



Five-day Short-term Course on Emerging Semiconductor Material, Device Technology, and Manufacturing

(Online Mode)

(4th - 8th December 2023)



Coordinators:

Dr. Sumit Saha

Dr. Arjun Singh Yadav

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Rourkela-769008, Odisha, India**

Technically Co-sponsored by:



Registration Link



About Institute: NIT Rourkela is one of the country's premier national-level institutions for technical education and is funded by the Government of India. The government of India has elevated the Regional Engineering College, Rourkela to a deemed university under the name of National Institute of Technology Rourkela. Please visit <https://www.nitrkl.ac.in/> to know more about NIT Rourkela.



About Department: The Department of **Electronics and Communication Engineering** was established with the vision to become a nationally acclaimed department of higher learning that will serve as a source of knowledge and expertise for society. The department offers various UG and PG programs with the mission to advance and spread knowledge in the areas of Electronics, Communication, Instrumentation, Signal Processing, Microwave and Radar, and VLSI leading to the creation of wealth and welfare of humanity. The department also offers Ph. D. for regular as well as sponsored candidates. The faculties of the EC department are handling several externally funded research projects. Please visit <https://website.nitrkl.ac.in/EC/> to know more about the department.

About the Course:

The short-term course on “Emerging Semiconductor Material, Device Technology, and Manufacturing” is designed to provide an in-depth understanding of emerging semiconductor materials and innovative device concepts, modeling and simulation of advanced materials and devices, semiconductor processes and manufacturing, and their applications in disruptive technologies. The course will cover topics such as tunnel FETs, GAA nanowire and nanosheet FETs, negative capacitance FETs, 2D material FETs, HEMT, III-V & 2D material optoelectronic and nanoelectronic devices, their applications and research opportunities. A detailed understanding of the semiconductor process and manufacturing will be provided by scientists from the industry and academics. The course will begin with interactive talks by academicians from IITs, NITs, and central universities, and scientists from industry, followed by hands-on training on material and device simulation. From the course, the participants will learn about advanced materials and devices, semiconductor processes and manufacturing, and, importantly, their applications in future disruptive technologies.

Course objectives are :

- to discuss recent trends in semiconductor materials and devices for disruptive innovations and challenges in semiconductor processes and manufacturing.
- to provide an in-depth understanding of emerging semiconductor materials and innovative device concepts.
- to provide hands-on experience in the simulation of advanced materials and devices.

Important Dates:

Registration Deadline	30 th November 2023
Confirmation to Participants by Email	1 st December 2023
Commencement of Course	4 th December 2023 (Online)

Topics to be covered (tentatively):

Emerging Materials and Innovative Device Concepts:

- Tunnel FETs.
- GAA nanowire and Nanosheet FETs.
- Negative Capacitance FETs.
- 2D Material FETs.
- HEMT.
- III-V and 2D Material Optoelectronic Devices.
- Third Generation Solar Cells.

Modeling and Simulation:

- Material Simulation.
- Semiconductor Device Simulation & Modeling.
- 2D material FET modeling.
- Machine Learning in Semiconductor Device Research.

Semiconductor Process and Manufacturing:

- Device Growth and Challenges.
- Fabrication of II-V and 2D materials for optoelectronic applications.
- Fabrication of 3rd Generation Solar Cells.

Topics for hands-on training sessions:

- Molecular structure modeling and simulation.
- Graphene & other 1D-2D Material Simulation.
- Nanoelectronic Semiconductor Device Simulation.
- Spintronics device Simulation.
- Photodetector Simulation.

Target Participants:

UG/PG/MS students, Ph.D. students/research scholars/project students, staff/faculty members, and industry professionals working/planning to work in the future in the area of semiconductor materials and device domain. The participants having Electronics and Communication Engineering, Electrical Engineering, Computer Science and Engineering, or related backgrounds will benefit from this course.

E-certificates will be provided to the registered participants upon successfully completing the course.

Speakers (Tentative):

Dr. Avirup Dasgupta, IIT Roorkee
Dr. Manodipan Sahoo, IIT (ISM) Dhanbad
Dr. Jhuma Saha, IIT Gandhinagar,
Dr. Deviprasad Panda, IMEC, Belgium
Dr. Navjeet Bagga, IIT Bhubaneswar
Dr. Sayan Kanungo, BITS Pilani
Dr. DipPrakash Samajdar, IIITDM Jabalpur
Dr. Rajesh Saha, MNIT Jaipur
Dr. Rupam Goswami, Tezpur University
Dr. J. Ajayan, SR University
Dr. Ekta Goel, NIT Warangal
Dr. Chandan Yadav, NIT Calicut
Dr. Gaurav Siddharth, NIT Calicut
Dr. Vadthiya Narendra, NIT Warangal
Dr. Sumit Saha, NIT Rourkela
Er. Anil Kumar Sharma, Impulse Technology

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Contact and Queries: Please send your queries directly to the course coordinators.

Registration Details:

The registration fee (non-refundable) for various participants for attending the short-term course is given below:

Registration Type	Fees
Student	INR 500
Faculty Members	INR 1000
Scientist from R&D Organization/Industry Person	INR 1500

- The students of NIT Rourkela are exempted from the payment of the registration fee.

Bank Account Details for Paying Registration Fee:

The registration fee is to be deposited in the following bank account:

Account Name	CONTINUING EDUCATION, NIT ROURKELA
Account Number	10138951784
Bank Name	State Bank of India
Branch Name	NIT Rourkela Campus (2109)
IFS Code	SBIN0002109

Registration Form:

To complete online registration, the participants need to fill the following google form:

<https://forms.gle/juNwZK5JDYS73KNY6>