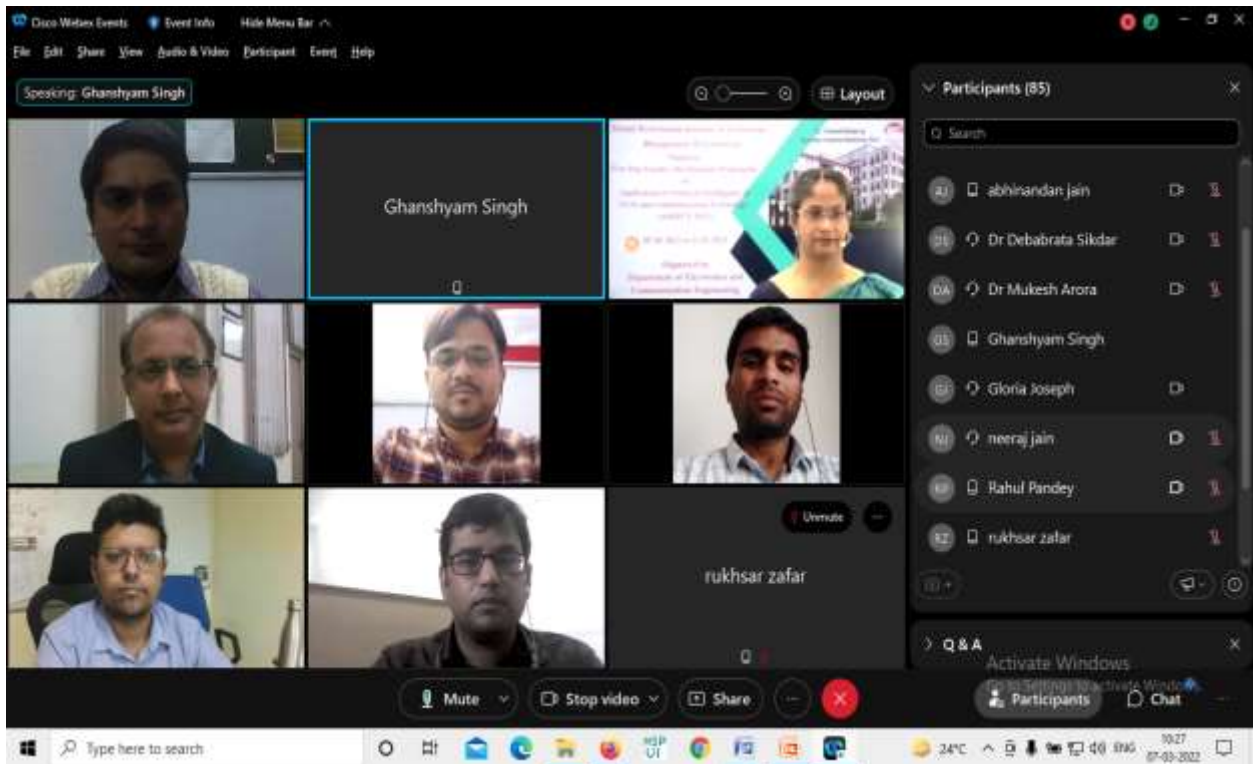
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## 7. Screenshots of the Event

### Day-1 Photos



# A Report on One Week FDP on AAIVCT-2022

The screenshot shows a Zoom meeting interface. The main content is a slide titled "Viewing Dr Debabrata Sikdar...". The slide features a graph with "Operating speed" on the y-axis (ranging from kHz to PHz) and "Critical dimension active devices (nm)" on the x-axis (ranging from 10nm to 1mm). The graph is divided into four quadrants: "Nanophotonics" (top-left, green), "Dielectric Photonics" (top-right, blue), "Semiconductor Electronics" (bottom-left, purple), and "The past" (bottom-right, red). Below the graph, the slide lists "Advantages of Nanophotonics":

- Nanoscale footprints—smaller components and devices
- Photon-electron process in nanoscale—faster processing speed
- Nanoscale confinement of optical radiation and electromagnetic fields—enhancing the light-matter interactions and dramatically reducing the optical energy consumption.

The Zoom interface includes a top bar with "Zoom Windows Events", "Event Info", and "Hide Menu Bar". Below this is a menu with "File", "Edit", "Share", "View", "Audio & Video", "Participant", "Event", and "Help". A participant list on the right shows 86 participants, with a panelist list of 5. The bottom of the screen shows a Windows taskbar with the date 07-03-2022 and time 10:40.

The screenshot shows a Zoom meeting interface. The main content is a slide titled "Viewing GHANSHYAM SINGH...". The slide text reads:

Faculty on  
Application of Artificial Intelligence on VLSI and Communication Technology

Organized by  
Swami Keshvanand Institute of Technology and management,  
Jagatpura, Jaipur, India  
(March 7-11, 2022)

**Role of Artificial Intelligence in 6G**

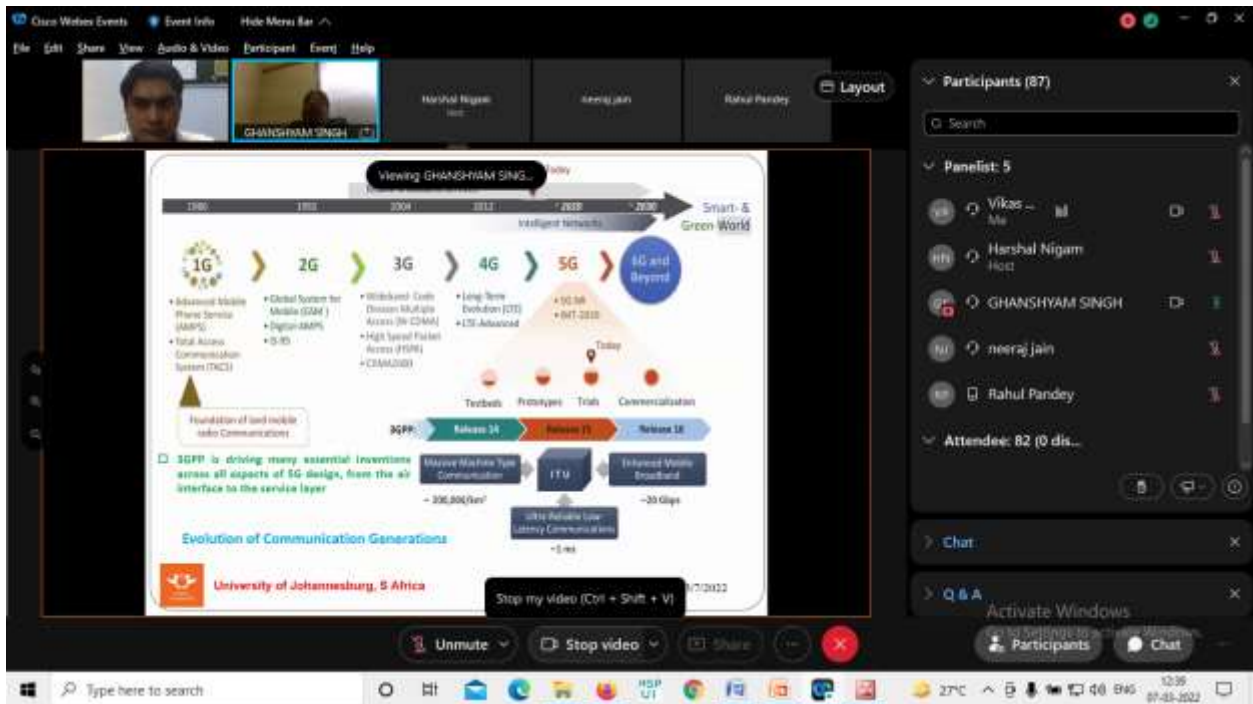
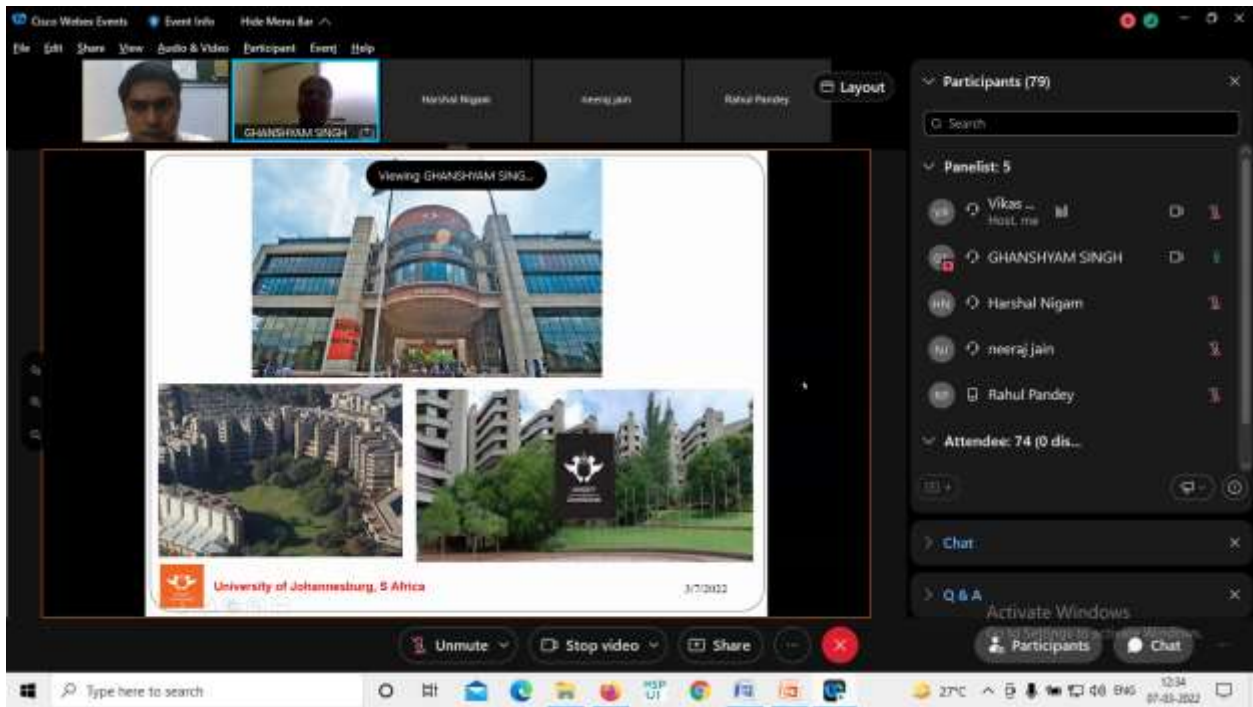
Prof. Ghanshyam Singh  
University of Johannesburg, Johannesburg, South Africa  
Email: ghanshyams@uj.ac.za

University of Johannesburg, South Africa 3/7/2022

The Zoom interface includes a top bar with "Zoom Windows Events", "Event Info", and "Hide Menu Bar". Below this is a menu with "File", "Edit", "Share", "View", "Audio & Video", "Participant", "Event", and "Help". A participant list on the right shows 74 participants, with a panelist list of 4. The bottom of the screen shows a Windows taskbar with the date 07-03-2022 and time 10:31.



# A Report on One Week FDP on AAIVCT-2022



# A Report on One Week FDP on AAI-VCT-2022

## Day-2

The screenshot shows a Zoom meeting interface. At the top, there are video thumbnails for participants: Vikas Pathak, Binod Kumar, Abhinandan Jain, Harshal Nigam, and neeraj jain. The main content is a presentation slide titled "Sensors are Everywhere!". The slide features a central rainbow-colored circular graphic with a grid of dots in the center. Surrounding this graphic are various icons and labels representing different sensor technologies, including: "Multispectral Vision / Optical Ambient Light", "Photocatalysis / CO2", "Chemical / Biological", "Acoustic / Vibration", "Thermal / Infrared", "Mechanical / Pressure", "Electromagnetic / Magnetic", "Chemical / Gas", "Biological / DNA", "Environmental / Humidity", "Thermal / Temperature", "Acoustic / Ultrasound", "Chemical / pH", "Biological / Glucose", "Environmental / Air Quality", "Thermal / Heat", "Mechanical / Strain", "Electromagnetic / EMI", "Chemical / Water Quality", "Biological / Biomarkers", "Environmental / Radiation", "Thermal / Infrared", "Mechanical / Vibration", "Electromagnetic / Magnetic", "Chemical / Gas", "Biological / DNA", "Environmental / Humidity", "Thermal / Temperature", "Acoustic / Ultrasound", "Chemical / pH", "Biological / Glucose", "Environmental / Air Quality", "Thermal / Heat", "Mechanical / Strain", "Electromagnetic / EMI", "Chemical / Water Quality", "Biological / Biomarkers", "Environmental / Radiation". The slide also includes a source link: "Source: <https://www.4mat.com/sensors>". On the right side of the Zoom window, there is a "Participants (65)" panel showing a list of participants under "Panelist: 7" and "Attendee: 58 (0 dis...)". The bottom of the screen shows the Windows taskbar with the search bar and various application icons.

The screenshot shows a Zoom meeting interface. At the top, there are video thumbnails for participants: Vikas Pathak, Binod Kumar, Abhinandan Jain, Harshal Nigam, and neeraj jain. The main content is a presentation slide titled "ARTIFICIAL INTELLIGENCE Technology Landscape". The slide features a central graphic of a brain with a gear inside, surrounded by a circular flow of icons representing different AI technologies and their applications. The central text reads "ARTIFICIAL INTELLIGENCE Technology Landscape". The surrounding icons and labels include: "COGNITIVE USER INTERFACES", "EMOTIONAL PERSONAL ASSISTANTS", "AUTONOMOUS VEHICLES", "HEALTH CARE MONITORING", "TELEHEALTH CONSULTATION", "REAL TIME LANGUAGE TRANSLATION", "SMART HOME AUTOMATION", "PERSONALIZED RECOMMENDATIONS", "DEEP LEARNING", "NEURAL NETWORKS", "HYPERPARAMETER OPTIMIZATION", "COMPUTATIONAL GRAPHICS", "REINFORCEMENT LEARNING", "NATURAL LANGUAGE PROCESSING", "COMPUTATIONAL GRAPHICS", "REINFORCEMENT LEARNING", "NATURAL LANGUAGE PROCESSING", "COMPUTATIONAL GRAPHICS", "REINFORCEMENT LEARNING", "NATURAL LANGUAGE PROCESSING". On the right side of the Zoom window, there is a "Participants (76)" panel showing a list of participants under "Panelist: 7" and "Attendee: 69 (0 dis...)". The bottom of the screen shows the Windows taskbar with the search bar and various application icons.

# A Report on One Week FDP on AAIVCT-2022

**Convolution Neural Network (CNN)**

INPUT (28 x 28 x 3)

Conv\_1 Convolution (3 x 3) kernel, valid padding

Max-Pooling (2 x 2)

Conv\_2 Convolution (5 x 5) kernel, valid padding

Max-Pooling (2 x 2)

Conv\_3 Convolution (3 x 3) kernel, valid padding

Conv\_4 Convolution (3 x 3) kernel, valid padding

OUTPUT (with Argmax!)

0, 1, 2, ..., 9

10 units

Participants (98)

Panelist: 6

Vikas Patil (Host, me)

Binod Kumar

Abhinandan Jain

Harshal Nigam

neeraj jain

rulkhoor zafar

Attendee: 92 (0 dis...)

Unmute, Start video, Share

26°C, 10:10, 08-01-2022

**Computations in a CNN: Linear Algebra**

Input Images

Output

Filters

Many Input Images

Many Output Images

GEMM: General Matrix Multiply

Data Heavy

Participants (101)

Panelist: 6

Vikas Patil (Host, me)

Binod Kumar

Abhinandan Jain

Harshal Nigam

neeraj jain

rulkhoor zafar

Attendee: 95 (0 dis...)

Unmute, Start video, Share

26°C, 10:12, 08-01-2022

# A Report on One Week FDP on AAIVCT-2022

The screenshot shows a Zoom meeting interface. The main window displays a slide with the following content:

### Some Available Resources (Open-Source)

High-level AI Accelerator Modeling	<a href="https://github.com/harvard-accelADDP">https://github.com/harvard-accelADDP</a>
DNN Accelerators Design Space Exploration	<a href="https://github.com/ARM-software/SCALE-Site">https://github.com/ARM-software/SCALE-Site</a>
CPU/Memory Architecture Modeling	<a href="https://www.gem5.org/">https://www.gem5.org/</a>
Accelerator Modeling (Eyeriss Design, MIT)	<a href="https://github.com/eyeriss/eyeriss">https://github.com/eyeriss/eyeriss</a>
Python-based Modeling of Hardware	<a href="https://www.myhdl.org/">https://www.myhdl.org/</a>
DRAM Power & Energy Estimation	<a href="https://www.ele.tue.nl/qsar/power/">https://www.ele.tue.nl/qsar/power/</a>
Running ML Algorithms (in Python)	<a href="https://rock-learn.org/table/">https://rock-learn.org/table/</a>
Open-source ASIC flow	<a href="https://theopenasicproject.org/">https://theopenasicproject.org/</a>
RTL simulation (Verilog/VHDL)	<a href="https://www.edaplayground.com/">https://www.edaplayground.com/</a>
Online Platform for ML/DL Training/Inference	<a href="https://arab-research.google.com/dnn_source_nova/index">https://arab-research.google.com/dnn_source_nova/index</a>
Processing-in-Memory simulator	<a href="https://github.com/CMU-SAFARI/memulator-pis">https://github.com/CMU-SAFARI/memulator-pis</a>

On the right side of the slide, there is a graphic with the text: "OPEN SOURCE" and "UBUNTU = 'I am because you are.'"

The Zoom interface shows a participant list on the right with 106 participants and a panelist list of 5 members.

The screenshot shows a Zoom meeting interface. The main window displays a slide with the following content:

### Comparative Evaluation of Different Devices

	CPU-based	GPU-based	FPGA-based	ASIC-based
<b>Advantages</b>	Good versatility Lowest price Multitasking High programmability	Medium versatility Massive parallelism Moderate programmability	Customized designs Low latency High performance/watt	Extremely low power Highest performance
<b>Limitations</b>	Limited parallelism	Power hungry	Limited on-chip memory Requires design expertise	High development cost Long Time-To-Market Low flexibility
<b>Example Devices</b>	Arm Cortex-M Series Raspberry Pi Series NanoPi Series Speed MAX Series	Nvidia Jetson Series AMD Ryzen Family Arm Mali GPUs	Xilinx Zynq FPGAs Intel Arria 10 FPGAs Lattice iCE40 FPGAs	Google Edge TPU Ascend 310 processor In-memory chips Neuromorphic chips
<b>Development Tools</b>	Arm NN TensorFlow Lite	TensorRT Intel OpenVino	Intel OpenVino Xilinx Edge AI platform	Apache TVM

At the bottom of the slide, it says: "Adapted from Hossain et al., 'Scaling Deep Learning on ARM Cortex-M Processors and FPGAs for Edge AI Applications', ICCV 2019, 4032-4041."

The Zoom interface shows a participant list on the right with 101 participants and a panelist list of 4 members. A chat window is also visible at the bottom right.

The screenshot shows a Zoom meeting interface. The main slide is titled "Computational Intelligence for Designing Integrated Circuits and Systems" and is presented by Dr. Jai Narayan Tripathi from IIT Jodhpur, India. The slide content includes:
 

- Computational Intelligence for Designing Integrated Circuits and Systems**
- Dr. Jai Narayan Tripathi**  
IIT Jodhpur, India.
- 'Faculty Development Programme' on Application of Artificial Intelligence in VLSI and Communication Technology (AAIVCT-2022), SKIT, Jaipur, 8 March 2022.


 The Zoom interface shows a top bar with "Zoom Video Events", "Event Info", and "Hide Menu Bar". Below this is a toolbar with "File", "Edit", "Share", "View", "Audio & Video", "Participant", "Event", and "Help". A video gallery at the top shows Dr. Jai Narayan Tripathi, neeraj jain, abhinandan jain, and ankit agarwal. A "Participants (72)" panel on the right lists 7 panelists and 65 attendees. The Windows taskbar at the bottom shows the time as 12:37 on 08-03-2022.

The screenshot shows a Zoom meeting interface. The main slide is titled "Heterogeneous Integration" and features a diagram illustrating the integration of different components. The diagram shows a flow from "Silicon active Components" (with sub-points: Die 1, Die 2, Die 3) to "Compound active Components" (with sub-points: Die 4, Die 5) to "Mechanical active Components" (with sub-points: Die 6, Die 7) and "Passive Components". An arrow labeled "Integration" points to a final product image. Text on the slide states: "Major set-back due to modeling limitations: The Heterogeneous Integration!". A bullet point at the bottom reads: "Omnipresent from AI enabled hardware for IoT and big-data to security, space and medical technology." The Zoom interface shows a top bar with "Zoom Video Events", "Event Info", and "Hide Menu Bar". Below this is a toolbar with "File", "Edit", "Share", "View", "Audio & Video", "Participant", "Event", and "Help". A video gallery at the top shows Abhinandan Jain, Dr. Jai Narayan Tripathi (highlighted with a blue box), neeraj jain, and ankit agarwal. A "Participants (79)" panel on the right lists 7 panelists and 72 attendees. The Windows taskbar at the bottom shows the time as 12:44 on 08-03-2022.

The screenshot shows a Zoom meeting interface. The main slide is titled "How Interconnects act a bottlenecks?". It features a diagram where a box labeled "Limited Bandwidth" has an arrow pointing to a larger box labeled "Signal Integrity + Power Integrity". To the left of this diagram is a list of factors: "Dimensions", "Technology", and "Material". Two callout boxes provide definitions: one for "Signal Integrity" (Quality of signal propagating from one point to another point in a network in terms of distortion, attenuation and noise) and one for "Power Integrity" (Quality of power in a system in terms of sufficiency, efficiency and stability). The Zoom interface shows participants: Vikas Patil, Abhinandan Jain, Dr. Jai Narayan Tripathi (highlighted), neeraj jain, and Suman Sharma. The chat panel on the right shows a list of participants and an attendee list.

The screenshot shows a Zoom meeting interface. The main slide is titled "Design Automation using Computational Intelligence". It contains a flowchart on the left and a list of bullet points on the right. The flowchart starts with "Manual circuit design/alter with input to capture requirements", leading to "Abstract model generation for simulation", then "Mathematical Algorithms", "Simulation Setup", "Simulation Engine", "App Simulation Data", "Post Simulation Processing", and finally "Final Simulation Report". The bullet points discuss EDA vendors, simulation engines, interoperability, and convergence issues. A citation at the bottom reads: "A. Chordia et al., 'An Automated Framework for Variability Analysis using Simulated Annealing', 22<sup>nd</sup> IEEE Workshop on Signal and Power Integrity (SPI), pp. 1-4, May 20-22, 2022". The Zoom interface shows participants: Vikas Patil, Abhinandan Jain, Dr. Jai Narayan Tripathi (highlighted), neeraj jain, and Suman Sharma. The chat panel on the right shows a chat message from Neeraj Gupta: "dear sir can you explain red deers optimization".

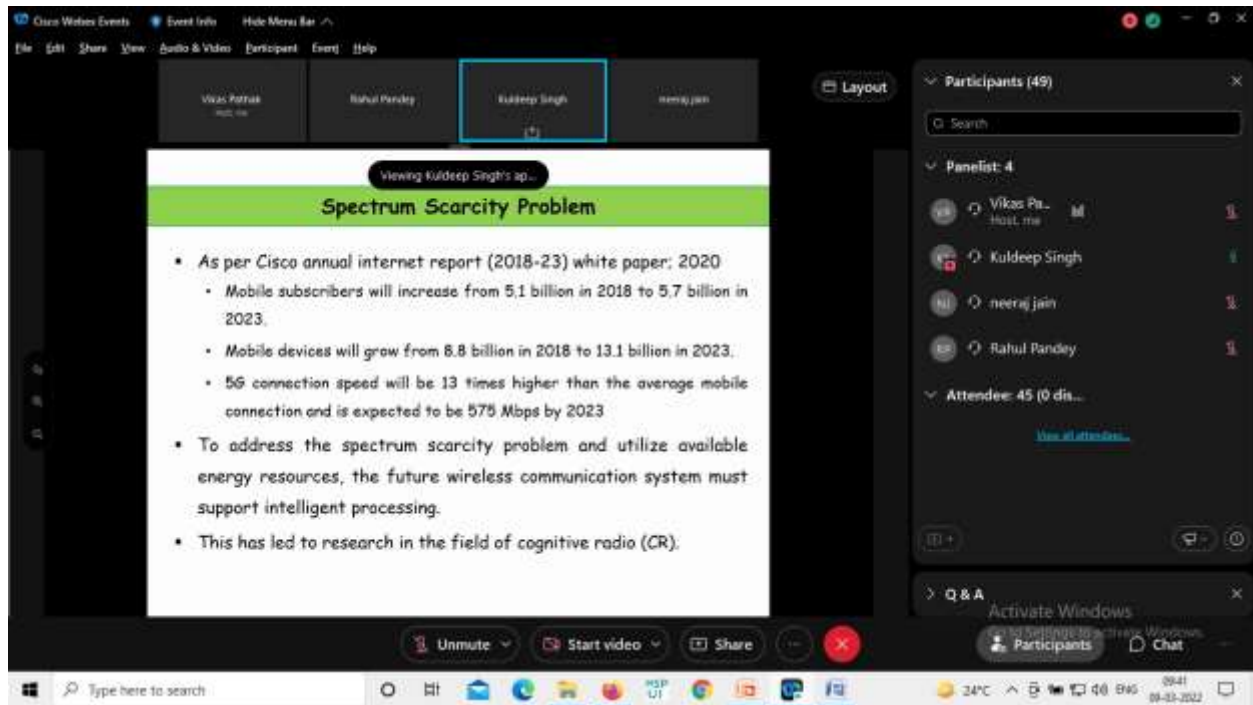
Day-3



**Dr. Kuldeep Singh**  
Assistant Professor,  
Dept. of Electronics &  
Comm. Engineering,  
MNIT, Jaipur

### About the Speaker

- ▶ At present Dr. Kuldeep Singh is working as a Assistant Professor in Dept. of Electronics & Comm. Engineering, MNIT, Jaipur
- He has received his Ph.D. degree in Computer Vision from Delhi Technological University, New Delhi, India and Processing from Netaji Subhash Institute of Techn
- He has worked as postdoctoral fellow at Unive where he was involved in development of deep prototype for agriculture applications.
- Before joining MNIT, he has worked at Central R Ghaziabad as Scientist from Jan 2007 to Mar 201 has worked on various projects of national importance. He was involved in software development of various C4I systems for Indian & foreign defense forces. He has been awarded R & D Excellence award at Bharat Electronics Ltd. in 2009 and 2011.
- He is reviewer of various IEEE transactions, Elsevier & Springer journals.
- His research interest includes Machine/Deep Learning, Computer Vision, Artificial Intelligence, Biometrics, Cyber Security



The screenshot shows a Zoom meeting in progress. The main content is a slide titled "Spectrum Scarcity Problem" with the following bullet points:

- As per Cisco annual internet report (2018-23) white paper; 2020
  - Mobile subscribers will increase from 5.1 billion in 2018 to 5.7 billion in 2023.
  - Mobile devices will grow from 8.8 billion in 2018 to 13.1 billion in 2023.
  - 5G connection speed will be 13 times higher than the average mobile connection and is expected to be 575 Mbps by 2023
- To address the spectrum scarcity problem and utilize available energy resources, the future wireless communication system must support intelligent processing.
- This has led to research in the field of cognitive radio (CR).

The Zoom interface also shows a list of participants: Vikas Patra (Host), Kuldeep Singh (Speaker), and neeraj jain. There are 49 participants in total.

# A Report on One Week FDP on AAIVCT-2022

The screenshot shows a Zoom meeting interface. The main content is a slide titled "Cognitive Radio (CR)". The slide text is as follows:

**What is CR?**

- An intelligent device which has ability to adapt the dynamic changes occur in wireless environment.
- Built on the software defined radio (SDR) technology
- Key enabler for dynamic spectrum access networks and utilized to solve spectrum shortage issue

**Users of Spectrum**

- Primary User (PU): Licensed user to access the spectrum
- Secondary User (SU) / CR device: Unlicensed User (opportunistically access the spectrum allocated to PU)

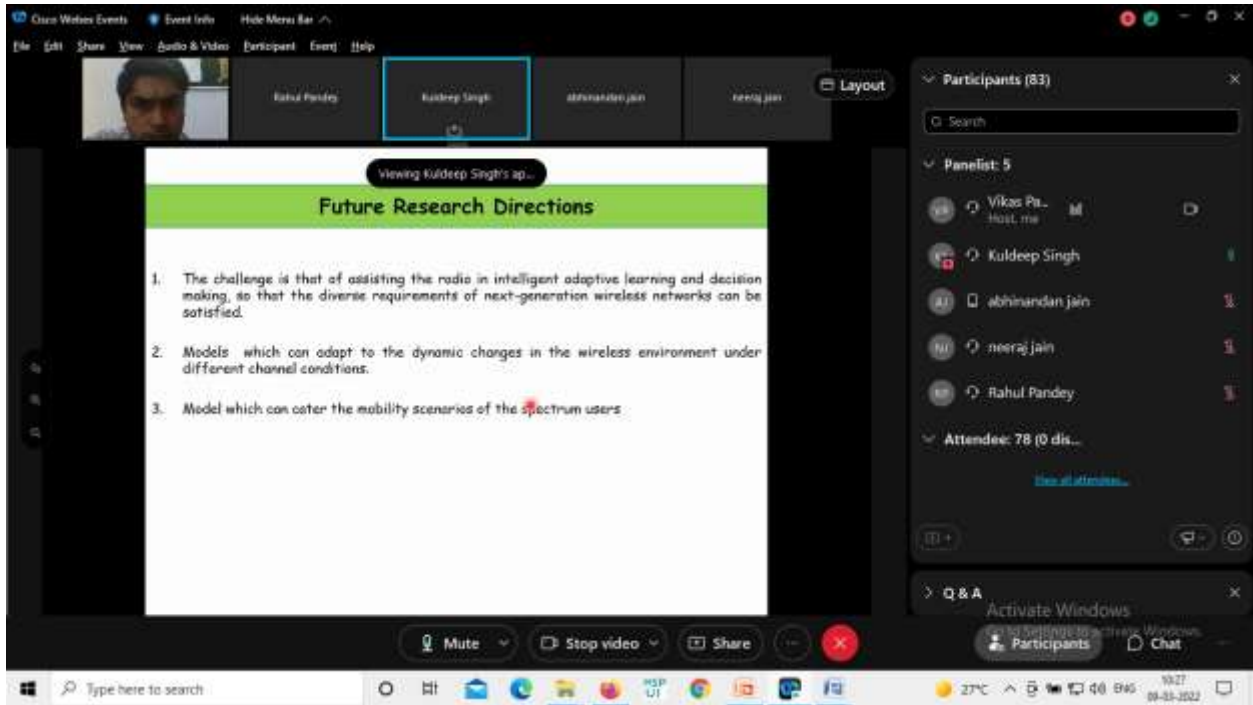
The Zoom interface shows a top bar with participant names: Vikas Pathak, Rahul Pandey, Kuldeep Singh (highlighted), and neeraj jain. The right sidebar shows a list of participants (50) and a panelist list with names: Vikas Pa., Kuldeep Singh, neeraj jain, and Rahul Pandey. The bottom status bar shows "Unmute", "Start video", and "Share" buttons.

The screenshot shows a Zoom meeting interface. The main content is a slide titled "ML Algorithms" featuring a classification tree diagram:

```
graph TD; ML[Machine Learning Algorithms] --> SL[Supervised Learning]; ML --> UL[Unsupervised Learning]; ML --> RL[Reinforcement Learning]; SL --> SL_Examples["SVM, KNN, Naive Bayes, decision tree, linear regression, ANN, Bayesian Learning"]; UL --> UL_Examples["K-Means, PCA, GMM, Fuzzy C-means, K-medoids, Genetic Algorithm"]; RL --> RL_Examples["Markov Decision Process, Multi-agent Learning"];
```

The Zoom interface shows a top bar with participant names: Vikas Pathak, Rahul Pandey, Kuldeep Singh (highlighted), abhinandan jain, and neeraj jain. The right sidebar shows a list of participants (72) and a panelist list with names: Vikas Pa., Kuldeep Singh, abhinandan jain, neeraj jain, and Rahul Pandey. The bottom status bar shows "Unmute", "Start video", and "Share" buttons.





Multi sharing 1 application

## About the Speaker



**Mr. Ankur Sangal**  
Lead Application Engineer,  
CoreEL Technologies (I)  
Pvt. Ltd., Noida, U.P.

- Presently Mr. Ankur is working in CoreEL Technology (I) Pvt. Ltd. as a Sr. Application Engineer.
- I had worked with CDAC as Design Engineer for
- He has done his M. Tech. in VLSI Design and in VLSI Domain.
- He has attended one week training on Caliber DRC by Mentor Graphics held at Mentor graphics
- Attended two days GDC PacRim Regional Bootcamp by Mentor Graphics held at Grant Hyatt Shenzhen , China
- Worked as a Team member in National Workshop "EDA Tools for VLSI Design" at CDAC NOIDA.
- He has written research paper on Low power VLSI Design in IEEE Conference Paper & Taylor & Francis
- He is expertise in CAD tool maintenance, complete flow from RTL to GDSII in Mentor Graphics for 8 digital modules, ASIC & FPGA domain..



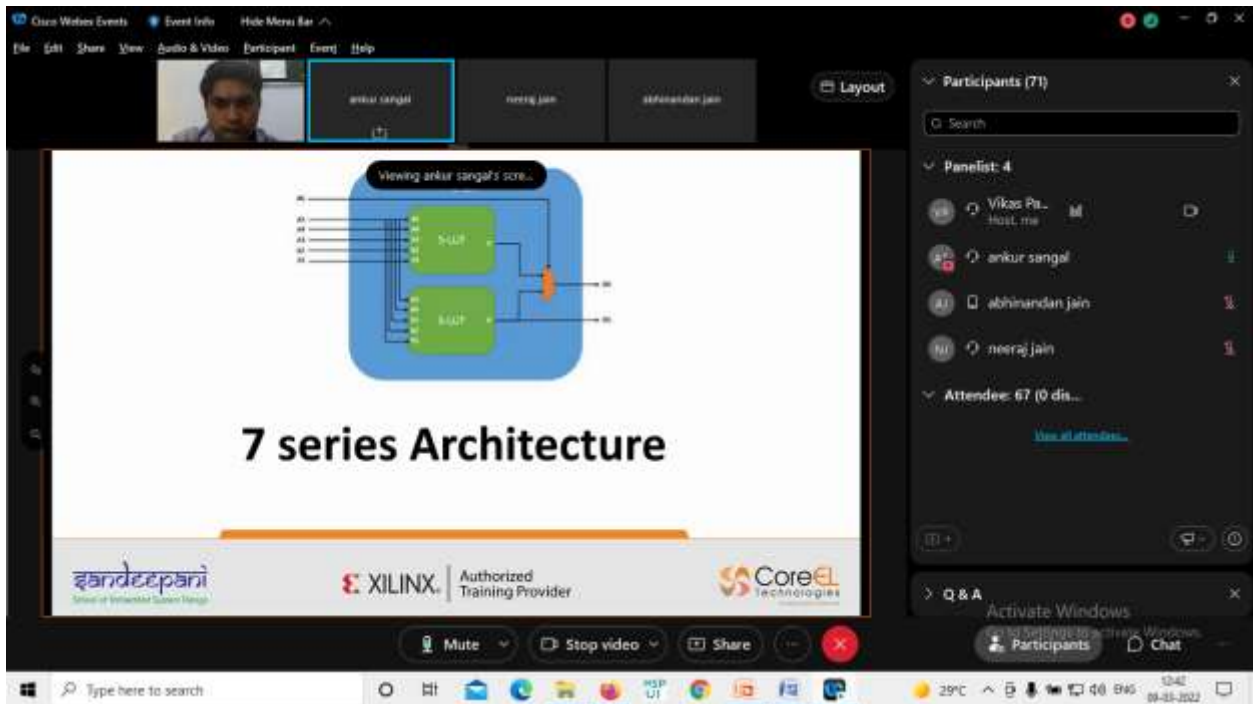
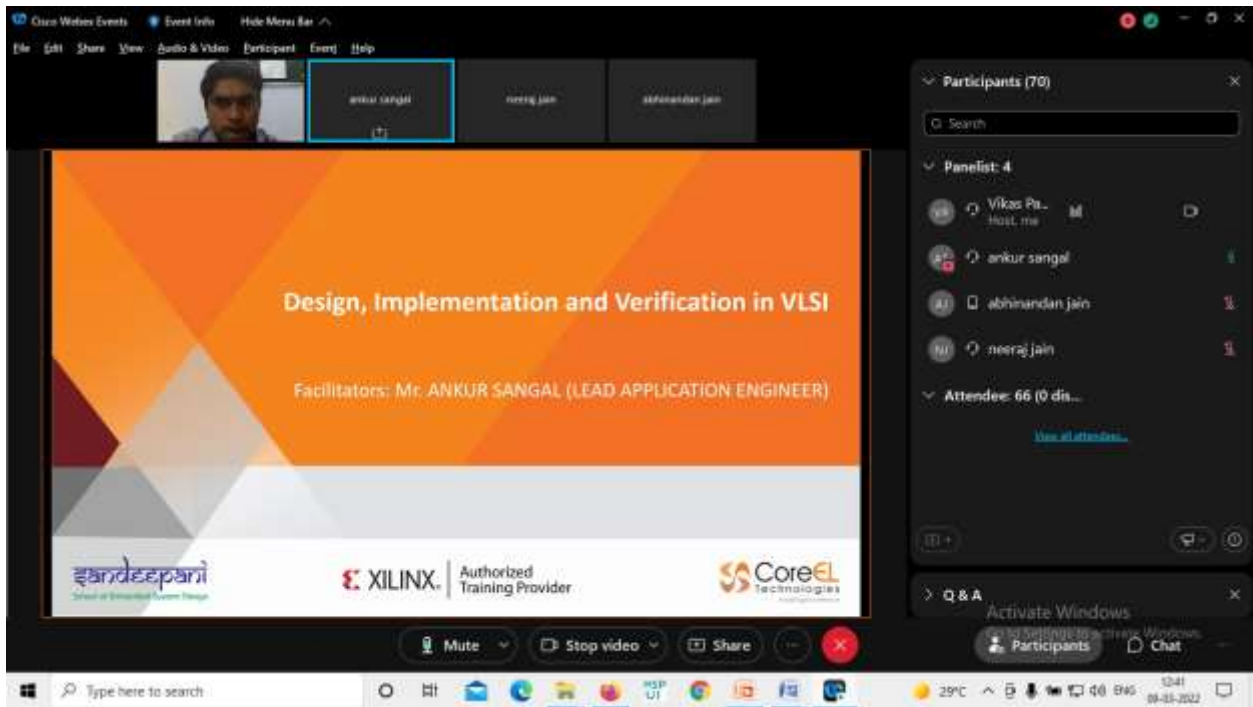
Speaking: neeraj jain

neeraj jain

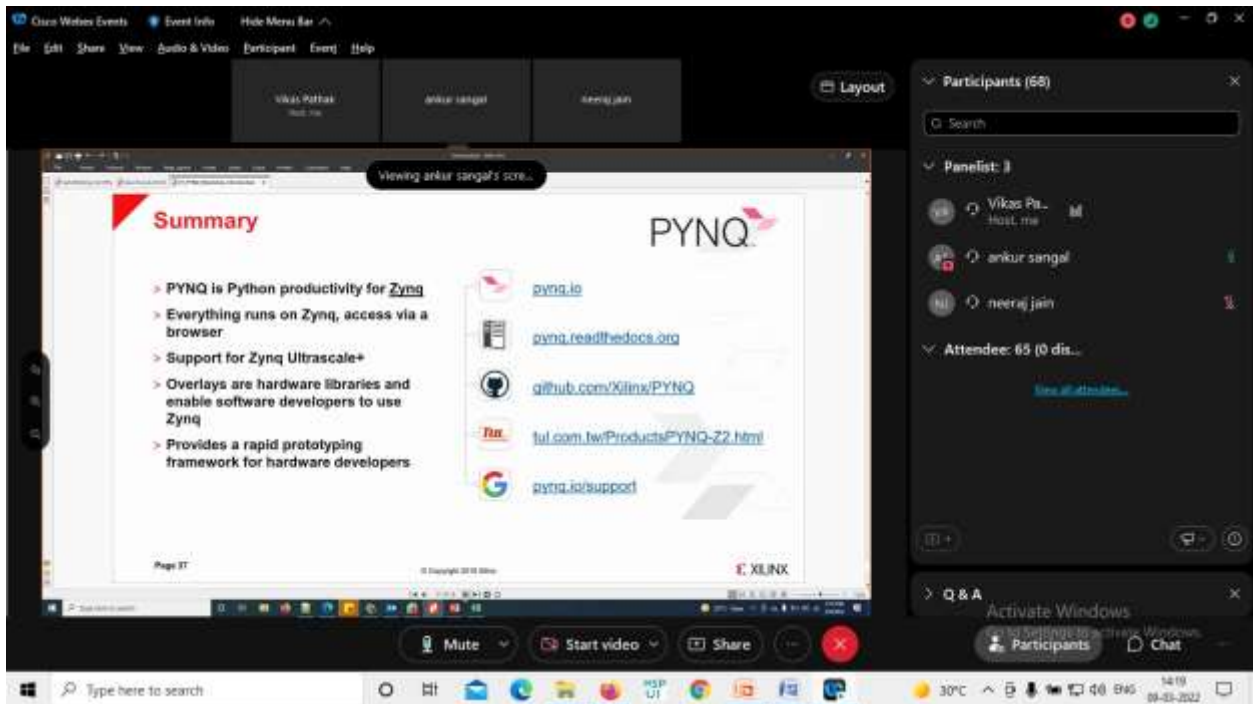
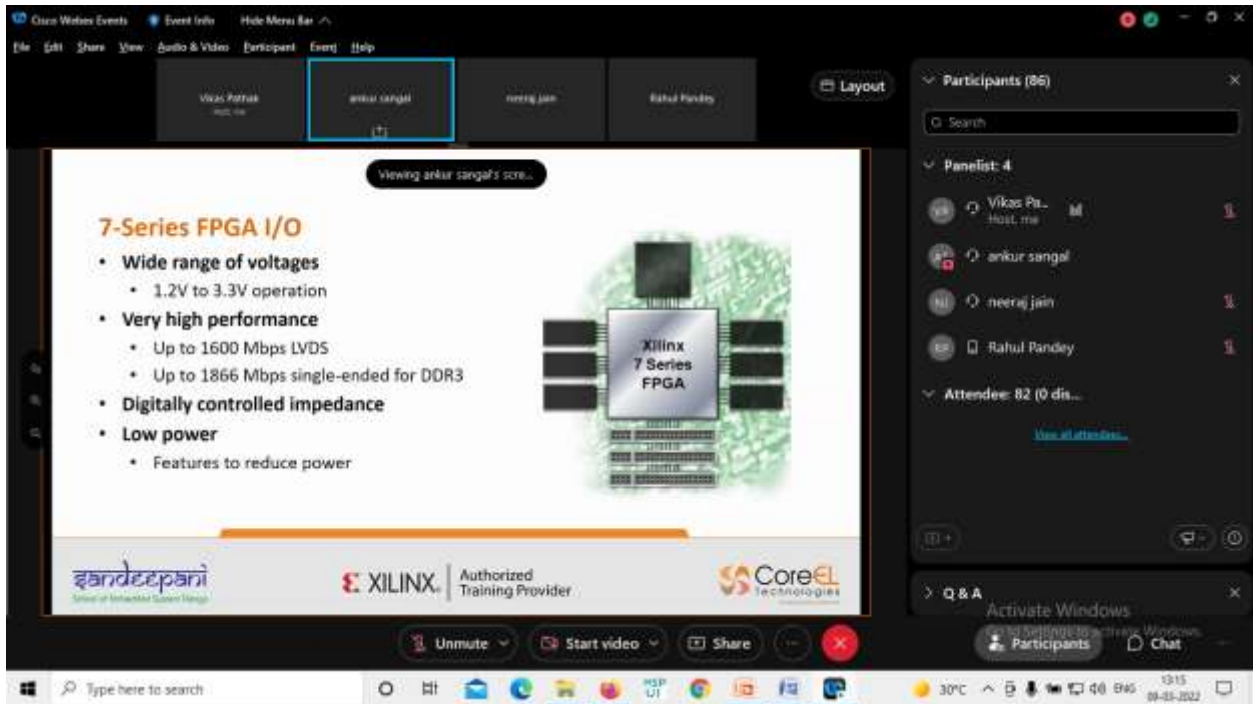
abhinandan jain

Activate Windows  
Go to Settings to activate Windows.

# A Report on One Week FDP on AAIVCT-2022



# A Report on One Week FDP on AAIVCT-2022



Day-4

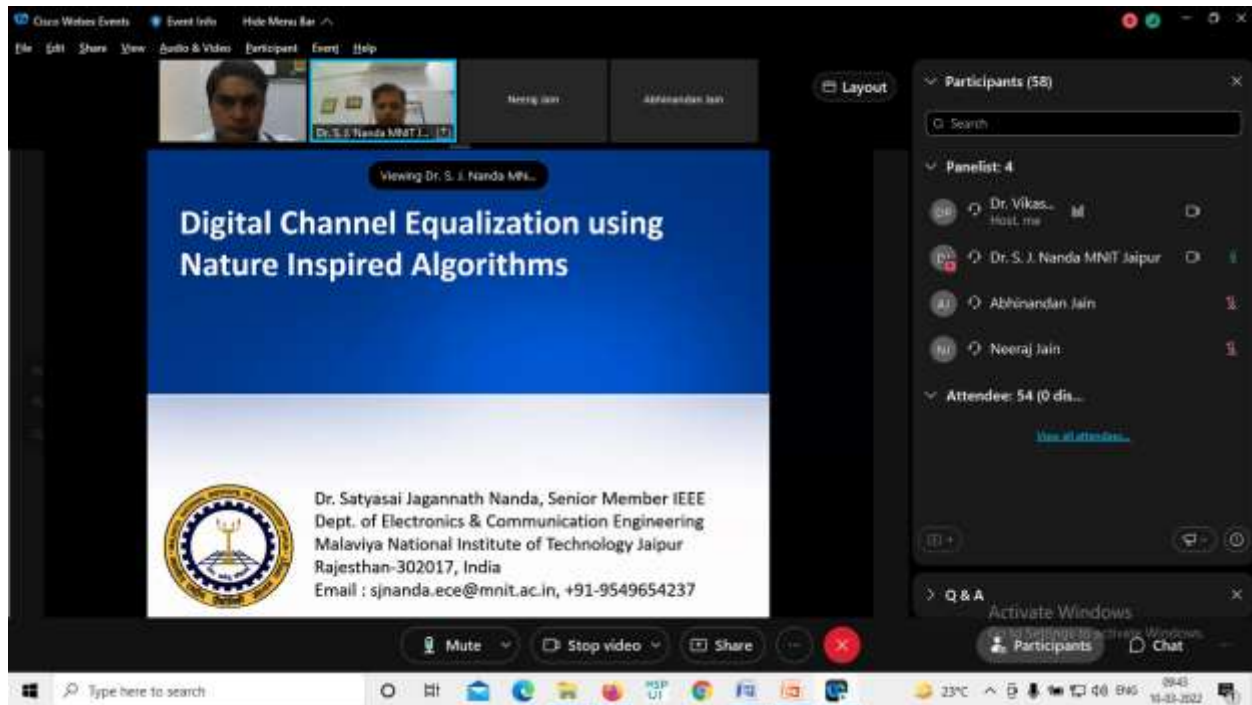
You're sharing 1 application

## About the Speaker



**Dr. S. J. Nanda**  
Assistant Professor,  
Dept. of Electronics &  
Comm. Engineering,  
MNIT, Jaipur

- Dr. S. J. Nanda is an assistant professor in the Department of ECE, Malaviya National Institute of Technology (MNIT), Jaipur since June 2013.
- Prior to joining MNIT Jaipur, he has received School of Electrical Sciences, IIT Bhubaneswar from Dept. of Electronics and Communication Engineering.
- He was the recipient of Canadian Research Award from Dept. of Foreign Affairs and Intern. Trade (DFAIT) for the year 2009-10.
- He was awarded Best PhD thesis award at SRM Institute of Technology, Roorkee.
- He received the best research paper awards at SocPros-2020 at IIT Indore, IC3-2018 at SMIT Sikkim, SocPros-2017 at IIT Bhubaneswar, IEEE UPCON-2016 at IIT BHU and Springer OWT-2017 at MNIT.
- He is the recipient of prestigious IEI Young Engineers Award by Institution of Engineers, Govt. of India in the field of Electronics and Telecommunication Engineering for the year 2018-19.



Class Within Events | Event Info | Hide Menu Bar

File Edit Share View Audio & Video Participant Event Help

Viewing Dr. S. J. Nanda MNIT Jaipur

### Digital Channel Equalization using Nature Inspired Algorithms

Dr. Satyasai Jagannath Nanda, Senior Member IEEE  
Dept. of Electronics & Communication Engineering  
Malaviya National Institute of Technology Jaipur  
Rajasthan-302017, India  
Email : sjnanda.ece@mnit.ac.in, +91-9549654237

Participants (58)

Panelist: 4

- Dr. Vikas... (Host, me)
- Dr. S. J. Nanda MNIT Jaipur
- Abhinandan Jain
- Neeraj Jain

Attendee: 54 (0 dis...)

Mute Stop video Share

Windows Taskbar: 23°C, 09:43, 11-03-2022

**Channel Equalization**

Binary Input  $u(k)$  → Channel  $H(z)$  → Nonlinearity  $f(\cdot)$  → Noise  $\eta(k)$  →  $x(k)$  → Equalizer → Decision Device → Recovered Binary Output

Adaptive Algorithm:  $e(k) = y(k) - \hat{y}(k)$

$$x(k) = f\left(\sum_{i=1}^N h(i)u(k-i)\right) + \eta(k)$$

$$\hat{y}(k) = \sum_{j=1}^Q x(k-j)w(j)$$

Decision Device:  $\hat{y}(k) \geq 0 \rightarrow 1$ , otherwise  $-1$

Recovered Binary Output

Delay:  $z^{-n}$

Unmute, Start video, Share

**Derivative Maximization**

**Uni-modal**

Process continues until and unless slope changes from positive to negative or vice versa where the algorithm assumes presence of maxima

$\frac{dy}{dx} = 0$

**Multi-modal**

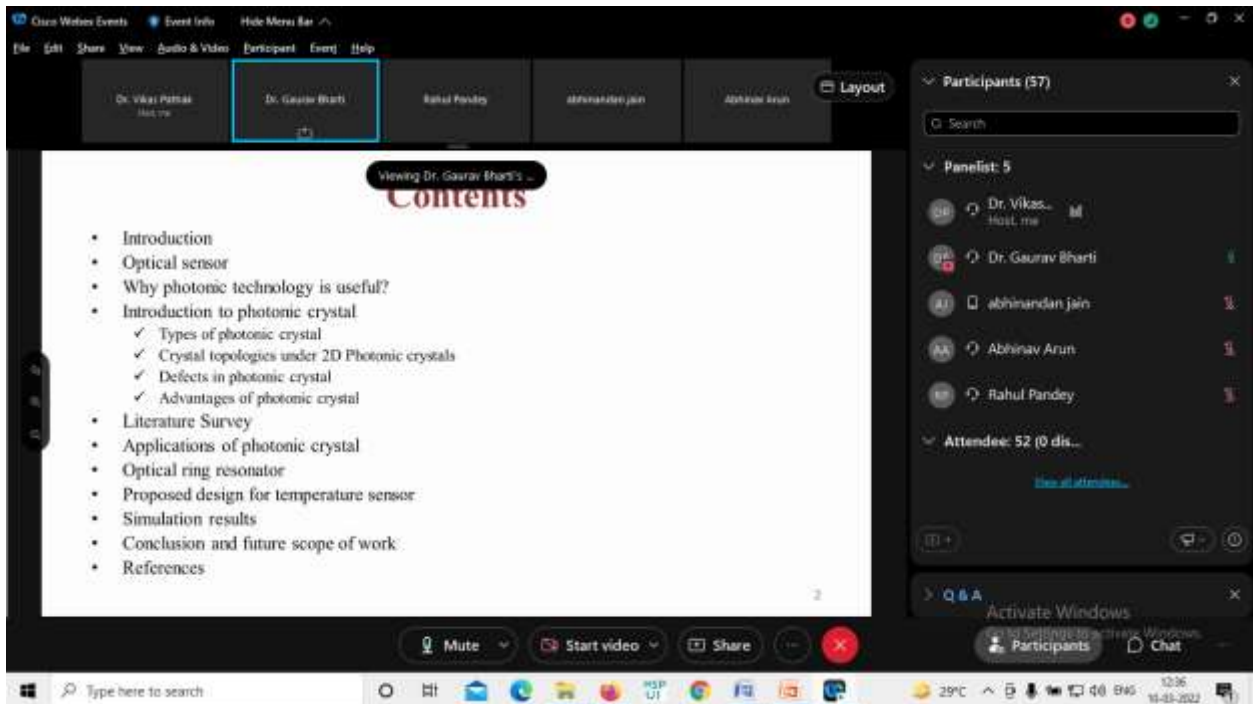
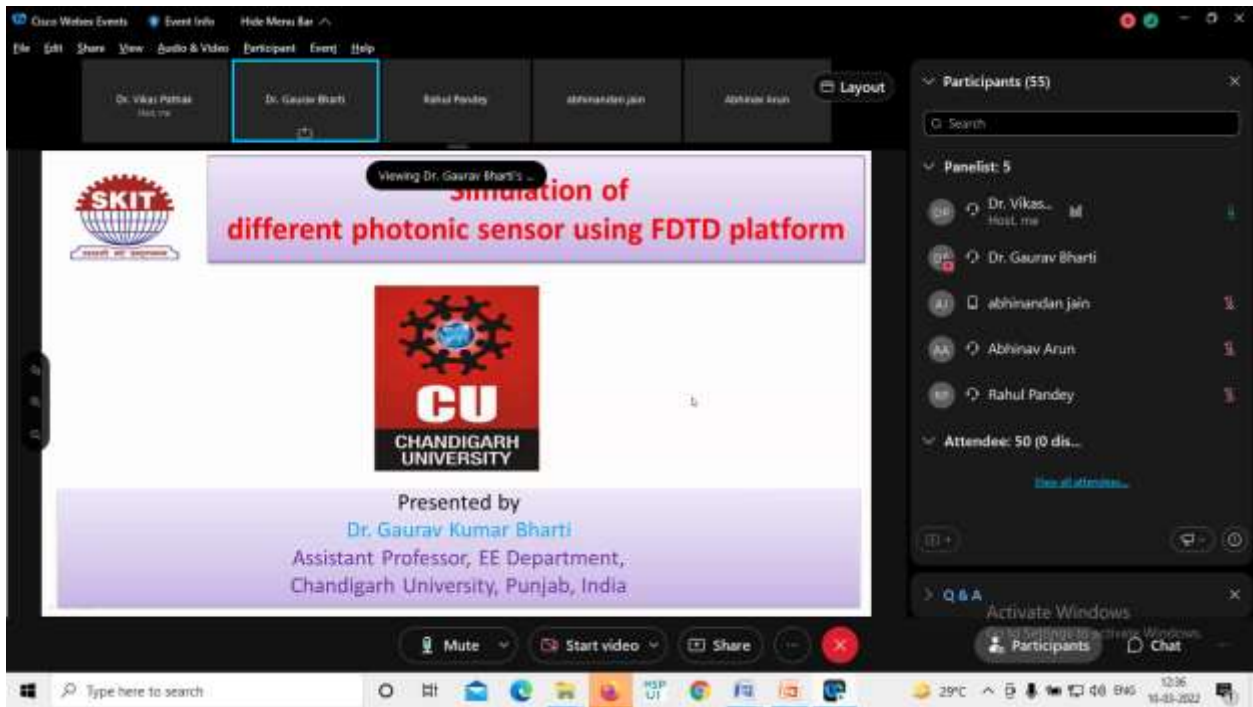
Global Maxima

Maxima

Maxima

Unmute, Start video, Share

# A Report on One Week FDP on AAIVCT-2022



Day-5

You're sharing Microsoft Office PowerPoint

### About the Speaker



**Dr. Rukhsar Zafar,**  
Associate Professor,  
Deptt. of Electronics &  
Comm. Engineering,  
SKIT, Jaipur

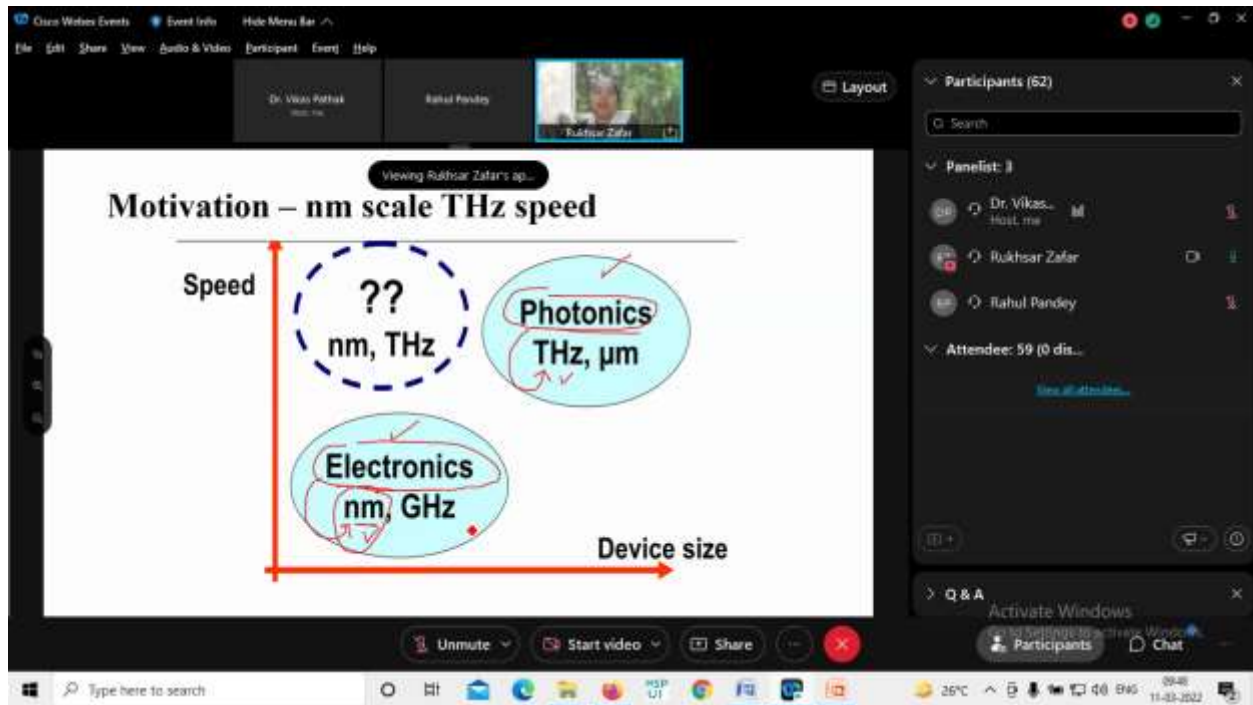
- Dr. Rukhsar Zafar received PhD degree from the Malaviya National Institute of Technology, Jaipur.
- She is currently working as an Associate Professor in the Department of Electronic and Communication Engineering at Swami Keshvanand Institute of Technology, Gramothan, Jaipur.
- Her research interests include photonic crystal, plasmonics, sensors, photonic integrated circuits, and slow light and has published over 30 research papers in refereed journals and conferences. She has guided several M. Tech. Dissertation and guiding 2 research scholars.
- She is a Member of OSA, OSI, IE, IEEE and ISTE and reviewer of several reputed journals (IEEE, OSA, Springer etc.)



Speaking: Rahul Pandey

Rahul Pandey

Activate Windows



Class Within Events | Event Info | Hide Menu Bar

File | Edit | Share | View | Audio & Video | Participant | Event | Help

Dr. Vikas Pathak | Rahul Pandey | Rukhsar Zafar

Layout

### Motivation – nm scale THz speed

Speed

Device size

?? nm, THz

Photonics THz,  $\mu\text{m}$

Electronics nm, GHz

Participants (62)

Search

Panelist: 3

- Dr. Vikas... Host, me
- Rukhsar Zafar
- Rahul Pandey

Attendee: 59 (0 dis...)

Q & A

Unmute | Start video | Share

26°C | 11-03-2022

**Solution: Plasmonics** Viewing Rukhsar Zafar's ap...

Plasmonics breaks the limits in the speed of nano-scale electronics and the size of terahertz dielectric photonics

Technology	Operating speed	Critical device dimension (nm)
Metallic nanoplasmonics	THz	10 nm - 100 nm
Dielectric photonics	THz	100 nm - 100 μm
Semiconductor electronics	GHz	100 nm - 100 μm
The past	KHz	100 μm - 1 mm

Operating speed: kHz, MHz, GHz, THz, PHz

Critical device dimension (nm): 10 nm, 100 nm, 1 μm, 10 μm, 100 μm, 1 mm

Participants (54): Dr. Vikas..., Rukhsar Zafar, Rahul Pandey

Panelist: 3

Attendee: 61 (0 dis...)

Q & A: Activate Windows

**Machine learning approach to model sensor**

```

    graph LR
      Electric[Electric] --> Signal[Signal Pre-treatment: x = √|x|]
      Signal --> Feature[Feature Extraction: x → u]
      Feature --> System[System Modeling: f(u) ⇒ {Y, V}]
  
```

Participants (75): Dr. Vikas..., Rukhsar Zafar, Abhinandan Jain, Rahul Pandey

Panelist: 4

Attendee: 71 (0 dis...)

Q & A: Activate Windows



Write sharing 1 application

## About the Speaker

- Dr. Ajay is working as Associate Professor in Electronics Engineering Department at Rajasthan Technical University, Kota (Rajasthan)
- He has Awarded Ph.D. degree in the field from Electronics & Comm. Engg. Deptt., IIT
- He has taught various subject related to com at UG and PG level.
- Presently he is supervising 3 Ph.D and already guided 15 PG disser award of M. Tech. (Digital Comm.
- He has been served the various administrative responsibilities in RTU, Kota.
- His research interest includes Signal and Image Processing, Communication Systems, Wireless Communication Networks

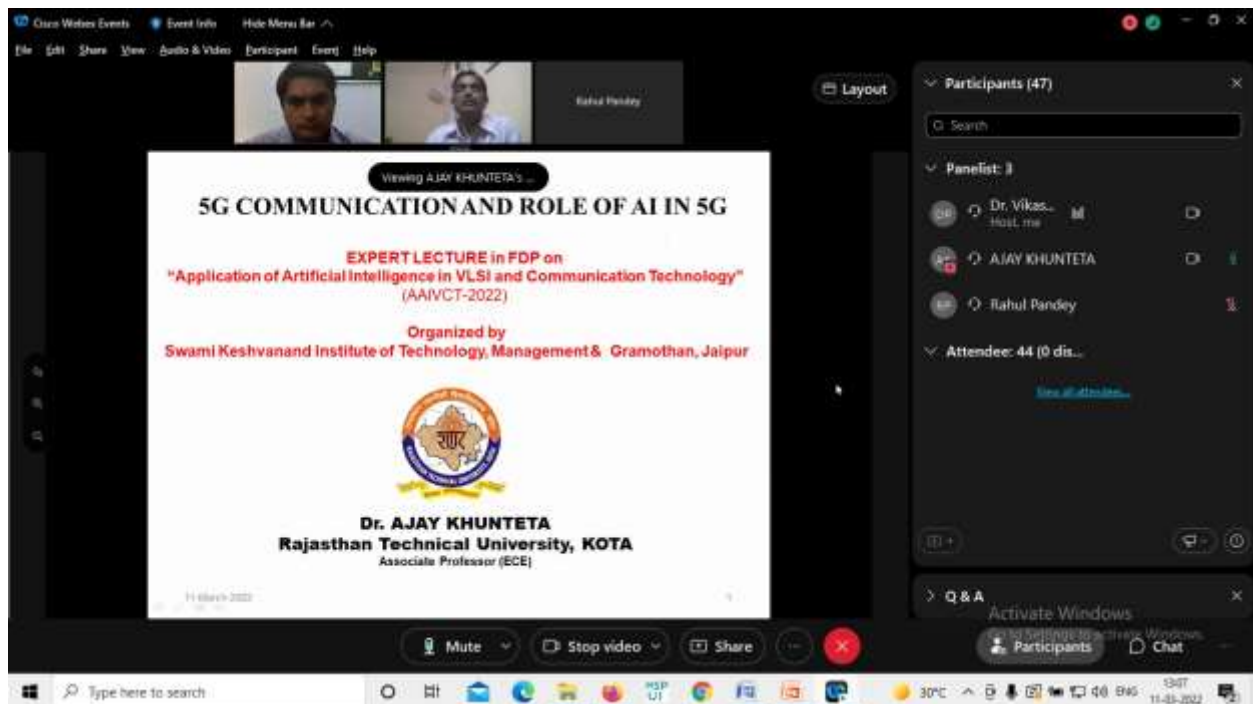


**Dr. Ajay Khunteta,**  
Associate Professor,  
Department of Electronics  
and Comm. Engineering,  
RTU, Kota



Speaking: Rahul Pandey  
Rahul Pandey

Activate Windows  
Go to Settings to activate Windows.



Zoom Windows Events | Event Info | Hide Menu Bar

File | Edit | Share | View | Audio & Video | Participant | Event | Help

Layout

Participants (47)

Search

Panelist: 3

- Dr. Vikas... Host me
- AJAY KHUNTETA
- Rahul Pandey

Attendee: 44 (0 dis...)

View all attendees...

Q & A

Activate Windows  
Go to Settings to activate Windows.


Participants | Chat

Viewing AJAY KHUNTETA'S...

### 5G COMMUNICATION AND ROLE OF AI IN 5G

**EXPERT LECTURE in FDP on**  
"Application of Artificial Intelligence in VLSI and Communication Technology"  
(AAIVCT-2022)

Organized by  
Swami Keshvanand Institute of Technology, Management & Gramothan, Jaipur



**Dr. AJAY KHUNTETA**  
Rajasthan Technical University, KOTA  
Associate Professor (ECE)

11 March 2022

Mute | Stop video | Share

Type here to search | 30°C | 13:07 11-03-2022

The screenshot shows a Zoom meeting interface. The main content is a slide titled "Role of Artificial Intelligence" with the following bullet points:

- AI techniques such as knowledge-based and expert systems, at first try to define the problem and then choose the best solution from the domain of different possible solutions.
- Machine Learning (ML) has benefited the VLSI industry so far by using **EDA tools** to their maximum usage which helps in reducing design time and cost to production.
- 5G will enhance the speed and integration of other technologies, while AI will allow machines and systems to function with intelligence levels similar to that of humans. 5G speeds up the services on the cloud while AI analyzes and learns from the same data faster.

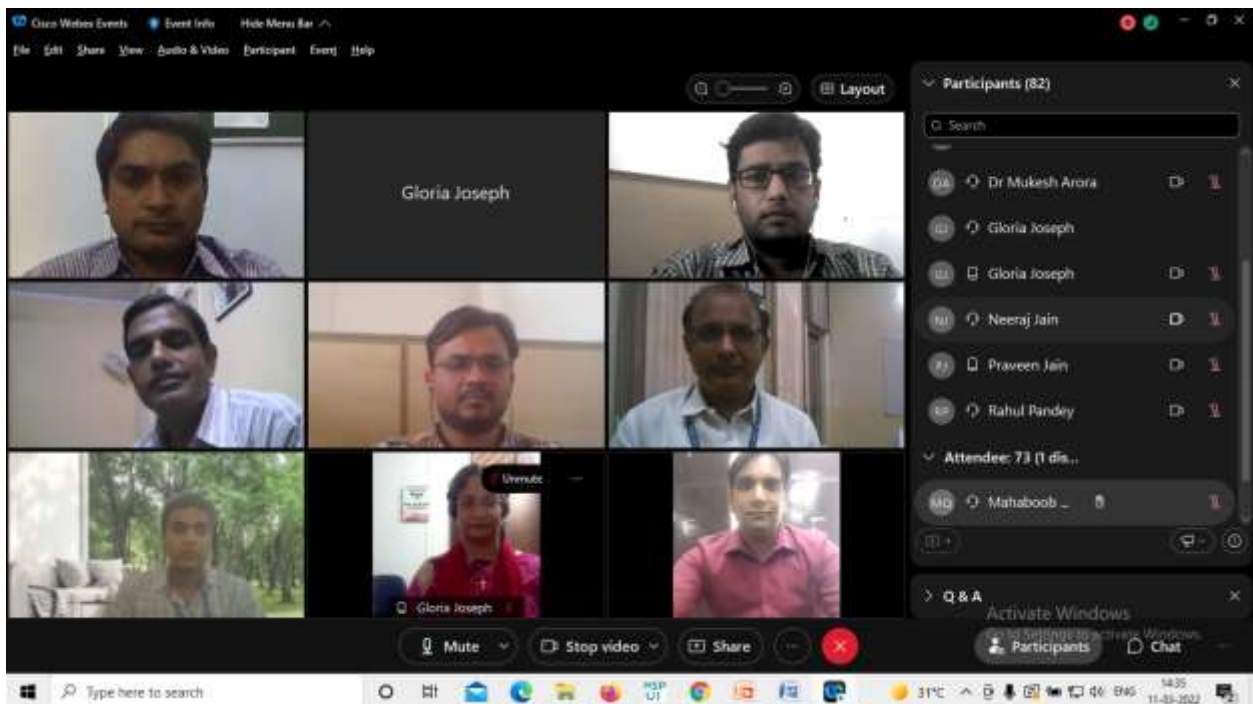
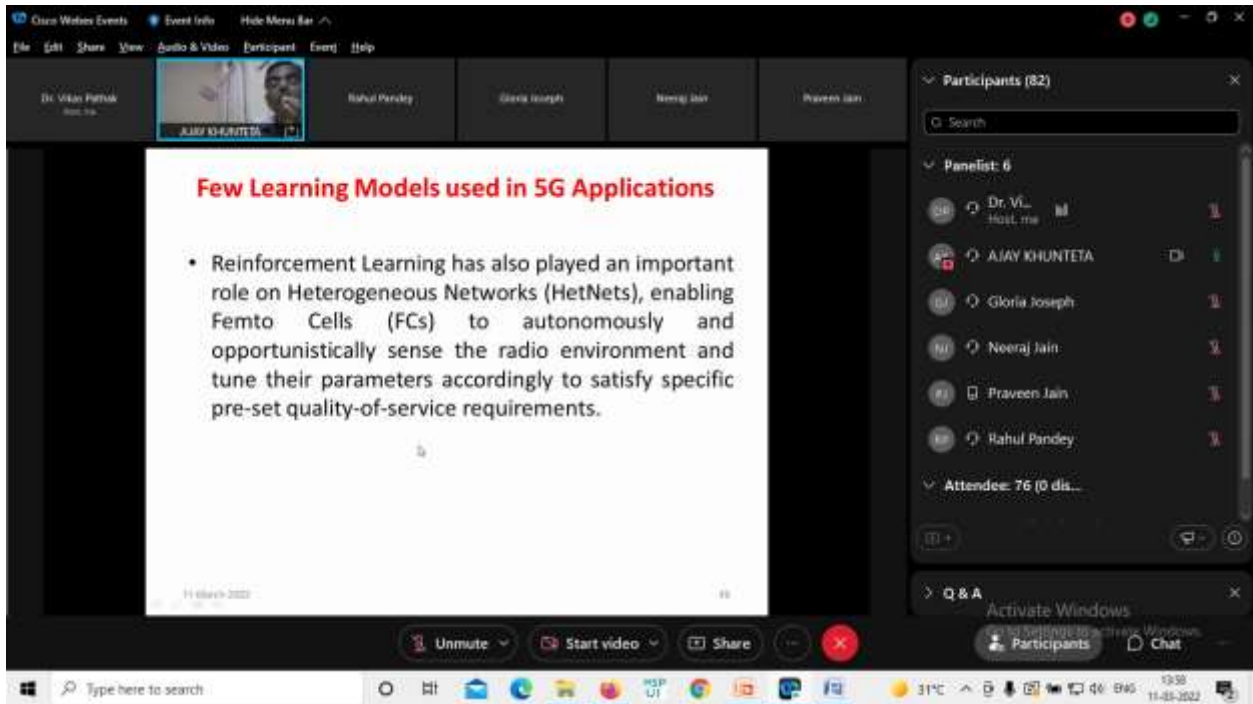
The slide footer indicates the date "11 March 2022". The Zoom interface shows a host (Dr. Vikas Pathak) and a participant (AJAY KHUNTETA). The right sidebar shows 63 participants and a panelist list including Dr. Vikas Pathak, AJAY KHUNTETA, and Rahul Pandey.

The screenshot shows a Zoom meeting interface. The main content is a slide titled "Artificial Intelligence in 5G Technology" with the following bullet points:



- AI and its subcategories like machine learning and deep learning mechanism allows fifth-generation (5G) wireless networks to be predictive and proactive, which is essential in making the 5G vision conceivable
- In 5G, mobile devices creating dynamically-adaptable clusters based on learned data rather than pre-established and fixed rules, that will improve in the efficiency, latency, and reliability of the current and real-time network applications in general
- Network related issues can be tackled by adopting the capability of learn offered by AI along with the dense amount of transmitted data or wireless configuration datasets

The slide footer indicates the date "11 March 2022". The Zoom interface shows a host (Dr. Vikas Pathak) and participants (AJAY KHUNTETA, Rahul Pandey, and Nirmal Jain). The right sidebar shows 77 participants and a panelist list including Dr. V.L. and AJAY KHUNTETA. A chat message "audio is slightly breaking" is visible.

# A Report on One Week FDP on AAIVCT-2022



## 8. Sample Copy of Certificate

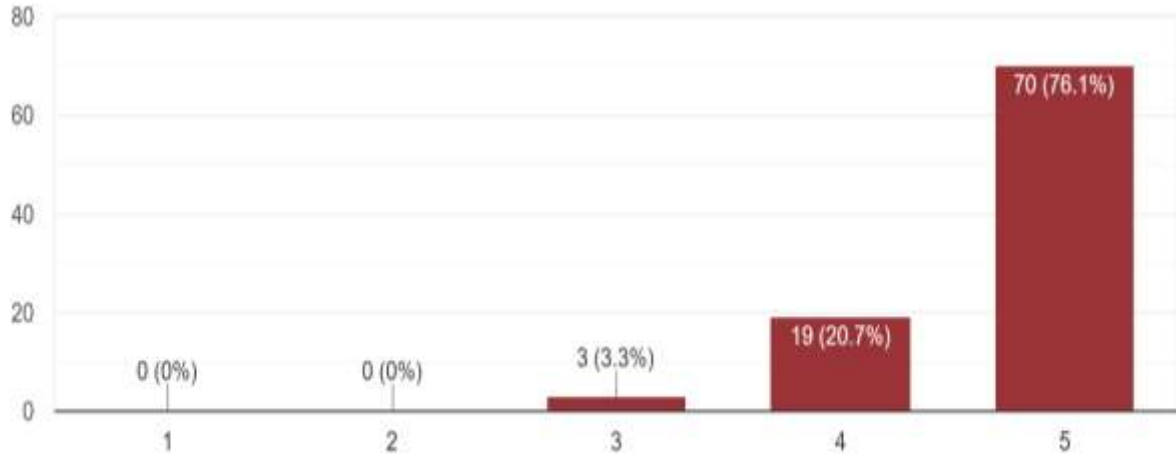
			
<b>Faculty Development Programme</b> on <b>Application of Artificial Intelligence on VLSI and Communication Technology</b> <b>(AAIVCT-2022)</b> Organised By <b>Swami Keshvanand Institute of Technology, Management &amp; Gramothan, Jaipur</b>			
<b>Certificate of Appreciation</b>			
Ref No./SKIT/2021-22/⟨⟨Sr. No.⟩⟩			
<i>This is to certify that ⟨⟨Salute⟩⟩ ⟨⟨Participate Name⟩⟩ of ⟨⟨Institute Name⟩⟩ has participated in the five days Faculty Development Programme on "Application of Artificial Intelligence on VLSI and Communication Technology (AAIVCT-2022)" held from 07/03/2022 to 11/03/2022 at "Swami Keshvanand Institute of Technology, Management &amp; Gramothan, Jaipur".</i>			
 Coordinator (SKIT, Jaipur)	Coordinator (SKIT, Jaipur)	Coordinator (SKIT, Jaipur)	Coordinator (SKIT, Jaipur)

## Expert Certificate

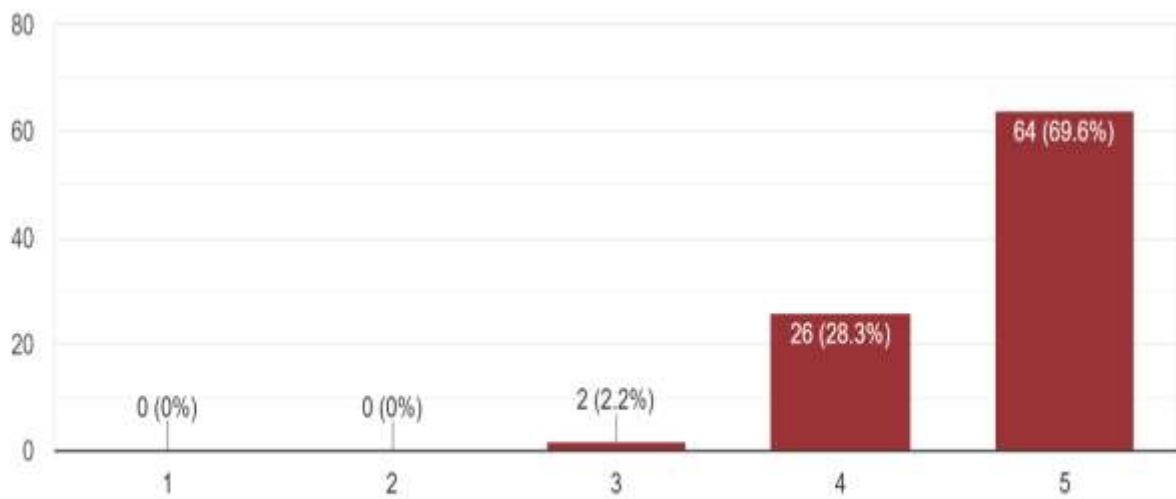
	
<b>Faculty Development Programme</b> on <b>Application of Artificial Intelligence on VLSI and Communication Technology</b> <b>(AAIVCT-2022)</b> Organised By <b>Swami Keshvanand Institute of Technology, Management &amp; Gramothan, Jaipur</b>	
<b>Certificate of Appreciation</b>	
Ref No./SKIT/2021-22/⟨⟨Sr. No.⟩⟩	
<i>This is to certify that ⟨⟨Salute⟩⟩ ⟨⟨Participate Name⟩⟩ of ⟨⟨Institute Name⟩⟩ has contributed as resource person in the five days Faculty Development Programme on "Application of Artificial Intelligence on VLSI and Communication Technology (AAIVCT-2022)" held from 07/03/2022 to 11/03/2022 at "Swami Keshvanand Institute of Technology, Management &amp; Gramothan, Jaipur".</i>	
Prof. Mukesh Arora Convenor AAIVCT-2022	Prof. Praveen Kumar Jain Convenor AAIVCT-2022

## 9. Feedback report

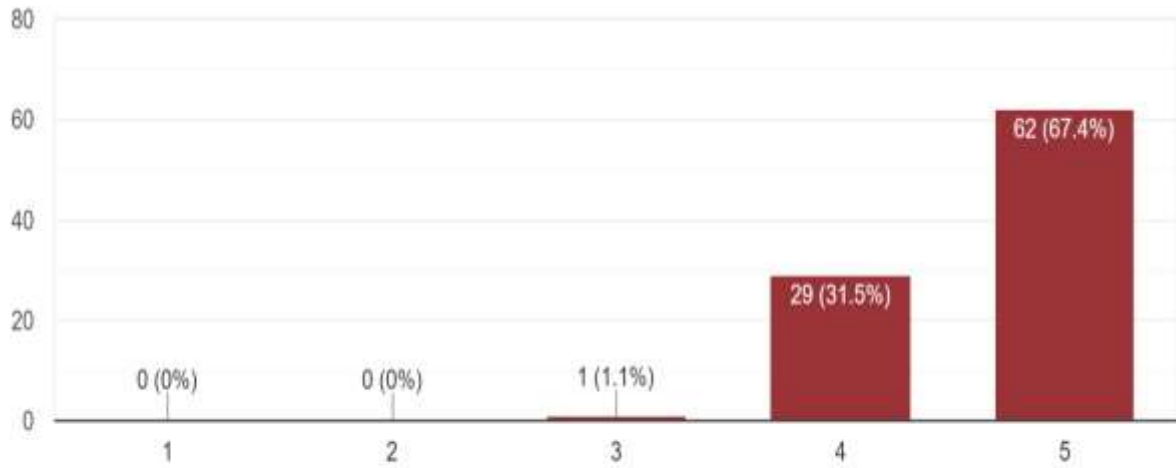
### 1. Your experience about the FDP



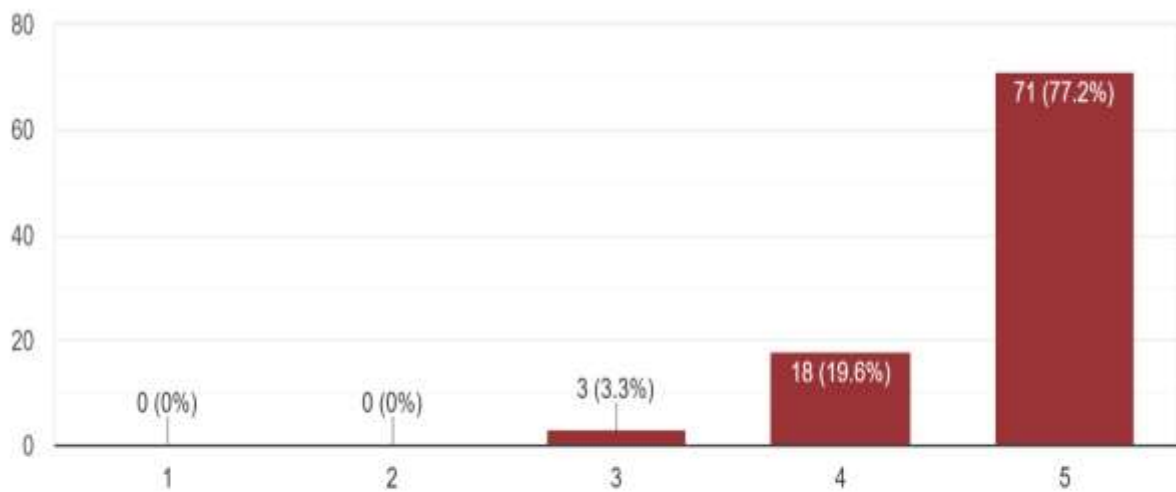
### 2. Overall, how do you rate the program you attended in terms of usefulness and effectiveness?



**3. How do you rate the content of the FDP?**



**4. About speaker**

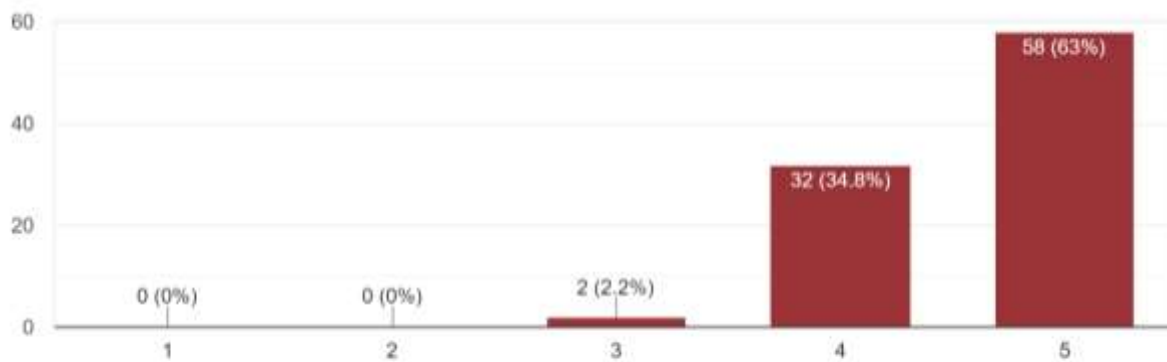


5. Knowledge gained by the FDP.

Yes  
Good  
Excellent  
great  
A lot  
yes  
MEMS  
VERY GOOD  
Knowledge about tools and technique in VLSI, MEMS, MOEMS in different fields like medical (early diagnosis) science .etc.

Advancements in mems and moems, and tools used in vlsi and smart sensors.  
i Learnt about technical knowledge of vlsi designing.  
Key points and impacts of modern techniques and electronic gadgets  
Very informative  
EXCELLENT SPEAKERS AND LATEST TOPIC  
Update my knowledge  
An exposure to sensor & and its engineering  
YES, Specially about MEMS and other sensors.  
50 PER

## 6. Relevancy of topics





## 10. Media Coverage

प्राचार्य ए.पी. माथूर एच.

# एसकेआईटी मे पांच दिवसीय फैकल्टी डेवलपमेंट प्रोग्राम की शुरुआत

### P3 Police Public Politics

जयपुर ! जगतपुरा स्थित स्वामी केशवानंद इंस्टीट्यूट ऑफ टेक्नोलॉजी, मैनेजमेंट एंड ग्रामोथान में इलेक्ट्रॉनिक्स एवं कम्युनिकेशन डिपार्टमेंट द्वारा =एप्लिकेशन ऑफ आर्टिफिशियल इंटेलिजेंस इन वीएलएसआई एंड कम्युनिकेशन टेक्नोलॉजी= पर पांच दिवसीय फैकल्टी

डेवलपमेंट प्रोग्राम की शुरुआत हुई। इस कार्यक्रम के मुख्य अतिथि प्रो. घनश्याम सिंह (जोहान्सबर्ग यूनिवर्सिटी, साउथ अफ्रीका ) तथा विशिष्ट अतिथि डॉक्टर देवव्रत सिकंदर( असिस्टेंट प्रोफेसर आईआईटी गुवाहाटी) रहे। कार्यक्रम की शुरुआत में इलेक्ट्रॉनिक्स एवं संचार विभाग के विभागाध्यक्ष डॉ. मुकेश अरोड़ा ने सभी अतिथियों का स्वागत करते हुए आर्टिफिशियल इंटेलिजेंस के महत्त्व पर प्रकाश डाला।

कार्यक्रम के समन्वयक मि. नीरज जैन ने सभी प्रतिभागियों के साथ एफडीपी का विस्तृत प्रारूप साझा किया। प्रोफेसर घनश्याम सिंह ने आर्टिफिशियल इंटेलिजेंस के हेल्थ



केयर, स्मार्ट सिटी, स्मार्ट ट्रांसपोर्ट सिस्टम आदि क्षेत्रों में अनुप्रयोगों के बारे में बताया, तथा उन्होंने शोधकर्ताओं विद्यार्थियों और व्याख्याताओं को प्रोत्साहित किया कि आर्टिफिशियल इंटेलिजेंस का प्रयोग करके समाज के विभिन्न समस्याओं का समाधान करने हेतु शोध करने का प्रयास करें। उद्घाटन समारोह के अंत में डॉ. विकास पाठक ने सभी आगंतुकों को धन्यवाद प्रस्तुत किया। एफडीपी के पहले दिन कुल दो सत्र आयोजित किए गए।

## 11. Technical Report

The One Week One Week Faculty Development Programme (FDP) on “*Application of Artificial Intelligence on VLSI and Communication Technology*” organized by SKIT Jaipur, from 7<sup>th</sup> - 11<sup>th</sup> March, 2022. This FDP is conducted on Webex online platform. In this FDP over 300 participants from all over India are well connected through WebEx for the entire duration of the FDP.

**Prof. Ghanshyam Singh, Professor, Department of Electrical and Electronic Engineering, University of Johannesburg, South Africa** was chief guest of FDP. The FDP began with the welcome address by Prof. Mukesh Arora (Head ECE & OFA), SKIT. The Inauguration ceremony also witnesses the presence of Prof. Praveen K. Jain (Dy.Head, ECE, SKIT), Dr. Rukhsar Zafar, Mr. Rahul Pandey, Mr. Neeraj Jain, Mr. Abhinandan Jain.

On the first session of the first day Dr Sikdar delivered an expert talk on Promises of Integrated Photonics Devices Technology with AI where he linked photonics plasmonics with AI . In the second session Prof Ghanshyam singh shared his valuable knowledge on the : Role of AI in 6G applications.

On the second day first session is started with the expert talk of Dr Binod Kumar, Ass Professor, IIT Jodhpur, in which participant learnt about Hardware Design Methodologies for Artificial Intelligence. He also explored with his own research and suggested further scope in this area to the participants. In the second session Dr Jai Narayan Tripathi, Assistant Professor, IIT Jodhpur, has delivered expert lecture on Computational Intelligence for Designing VLSI Systems.

Third day was started with the expert talk of Dr Kuldeep singh of MNIT Jaipur, and he has shared valuable knowledge on Nature inspired optimization techniques and their application in communication engineering

.In the second session of third day a hands on session is taken by Dr. Vikas Pathak and Mr. Ankur Sangal (Lead Application Engineer, CoreEL Technologies, New Delhi) on the Xilinx Vivado Design flow using 7 series FPGA Architecture.

On the IV day first session is started by DR. S. J. Nanada of MNIT Jaipur, on Machine Learning for Cooperative Spectrum Sensing. In the second session a hands on session is taken by Dr. Gaurav Kumar Bharti Electrical Engineering Department, Chandigarh University, Chandigarh  
Title: Hands-on session on "Simulation of different photonic sensor using FDTD platform

## **A R e p o r t o n O n e W e e k F D P o n A A I V C T - 2 0 2 2**

On the last day of this FDP had 2 session .session 1 was delivered by Dr. Rukhsar zafar associate prof. SKIT Jaipur and she has enlightned us with her expert talk of Intelligent photonics. Session 2 was delivered by Dr. Ajay Khunteta associate professor of RTU kota he has delivered valuable talk on 5G communication and Role of AI in 5G.

This FDP enables the researchers, students, faculties to explore a new realm of technology and to work in this particular field to the next extent.

---Thank You-----