



Indian Nanoelectronics Users' Programme - Idea to Innovation (INUP- i2i) (MeiTy)



2nd Hands-on Training on Fabrication & Characterization of Field-Effect Transistor (FET)

10th - 19th October, 2022

Workshop Coordinators: Prof. Bhaskar Mitra, Prof. Samaresh Das and Prof. Dhiman Mallick
Nanoscale Research Facility, Indian Institute of Technology Delhi



Date	Time (in hours)	Session (Day 1)	Venue
10-10-2022	09:30 – 09:45	Registration	Physics Committee Room Main Building, III floor (MS-412)
	09:45 – 10:15	Welcome Address and Introduction to INUP & Introduction of Hands-on Training Workshop (Prof. Neeraj Khare/Prof. Samaresh Das/Prof. Bhaskar Mitra)	
Theme: Clean Room			
10-10-2022	10:30 – 13:00	Clean Room – Safety Prof. Bhaskar Mitra & Manjeet Kumar (BM)	Physics Committee Room (MS-412)
Lunch Break (13:00 -14:00)			
Theme: Lab Session			
10-10-2022	14:30 – 17:00	NRF Lab Visit - Manjeet (BM) Ashutosh (VKK)/Amish & Mohit (NK)	NRF Facility, Block 6
Tea (17:00 onwards)			



Indian Nanoelectronics Users' Programme - Idea to Innovation (INUP- i2i) (MeiTy)



2nd Hands-on Training on Fabrication & Characterization of Field-Effect Transistor (FET)

10th - 19th October, 2022

Workshop Coordinators: Prof. Bhaskar Mitra, Prof. Samaresh Das and Prof. Dhiman Mallick
Nanoscale Research Facility, Indian Institute of Technology Delhi



Date	Time (in hours)	Session (Day 2)	Venue
Theme: Lecture			
11-10-2022	09:30 – 10:00	Gathering at Physics Committee Room	Physics Committee Room Main Building, III floor (MS-412)
	10:00 – 11:00	Device Structure & Process Flow Prof. Samaresh Das	
	11:00 – 12:00	Characterization by XRD/SEM Prof. Neeraj Khare	
	12:00 – 13:00	Characterization by FTIR Prof. Prashant Mishra	
Lunch Break (13:00 -14:00)			
Theme: Lab Session			
11-10-2022	14:30 – 17:00	Mask Design Software (L-Edit/K-Layout) Training in Computer Sumit Sharma/Khanjan (* Participants should bring their laptop for the training)	Physics Committee Room (MS-412)



Indian Nanoelectronics Users' Programme - Idea to Innovation (INUP- i2i) (MeiTy)



2nd Hands-on Training on Fabrication & Characterization of Field-Effect Transistor (FET)

10th - 19th October, 2022

Workshop Coordinators: Prof. Bhaskar Mitra, Prof. Samaresh Das and Prof. Dhiman Mallick
Nanoscale Research Facility, Indian Institute of Technology Delhi



Date	Time (in hours)	Session (Day 3)	Venue
Theme: Lecture			
12-10-2022	09:30 – 10:00	Gathering at Physics Committee Room	Physics Committee Room Main Building, III floor (MS-412)
	10:00 – 12:00	Wafer/Subtract Cleaning & Oxidation (Prof. Bhaskar Mitra)	
	12:00 – 13:00	TA’s Interaction Session	
Lunch Break (13:00 - 14:00)			
Theme: Lab Session			
12-10-2022	14:30 – 17:00	Wafer/Subtract Cleaning/Thermal Oxidation Growth Shrestha (VKK)/Satish Verma (BM)	NRF Facility, Block 6



Indian Nanoelectronics Users' Programme - Idea to Innovation (INUP- i2i) (MeiTy)



2nd Hands-on Training on Fabrication & Characterization of Field-Effect Transistor (FET)

10th - 19th October, 2022

Workshop Coordinators: Prof. Bhaskar Mitra, Prof. Samaresh Das and Prof. Dhiman Mallick
Nanoscale Research Facility, Indian Institute of Technology Delhi



Date	Time (in hours)	Session (Day 4)	Venue
Theme: Lecture			
13-10-2022	09:30 – 10:00	Gathering at Physics Committee room	Physics Committee Room Main Building, III floor (MS-412)
	10:00 – 11:30	(a) Introduction to Sputtering (Prof. Vamsi Krishna) Ashutosh (VKK)	
	11:30 – 13:00	(b) Lithography (Prof. Dhiman Mallick) Nadeem Tariq (DM)/Sandeep (PD)	
Lunch Break (13:00 - 14:00)			
Theme: Lab Session			
13-10-2022	14:30 – 17:00	Lab Visit (Sputtering setup, Mask Aligner) Ashutosh (VKK) Nadeem Tariq (DM)/Sandeep (PD)	NRF Facility, Block 6



Indian Nanoelectronics Users' Programme - Idea to Innovation (INUP- i2i) (MeiTy)



2nd Hands-on Training on Fabrication & Characterization of Field-Effect Transistor (FET)

10th - 19th October, 2022

Workshop Coordinators: Prof. Bhaskar Mitra, Prof. Samaresh Das and Prof. Dhiman Mallick
Nanoscale Research Facility, Indian Institute of Technology Delhi



Date	Time (in hours)	Session (Day 5)	Venue
Theme: Lab Session			
14-10-2022	09:30 – 10:00	Gathering at NRF	NRF Facility, Block 6
	10:00 – 13:00	Lithography 1 st level: Spin Coating, Oven, Mask Aligner Nadeem Tareeq (DM)/Sandeep (PD)	
Lunch Break (13:00 -14:00)			
Theme: Lab Session			
14-10-2022	14:30 – 17:00	ZnO Deposition-RF Sputtering on Si/SiO ₂ and Quartz Substrates Ashutosh (VKK)	NRF Facility, Block 6
Tea (17:00 onwards)			



Indian Nanoelectronics Users' Programme - Idea to Innovation (INUP- i2i) (MeiTy)



2nd Hands-on Training on Fabrication & Characterization of Field-Effect Transistor (FET)

10th - 19th October, 2022

Workshop Coordinators: Prof. Bhaskar Mitra, Prof. Samaresh Das and Prof. Dhiman Mallick
Nanoscale Research Facility, Indian Institute of Technology Delhi



Date	Time (in hours)	Session (Day 6)	Venue
Theme: Lab Session			
15-10-2022	09:30 – 10:00	Gathering at NRF	NRF Facility, Block 6
	10:30 – 13:00	Characterization by XRD/FTIR/SEM Amish Gautam (NK)/Kritika (PM)/Mohit (NK)	
Lunch Break (13:00 -14:00)			
Theme: Lab Session			
15-10-2022	14:30 – 17:00	Lithography 2 nd level: Spin coating, Oven, Mask Aligner Nadeem Tariq (DM)/Sandeep (PD)	NRF Facility, Block 6
Tea (17:00 onwards)			



Indian Nanoelectronics Users' Programme - Idea to Innovation (INUP- i2i) (MeiTy)



2nd Hands-on Training on Fabrication & Characterization of Field-Effect Transistor (FET)

10th - 19th October, 2022

Workshop Coordinators: Prof. Bhaskar Mitra, Prof. Samaresh Das and Prof. Dhiman Mallick
Nanoscale Research Facility, Indian Institute of Technology Delhi



Date	Time (in hours)	Session (Day 7)	Venue
Theme: Lecture			
16-10-2022	10:00 – 10:30	Gathering at Physics Committee Room	Physics Committee Room Main Building, III floor (MS-412)
	10:30 – 13:00	NRF Videos Amish Gautam (NK)/Mohit (NK)/Mr. Shivlove	
Lunch Break (13:00 -14:00)			
Theme: Lecture			
16-10-2022	14:30 – 15:30	Electrical Characterization, Part 1: MOS/TLM Structures Prof. Rajendra Singh (Hardhyan (RS))	Physics Committee Room Main Building, III floor (MS-412)
	15:30 – 17:00	Interaction with TA’s	
Tea (17:00 onwards)			



Indian Nanoelectronics Users' Programme - Idea to Innovation (INUP- i2i) (MeiTy)



2nd Hands-on Training on Fabrication & Characterization of Field-Effect Transistor (FET)

10th - 19th October, 2022

Workshop Coordinators: Prof. Bhaskar Mitra, Prof. Samaresh Das and Prof. Dhiman Mallick
Nanoscale Research Facility, Indian Institute of Technology Delhi



Date	Time (in hours)	Session (Day 8)	Venue
Theme: Lecture			
17-10-2022	09:30 – 10:00	Gathering at Physics Committee Room	Physics Committee Room Main Building, III floor (MS-412)
	10:00 – 11:30	E-beam Evaporation Lecture & Demonstration Prof. Neeraj Khare (Dr. Deepanshu Sharma/Arun Mondal (NK))	
	11:30 – 13:00	Video Streaming/Interaction with Participants (Shiv/Amish)	
Lunch Break (13:00 -14:00)			
Theme: Lab Session			
17-10-2022	14:30 – 17:00	Lab Visit (E-beam Deposition, Electrical Characterization Lab) Dr. Deepanshu Sharma/Arun Mondal (NK), Hardhyan (RS)	NRF Facility, Block 6



Indian Nanoelectronics Users' Programme - Idea to Innovation (INUP- i2i) (MeiTy)



2nd Hands-on Training on Fabrication & Characterization of Field-Effect Transistor (FET)

10th - 19th October, 2022

Workshop Coordinators: Prof. Bhaskar Mitra, Prof. Samaresh Das and Prof. Dhiman Mallick
Nanoscale Research Facility, Indian Institute of Technology Delhi



Date	Time (in hours)	Session (Day 9)	Venue
Theme: Lab Session			
18-10-2022	09:30 – 10:00	Gathering at NRF, Block 6	NRF Facility, Block 6
	10:00 – 10:30	Tea Break	
	10:30 – 13:00	Metallization Lift off/Inspection Aamir Saud Khan (BM)	
Lunch Break (13:00 -14:00)			
Theme: Lecture/Lab Session			
18-10-2022	14:30 – 15:30	Interaction of participants with Prof. Vikram Kumar	Physics Committee Room III floor (MS-412)
	15:30 – 17:30	Inspection: Microscope Nadeem Tariq (DM)/Sandeep (PD)	NRF Facility, Block 6



Indian Nanoelectronics Users' Programme - Idea to Innovation (INUP- i2i) (MeiTy)



2nd Hands-on Training on Fabrication & Characterization of Field-Effect Transistor (FET)

10th - 19th October, 2022

Workshop Coordinators: Prof. Bhaskar Mitra, Prof. Samaresh Das and Prof. Dhiman Mallick
Nanoscale Research Facility, Indian Institute of Technology Delhi



Date	Time (in hours)	Session (Day 10)	Venue
Theme: Lab Session			
19-10-2022	09:30 – 10:00	Gathering at NRF, Block 6	NRF Facility, Block 6
	10:00 – 10:30	Tea Break	
	10:30 – 13:00	Electrical Characterization, Part 2: FET Hardhyan (RS)/Sumit Sharma (SD)	
Lunch Break (13:00 -14:00)			
Discussion/Concluding Remark			
19-10-2022	14:30 – 17:00	Prof. Prashant Mishra	Faculty Guest House