Faculty Development Program
On
Next-Generation Semiconductor Devices for high-end applications (Online)

Under the banner of

Electronics and ICT Academy, NIT Patna

22nd - 27th June 2020

Patron

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Sponsored by

Meity and Govt. of India

Organized by

Department of Electrical Engineering,
National Institute of Technology, Patna-800005

About NIT Patna

National Institute of Technology Patna is the 18th National Institute of Technology created by the Ministry of H.R.D. Government of India after rechristening the erstwhile Bihar College of Engineering Patna on 28.01.2004. NIT Patna marked its humble beginning in 1886 with the establishment of a pleaders survey training school which was subsequently promoted to Bihar College of Engineering Patna in 1924. This made this institute the 6th oldest Engineering Institute of India. The Institute is situated on the south bank of holy river Ganges behind Gandhi Ghat (where the ash of father of the Nation, Mahatma Gandhi was offered in the river Ganges). The campus has a picturesque river view with historic building presenting a spectacle of architectural delight and natural beauty. The Institute imparts high-level education training, research and development in science, engineering technology and humanities along with high quality education and values at UG, PG, and Ph.D. level. At present, the Institute offers courses in six major technical disciplines viz. Architecture, Civil Engineering, Computer Science & Engg., Electrical Engg., Electronics & Communication Engg. And Mechanical Engg. It also consists of well-established departments of Physics, Chemistry, Mathematics and Humanities and Social Sciences.

Electronics and ICT Academy

Ministry of Electronics and Information Technology, Government of India has instituted seven Electronics and Information & Communications Technology (ICT) Academies of which, the academy of NIT Patna is one. The Academy at NIT Patna aims to design and organize basic as well as specialized training programs in niche areas of electronics and ICT for the development of required knowledge base, skills, and tools to equip the teaching community with better knowledge and understanding.

Overview of Program

The semiconductor device technology is the basic building block of various electrical & electronics devices for a wide range of applications. Semiconductor devices such as *Solar Cells, LEDs, Photodetectors, Sensors, Non-volatile memories* & others are used for various *energy, optical, chemical, biological, computing & other applications*. To cater to the needs of rapidly growing modern technologies, these semiconductor devices have been progressively evolving as well. This program gives an insight into various semiconductor devices from basic level to advanced level. Further, next-generation innovations in devices and various challenges involved will be discussed to elaborate on current research and enhancements in the respective fields. Theory along with lab sessions would be conducted to discuss various modelling and fabrication techniques of the semiconductor devices. This program will serve as a great platform to understand various aspects of semiconductor devices for research as well as academic purposes.

Objectives and Scope

- Main objective of this program is to provide an exposure of *current status and next generation innovations of various semiconductor devices*.
- During this program, our focus will be to explore various aspects of semiconductor devices *from theory and modelling to fabrication and performance characterization* along with challenges involved through interaction with experts from academia (IITs/NITs & premier institutions) & industries.
- This program would provide a platform for collaborative participation of research, industry, and academia through interactive sessions among faculties, students (UG, PG), Ph.D. scholars, other researchers, and working professionals from engineering as well as basic science background.
- The topics will focus on basics, advances and applications to benefit different people from academic & research communities associated with the disciplines of *Electrical, Electronics, Computer Science, Chemistry, Physics, Nanotechnology* etc.
- Along with *theoretical concepts*, lab sessions will provide general training on the basics of *necessary modelling tools*. Various *Deposition/Fabrication techniques* would be briefly discussed.
- *Research methodology* along with *illustrations from published works of various premium journals* would be discussed. By the end of this program, participants could start their research work in the respective fields to help their research as well as academic career.

Course Content

The following topics will be discussed in Theory Sessions & corresponding Lab Sessions.

Theory Session

- ***Semiconductor basics, theory of semiconductor devices and applications.***
- ***Basics & Recent developments in Photonics & related devices (LEDs, Photodetectors etc.).***
- ***Current status, recent advances, and next-generation innovations in Photovoltaic Cells.***
- ***Next-generation Non-volatile Memories & their Neuromorphic Computing applications.***
- ***Sensor basics, advances and their roles in high-end (biomedical & others) applications.***

Lab Session

Basics of the following tools and their implementation for the simulation of devices (from theory sessions) would be demonstrated in Online Lab Sessions.

- ***Silvaco TCAD, COMSOL Multiphysics***
- ***SCAPS, MATLAB etc.***

Besides modelling, Fabrication methods for different devices along with their performance characterization techniques would be briefly discussed.

Resource Persons

Esteemed experts for theory & lab sessions:

- **Dr. Brajesh Kumar Kaushik, ECE, IIT Roorkee**
- **Dr. Saurabh Kumar Pandey, EE, IIT Patna**
- **Dr. Sushil Kumar Pandey, ECE, NIT Surathkal**
- **Dr. Vivek Garg, EE, DIAT Pune**
- **Dr. Brajendra S. Sengar, Energy Science & Technology, CAS Lucknow**
- **Dr. Pramila Jakhar, EE, BITS Pilani**
- **Dr. Shivendra Kumar Pandey,EIE, NIT Silchar**
- **Dr. Arunangshu Ghosh, EE, NIT Patna**

One-week FDP includes

6-Days Training will be taken by a group of experts from academics (IITs, NITs & other premier institutions) as well as industries working in different areas of Semiconductor devices. The daily training sessions would run for 6-7 hours/ each day. The mode of training is Instructor-led live online.

- **Interactive Theory & Lab Sessions for 40 hours.**
- **Soft copy of study materials, training videos etc.**
- **Certificate from E & ICT Academy, NIT Patna**

Who Can Participate

Faculty members of UGC/AICTE recognized Universities and Engineering colleges all over India, Research scholars (Ph.D. only), students (UG/PG) and Industry personals, however priority will be given to the faculty members.

Registration Fee

- **Faculty Members & Ph.D. Scholars: Rs 500/-**
- **UG & PG Students: Rs 500/-**
- **Industry & others: Rs 1000/-**

The certificate will be given by Electronics & ICT Academy, NIT Patna.

Registration Process

1. Registration fee will be paid through online mode. The account details for this purpose is as follows:
   Account Name: NIT Patna
   Account No.: 50380476798
   IFSC Code: ALLA0212286
2. Link for registration:
   https://forms.gle/1N8kzZ3N94RQ27VW7
3. The brochure of the program may be downloaded from the Institute website (**www.nitp.ac.in**).
4. **Last date of registration: 19.06.2020**

Total 100 seats and the selection will be done on the first-cum-first-serve basis. PDF file of online filled registration form with proof of registration fee paid is to be sent through email to any of the following:

- **Dr. Amitesh Kumar**
  (Email: amitesh.ee@nitp.ac.in, Contact No.: 8349287043)
- **Dr. Rajeev Kumar Arya**
  (Email: rajeev.arya@nitp.ac.in, Contact No.: 8130336451)

FDP On

Next-Generation Semiconductor Devices for high-end applications

(22nd - 27th June 2020)

REGISTRATION FORM

Photo

1. Name (block letter): ……....
2. Gender: .....
3. Caste:……
4. DOB:……
5. Designation ……..
6. Organization: ……..
7. Address for communication: ……

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   Pin code: …… Ph. No.: ……..

   E-mail: ……
8. Highest Academic Qualification: ……..
9. Specialization: ……
10. Experience (in years):

    (a) Teaching: …… (b) Industrial: ……
11. Aadhar No:……..

DECLARATION

I do hereby agree to abide by the rules and regulations of the FDP.

Place: ……

Date:……..……..

……..

Signature of the Applicant