

Report of
Short Term Course (STC) on
“Nano-electronics & VLSI: Devices, Circuits and Systems”
conducted under
TEQIP-III (Twinning Activities with SLIET Longowal)

- 1. Name of the Department:** Department of Electronics Engineering
- 2. Title of Short term course:** Nanoelectronics & VLSI: Devices, Circuits and Systems
- 3. Name of Convener::** Dr. Pankaj Kumar Pal (NIT Uttarakhand)
Prof. Jagpal Singh Ubhi & Er. Pankaj Kumar Das (SLIET)
- 4. Name of Coordinator:** Dr. Tushar Goel,
Dr. Siva Kumar Tadepalli
Mr. Hemant Kumar Singhal
Ms. Sarita Yadav
- 5. Duration (Dates) :** Five (05) days during November 04-08, 2019
- 6. Day-wise Schedule:** Please refer to **Annexure-A**.
- 7. Details of Experts/Keynote Speakers:**

S.N.	Name of Expert with	Designation	Organization	No. of Lectures Delivered/Hours
1.	Prof. J. S. Ubhi	Professor	SLIET, Longowal	One Hour
2.	Prof. B.K Kaushik	Asso. Professor	IIT, Roorkee	Three Hours
3.	Shri H.S Jattana	Scientist-G and Group-Head, DPG	SCL Chandigarh	Three Hours
4.	Dr. Sanjeev Kumar Gupta	Scientist D and Joint Director	MEITY, GoI, Delhi	Three Hours
5.	Dr. Bishnu Prasad Das	Asst. Professor	IIT, Roorkee	Three Hours
6.	Dr. Ashutosh Nandi	Asst. Professor	NIT, Kurukshetra	Three Hours
7.	Dr. Balraj Singh	Asst. Professor	GBPIET, Pauri	One and Half Hour
8.	Er. Pankaj Kumar Das	Asst. Professor	SLIET, Longowal	One and Half Hour
9.	Dr. Pankaj Kumar Pal	Asst. Professor	NIT, Uttarakhand	Six Hours
10.	Ms. Sarita Yadav	Trainee Teacher	NIT, Uttarakhand	Three Hours

8. Details of Participants:

(a) No. of participants: 25

	Faculty	Research Scholars (PhD and M.Tech)	Industry Participants	Total
External	02	02	00	04
Internal	07	14	00	21

a) List of registered participants: Attached as **Annexure-B**

b) Photocopy of the daily attendance: Attached as per **Annexure-C**

9. Registration Fee:

Total registration fee collected from participants: NIL (as all participants are from TEQIP III Institutions)

10. Expenditure Details: (In ₹)

S. No.	Particulars	Approved Expend. (₹)	Actual Expend. (₹)
1.	Honorarium (@ Rs. 5000/- per day for an expert)	75,000/-	50,000/-
2.	Travelling allowances (for external experts)	1,25,000/-	53,513/- + Air Fare of 1 Expert (Claimed by the Experts; Actual may be less after audit from Acc. Section)
3.	Lodging & Fooding for External Experts & Collaborators from SLIET	80,000/-	Arranged by the Institute
4.	Printing materials like Flex, workshop brochure, stationery, certificates & registration materials	20,000/-	11,828/-
5.	Lodging and Fooding (breakfast & dinner only) for external Participants	25,000/-	2,700/- + Bill from Riverside for extra Double occupancy charges
6.	Refreshment (Tea & Snacks) and Lunch during STC	25,000/-	24,000/-
7.	Hired Taxi (for local travel)	15,000/-	- NIL -
8.	Miscellaneous (Flowers Bouquets, Mementos etc.) <i>from Institute Fund</i>	15,000/-	12,328/-
	Grand Total	3,80,000/-	1,54,369/- + Actual bill of Expert Lodging and Air Fares

Note: A sum of Rs. 50,000/- is taken as Advance from Institute Funds for prior-arrangements of STC i.e. reg. materials, banners etc.. In this regard, Rs. 48,303/- was paid and remaining amount of Rs. 1,697/- was submitted to Institute Account (SBI savings acc. No. 37530566069) on 8th Nov. 2019 after the STC. In addition, A reimbursement of Rs. 7,278/- is submitted to account section for the payment done by me on account of Printing materials i.e. banners, flexes, certificates, ID cards etc.

11. Outcome of the program on the basis of brainstorming session: After having rigorous brainstorming, it is observed that the STC in question was conducted meticulously for the target group including Faculty, Research Scholars, and PG Students with the achievement of the following aims/objectives:

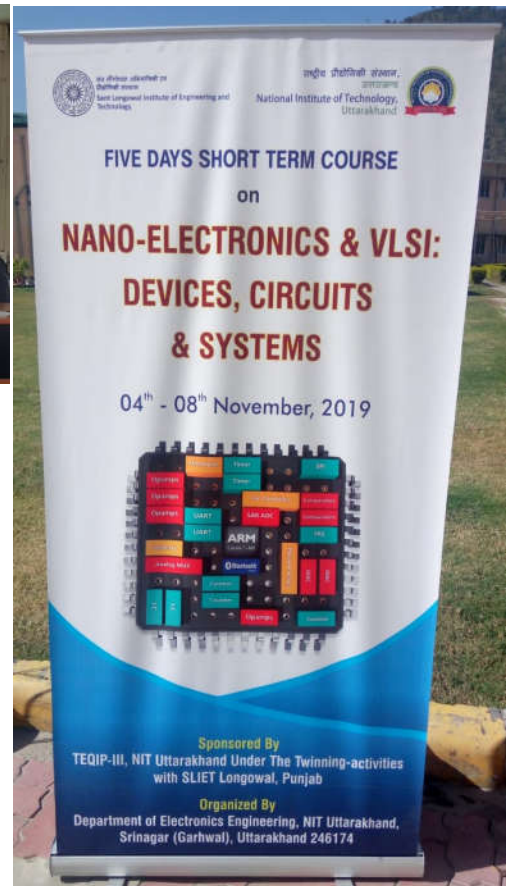
- Provided broad exposure to the participants about the various aspects of Nano-electronics & VLSI design from device level to low-power circuits & systems.
- Enabled the participants in the field of Electronics and Communication Engineering to introspect and learn techniques that help them for active and successful participants in a knowledge society
- Enhanced the faculty and research scholars' effectiveness in teaching, learning and research in the field of nano-electronics & VLSI design, modeling and simulation of device and circuits.
- Enriched the knowledge of participants by exposing them to latest trends and dimensions in nano-electronics such as spintronics, GaN and SiC devices.
- Provided interaction with experts, which helps the participants to initiate their research in recent area in VLSI.

Strengths:

- Very good, talented, experienced, knowledgeable and well-qualified experts working in different areas of Nano-electronics & VLSI design having in-depth knowledge in the respective field interacted very friendly with the participants.
- Topics covered and technical talks delivered were very valuable and effective as well as up to the marks. Different applications of same were also discussed.
- Knowledgeable and effective expert lectures delivered in various fields. STC covered all topic of recent technology and expert lectures were really useful. New knowledge and new skills were imparted and discussion on new ideas and their practical aspects were also provided.
- Participants were very friendly and cooperative.
- Hospitality was very good including food quality as well.

- Knowledge provided about the different software(s) was quite useful for the research work.

A few glimpse of Short Term Course on "Nano-electronics and VLSI: Devices, Circuits & Systems" conducted during Nov. 4th – 8th, 2019 at NIT Uttarakhand (Parent campus) are as follows:









CMOS Swit







Dr. Pankaj Kumar Pal
Convener, STC &
Asst. Prof., ECE, NITUK



Five Days Short Tem Course
on

"Nano-electronics & VLSI: Devices, Circuits and Systems"

(November 04th- 08th, 2019)

Conference Room, Admin. Block, NIT Uttarakhand, ITI Campus, Srinagar (Garhwal)-246174



Schedule

Date & Time	09:30 AM to 10:00 AM	10:00 AM to 11:00 AM	11:00 AM to 11:15 AM	11:15 AM to 12:45 PM	12:45 PM to 02:15 PM	02:15 PM to 03:45 PM	03:45 PM to 04:00 PM	04:00 PM to 05:30 PM
04/11/2019 Monday	Registration & Inauguration	Introduction of STC (JSU)	High-Tea	Intro. to Nanoelectronics (BKK)	Lunch Break	Semiconductor Device Physics & Scaling Chal. (PKP)	Tea & Discussion	Device Models for Multi- gate MOSFETs (AN)
05/11/2019 Tuesday	Spintronics & STT-MRAMs (BKK)		Tea & Discussion	GaN Device & Technology (AN)	Lunch Break	Tunnel FETs & Junctionless Devices (BS)	Tea & Discussion	Low-Power VLSI Circuits (BPD)
06/11/2019 Wednesday	On-Chip Process Variations (BPD)		Tea & Discussion	Silicon-on-Insulator Technology (PKP)	Lunch Break	Double gate & FinFETs Technology (PKP)	Tea & Discussion	TCAD Device/Mixed-Mode Circuit Simulations - Lab (SY/PKP)
07/11/2019 Thursday	On-chip Interconnects (PKD)		Tea & Discussion	Semiconductors Memories (PKP)	Lunch Break	VLSI Technology for Device Fabrication (SKG)	Tea & Discussion	Digital Circuit Simulation using SPICE - Lab (SY/PKP)
08/11/2019 Friday	Silicon Carbide based Device Technology (SKG)		Tea & Discussion	Analog Design-Front- end (HSJ)	Lunch Break	Challenges & Issues in design of SOCs (HSJ)	Valedictory & Certificate Distribution	High-Tea

*Tea-Snacks and Lunch will be served outside the Conference Room. Any change in above schedule will be intimated.

JSU - Prof. Jagpal Singh Ubhi, Professor, ECE, SLIET, Longowal

BKK - Dr. Brajesh Kumar Kaushik, Asso. Professor, ECED, IIT Roorkee

BPD - Dr. Bishnu Prasad Das, Asst. Professor, ECED, IIT Roorkee

HSJ - Shri H. S. Jattana Ji, Group Head-DPG, SCL Mohali, Chandigarh

SKG - Dr. Sanjeev Kumar Gupta, Sci. D, Ministry of Electronics & Info. Technology, Delhi

AN - Dr. Ashutosh Nandi, Asst. Professor, ECE, NIT Kurukshetra

BS - Dr. Balraj Singh, Asst. Professor, ECE, GBP IET, Pauri

PKD - Er. Pankaj Kumar Das, Asst. Professor, ECE, SLIET, Longowal

PKP - Dr. Pankaj Kumar Pal, Asst. Professor, ECE, NIT Uttarakhand

SY - Ms. Sarita Yadav, Trainee Teacher, ECE, NIT Uttarakhand

A Short Term Course (STC) on

"Nano-electronics & VLSI: Devices, Circuits & Systems"

November 4th-8th, 2019; Organized at NIT Uttarkhand

Sponsored by:- TEQIP III under twinning activities with SLIET Logowal

Date: 04/11/19

Registration Sheet

S.N.	Name	Designation	Organization	Signature
1	Sumit Kumar	M.TECH	NIT UK	Sumit Kumar
2	Abhishek Kumar	M-Tech	NIT UK	Abhishek Kumar
3	Ishe chandra	M-Tech	NIT UK	Ishe chandra
4	Ruchi Jyoti	PhD	NIT UK	Ruchi
5	Sumit K. Maurya	M.Tech	NIT UK	Sumit
6	Ektta Priyadarshini	M.Tech	NIT UK	Ektta
7	Arvind R. S. L. T.	PhD-Scholar	NIT UK	Arvind
8	Manojesh K. Singh	PhD-Scholar	NIT UK	Manojesh
9	LALIT GARIA	PhD	NIT UK	Lalit
10	Sat Rajeev Kumar	Project Lect.	NIT UK	Rajeev
11	Sachin Tiwari	PHD	NIT UK	Sachin
12	Vatun K. Kakar	PhD scholar	NIT UK	Vatun
13	Jasmin Sij/Kabi	PhD Scholar	SLIET Logowal	Jasmin
14	Mukesh Kumar	PhD Scholar	SLIET Logowal	Mukesh
15	Shyam Tripathi	M.Tech Scholar	NIT UK	Shyam
16	Prakash Dwivedi	Asst. Prof.	NIT UK	Prakash
17	SOURAV BOSE	Asst. Prof.	NIT UK	Sourav
18	B. K. Hemant	AP, MSIT Delhi-SS	MSIT-Delhi	Hemant
19	Deepshikha Singh	PhD Scholar	NIT UK	Deepshikha
20	Pooja P. B.	Asst. Prof.	NIT UK	Pooja
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				
31				
32				
33				
34				

[Handwritten signature]

(159)

A Short Term Course (STC) on

"Nano-electronics & VLSI: Devices, Circuits & Systems"

November 4th-8th, 2019; Organized at NIT Uttarkhand

Sponsored by:- TEQIP III under twinning activities with SLIET Logowal

Day: 01

Date: 04/11/19

Attendance Sheet

S.N.	Name	Designation	Signature	
			Morning Session	Evening Session
1	Dr. Tajinder Singh Arora	Asst. Prof., ECE Dept.		
2	Dr. Sarika Pal	Asst. Prof., ECE Dept.		
3	Dr. Pankaj Kumar Pal	Asst. Prof., ECE Dept.		
4	Dr. Tushar Goel	Asst. Prof., ECE Dept.		
5	Ms. Sarita Yadav	Trainee Teacher, ECE Dept.		
6	Mr. Mandeep Singh	Teaching Associate, ECE		
7	Mr. Rajesh Saha	Project Eng. (SMDP-C2SD)		
8	Mr. Rajeev Kumar	Project Lecturer		
9	Prof. J. S. Ubhi	Professor SLIET Longowal		
10	Er. Pankaj Kumar Das	Asst. Prof., SLIET Longowal		
11	Dr. Prakash Dwivedi	Asst. Prof., EEE Dept.		
12	Dr. Sourav Bose	Asst. Prof., EEE Dept.		
13	Ms. Ruchi Juyal	Ph.D. Scholar, ECE Dept.		
14	Mr. Lalit Kumar Garia	Ph.D. Scholar, ECE Dept.		
15	Ms. Deepshika Singh	Ph.D. Scholar, ECE Dept.		
16	Mr. Varun Kumar Kakar	Ph.D. Scholar, ECE Dept.		
17	Mr. Sachin Tiwari	Ph.D. Scholar, ECE Dept.		
18	Mr. B. K. Hemant	Ph.D. Scholar, ECE Dept.		
19	Mr. Maneesh Kumar Singh	Ph.D. Scholar, ECE Dept.		
20	Mr. Arvind Bisht	Ph.D. Scholar, ECE Dept.		
21	Mr. Sumit Kumar	M.Tech. Scholar, ECE Dept.		
22	Mr. Raghavendra Nath Yadav	M.Tech. Scholar, ECE Dept.		
23	Mr. Shivam Tripathi	M.Tech. Scholar, EEE Dept.		
24	Mr. Mukesh Kumar	Ph.D. Scholar, SLIET Longowal		
25	Mr. Jasvir Singh Kalsi	Ph.D. Scholar, SLIET Longowal		
26	Ms. Ekta priya darshani	M.Tech. Scholar, EEE Dept.		
27				
28				
29				
30				
31				
32				
33				
34				
35				
36				
37				
38				
39				
40				

**A Short Term Course (STC) on
"Nano-electronics & VLSI: Devices, Circuits & Systems"**

November 4th-8th, 2019; Organized at NIT Uttarkhand
Sponsored by:- TEQIP III under twinning activities with SLIET Longowal

Day: 02

Date: 05/11/19

Attendance Sheet

S.N.	Name	Designation	Signature	
			Morning Session	Evening Session
1	Dr. Tajinder Singh Arora	Asst. Prof., ECE Dept.		
2	Dr. Sarika Pal	Asst. Prof., ECE Dept.		
3	Dr. Pankaj Kumar Pal	Asst. Prof., ECE Dept.		
4	Dr. Tushar Goel	Asst. Prof., ECE Dept.		
5	Ms. Sarita Yadav	Trainee Teacher, ECE Dept.		
6	Mr. Mandeep Singh	Teaching Associate, ECE		
7	Mr. Rajesh Saha	Project Eng. (SMDP-C2SD)		
8	Mr. Rajeev Kumar	Project Lecturer		
9	Prof. J. S. Ubhi	Professor SLIET Longowal		
10	Er. Pankaj Kumar Das	Asst. Prof., SLIET Longowal		
11	Dr. Prakash Dwivedi	Asst. Prof., EEE Dept.		
12	Dr. Sourav Bose	Asst. Prof., EEE Dept.		
13	Ms. Ruchi Juyal	Ph.D. Scholar, ECE Dept.		
14	Mr. Lalit Kumar Garia	Ph.D. Scholar, ECE Dept.		
15	Ms. Deepshika Singh	Ph.D. Scholar, ECE Dept.		
16	Mr. Varun Kumar Kakar	Ph.D. Scholar, ECE Dept.		
17	Mr. Sachin Tiwari	Ph.D. Scholar, ECE Dept.		
18	Mr. B. K. Hemant	Ph.D. Scholar, ECE Dept.		
19	Mr. Maneesh Kumar Singh	Ph.D. Scholar, ECE Dept.		
20	Mr. Arvind Bisht	Ph.D. Scholar, ECE Dept.		
21	Mr. Sumit Kumar	M.Tech. Scholar, ECE Dept.		
22	Mr. Raghavendra Nath Yadav	M.Tech. Scholar, ECE Dept.		
23	Mr. Shivam Tripathi	M.Tech. Scholar, EEE Dept.		
24	Mr. Mukesh Kumar	Ph.D. Scholar, SLIET Longowal		
25	Mr. Jasvir Singh Kalsi	Ph.D. Scholar, SLIET Longowal		
26	Ms. Ekta priya darshani	M.Tech. Scholar, EEE Dept.		
27				
28				
29				
30				
31				
32				
33				
34				
35				
36				
37				
38				
39				
40				

A Short Term Course (STC) on
"Nano-electronics & VLSI: Devices, Circuits & Systems"

November 4th-8th, 2019; Organized at NIT Uttarkhand
 Sponsored by:- TEQIP III under twinning activities with SLIET Logowal

Day: 03

Date: 06/11/19

Attendance Sheet

S.N.	Name	Designation	Signature	
			Morning Session	Evening Session
1	Dr. Tajinder Singh Arora	Asst. Prof., ECE Dept.		
2	Dr. Sarika Pal	Asst. Prof., ECE Dept.		
3	Dr. Pankaj Kumar Pal	Asst. Prof., ECE Dept.		
4	Dr. Tushar Goel	Asst. Prof., ECE Dept.		
5	Ms. Sarita Yadav	Trainee Teacher, ECE Dept.		
6	Mr. Mandeep Singh	Teaching Associate, ECE		
7	Mr. Rajesh Saha	Project Eng. (SMDP-C2SD)		
8	Mr. Rajeev Kumar	Project Lecturer		
9	Prof. J. S. Ubhi	Professor SLIET Longowal		
10	Er. Pankaj Kumar Das	Asst. Prof., SLIET Longowal		
11	Dr. Prakash Dwivedi	Asst. Prof., EEE Dept.		
12	Dr. Sourav Bose	Asst. Prof., EEE Dept.		
13	Ms. Ruchi Juyal	Ph.D. Scholar, ECE Dept.		
14	Mr. Lalit Kumar Garia	Ph.D. Scholar, ECE Dept.		
15	Ms. Deepshika Singh	Ph.D. Scholar, ECE Dept.		
16	Mr. Varun Kumar Kakar	Ph.D. Scholar, ECE Dept.		
17	Mr. Sachin Tiwari	Ph.D. Scholar, ECE Dept.		
18	Mr. B. K. Hemant	Ph.D. Scholar, ECE Dept.		
19	Mr. Maneesh Kumar Singh	Ph.D. Scholar, ECE Dept.		
20	Mr. Arvind Bisht	Ph.D. Scholar, ECE Dept.		
21	Mr. Sumit Kumar	M.Tech. Scholar, ECE Dept.		
22	Mr. Raghavendra Nath Yadav	M.Tech. Scholar, ECE Dept.		
23	Mr. Shivam Tripathi	M.Tech. Scholar, EEE Dept.		
24	Mr. Mukesh Kumar	Ph.D. Scholar, SLIET Longowal		
25	Mr. Jasvir Singh Kalsi	Ph.D. Scholar, SLIET Longowal		
26	Ms. Ekta priya darshani	M.Tech. Scholar, EEE Dept.		
27				
28				
29				
30				
31				
32				
33				
34				
35				
36				
37				
38				
39				
40				

A Short Term Course (STC) on
"Nano-electronics & VLSI: Devices, Circuits & Systems"

November 4th-8th, 2019; Organized at NIT Uttarkhand
 Sponsored by:- TEQIP III under twinning activities with SLIET Logowal

Day: 01

Date: 07/11/19

Attendance Sheet

S.N.	Name	Designation	Signature	
			Morning Session	Evening Session
1	Dr. Tajinder Singh Arora	Asst. Prof., ECE Dept.		
2	Dr. Sarika Pal	Asst. Prof., ECE Dept.		
3	Dr. Pankaj Kumar Pal	Asst. Prof., ECE Dept.		
4	Dr. Tushar Goel	Asst. Prof., ECE Dept.		
5	Ms. Sarita Yadav	Trainee Teacher, ECE Dept.		
6	Mr. Mandeep Singh	Teaching Associate, ECE		
7	Mr. Rajesh Saha	Project Eng. (SMDP-C2SD)		
8	Mr. Rajeev Kumar	Project Lecturer		
9	Prof. J. S. Ubhi	Professor SLIET Longowal		
10	Er. Pankaj Kumar Das	Asst. Prof., SLIET Longowal		
11	Dr. Prakash Dwivedi	Asst. Prof., EEE Dept.		
12	Dr. Sourav Bose	Asst. Prof., EEE Dept.		
13	Ms. Ruchi Juyal	Ph.D. Scholar, ECE Dept.		
14	Mr. Lalit Kumar Garia	Ph.D. Scholar, ECE Dept.		
15	Ms. Deepshika Singh	Ph.D. Scholar, ECE Dept.		
16	Mr. Varun Kumar Kakar	Ph.D. Scholar, ECE Dept.		
17	Mr. Sachin Tiwari	Ph.D. Scholar, ECE Dept.		
18	Mr. B. K. Hemant	Ph.D. Scholar, ECE Dept.		
19	Mr. Maneesh Kumar Singh	Ph.D. Scholar, ECE Dept.		
20	Mr. Arvind Bisht	Ph.D. Scholar, ECE Dept.		
21	Mr. Sumit Kumar	M.Tech. Scholar, ECE Dept.		
22	Mr. Raghavendra Nath Yadav	M.Tech. Scholar, ECE Dept.		
23	Mr. Shivam Tripathi	M.Tech. Scholar, EEE Dept.		
24	Mr. Mukesh Kumar	Ph.D. Scholar, SLIET Longowal		
25	Mr. Jasvir Singh Kalsi	Ph.D. Scholar, SLIET Longowal		
26	Ms. Ekta priya darshani	M.Tech. Scholar, EEE Dept.		
27				
28				
29				
30				
31				
32				
33				
34				
35				
36				
37				
38				
39				
40				

105

A Short-Term Course (STC) on
"Nano-electronics & VLSI: Devices, Circuits & Systems"

November 4th-8th, 2019; Organized at NIT Uttarkhand
 Sponsored by:- TEQIP III under twinning activities with SLIET Logowal

Day: 05

Date: 08/11/19

Attendance Sheet

S.N.	Name	Designation	Signature	
			Morning Session	Evening Session
1	Dr. Tajinder Singh Arora	Asst. Prof., ECE Dept.		
2	Dr. Sarika Pal	Asst. Prof., ECE Dept.		
3	Dr. Pankaj Kumar Pal	Asst. Prof., ECE Dept.		
4	Dr. Tushar Goel	Asst. Prof., ECE Dept.		
5	Ms. Sarita Yadav	Trainee Teacher, ECE Dept.		
6	Mr. Mandeep Singh	Teaching Associate, ECE		
7	Mr. Rajesh Saha	Project Eng. (SMDP-C2SD)		
8	Mr. Rajeev Kumar	Project Lecturer		
9	Prof. J. S. Ubhi	Professor SLIET Longowal		
10	Er. Pankaj Kumar Das	Asst. Prof., SLIET Longowal		
11	Dr. Prakash Dwivedi	Asst. Prof., EEE Dept.		
12	Dr. Sourav Bose	Asst. Prof., EEE Dept.		
13	Ms. Ruchi Juyal	Ph.D. Scholar, ECE Dept.		
14	Mr. Lalit Kumar Garia	Ph.D. Scholar, ECE Dept.		
15	Ms. Deepshika Singh	Ph.D. Scholar, ECE Dept.		
16	Mr. Varun Kumar Kakar	Ph.D. Scholar, ECE Dept.		
17	Mr. Sachin Tiwari	Ph.D. Scholar, ECE Dept.		
18	Mr. B. K. Hemant	Ph.D. Scholar, ECE Dept.		
19	Mr. Maneesh Kumar Singh	Ph.D. Scholar, ECE Dept.		
20	Mr. Arvind Bisht	Ph.D. Scholar, ECE Dept.		
21	Mr. Sumit Kumar	M.Tech. Scholar, ECE Dept.		
22	Mr. Raghavendra Nath Yadav	M.Tech. Scholar, ECE Dept.		
23	Mr. Shivam Tripathi	M.Tech. Scholar, EEE Dept.		
24	Mr. Mukesh Kumar	Ph.D. Scholar, SLIET Longowal		
25	Mr. Jasvir Singh Kalsi	Ph.D. Scholar, SLIET Longowal		
26	Ms. Ekta priya darshani	M.Tech. Scholar, EEE Dept.		
27				
28				
29				
30				
31				
32				
33				
34				
35				
36				
37				
38				
39				
40				