



KARYASHALA on

Emerging Devices, Circuits & Systems for Next Generation Biomedical Applications

Sponsored by Science and Engineering Research Board (SERB), India

10th - 16th July 2023



Patron:

Prof. K. Umamaheshwar Rao,
Director, NIT Rourkela

Chairman:

Dr. K. K. Mahapatra,
Professor HAG, Dept. of ECE

Coordinators:

Dr. Sudip Kundu
Dr. Sougata Kumar Kar

Department of Electronics and Communication Engineering,
National Institute of Technology Rourkela
Rourkela-769008, Odisha, India

Technically Co-sponsored by:



Registration Link



About Institute: NIT Rourkela is one of the premier national level institutions for technical education in the country and is funded by the Government of India. 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/>

Rankings - 2022

39 NIRF Overall	15 NIRF Engg.	24 NIRF Research	281-290 QS Asia
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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 the society. The department offers various UG and PG programmes with the mission to advance and spread knowledge in the areas of Electronics, Communication, Instrumentation, Signal processing, Microwave and Radar and VLSI leading to creation of wealth and welfare of humanity. The department also offers Ph. D. for regular as well as sponsored candidates. The faculties of EC department are handling several externally funded research projects. Please visit

<https://www.nitrkl.ac.in/EC/>.

Relevance of Workshop:

In India, in terms of revenue and employment generation, the healthcare market is becoming one of the largest sectors. To support this exponential growth, there is a direct need of growing R&D in this field.

The advancement of electronic devices is now an integral part of health diagnosis and therapeutic systems. The enhanced demand for portable and implantable devices for health monitoring and therapeutic use is leading to the demand for ultra-low-power, efficient devices. Therefore, biomedical integrated circuits and systems are becoming a hot topic for present-day research. Different biological signals such as electrophysiological, electrochemical, optical, and magnetic are acquired using the front-end part of these circuits and systems. Then these biological signals are used for the detection, diagnosis, and even prediction of diseases. The significant advancements in semiconductor industries are not only focusing on circuit design aspects but also on other aspects of biomedical applications, like sensing, imaging, actuating, etc. This workshop will give an intense emphasis on the recent research activities and emerging trends in the domain of MEMS devices, circuits and systems for biomedical applications.

Workshop objectives are :

- to discuss recent trends in the field of electronic devices, circuits and systems aiming toward "Biomedical Applications".
- to focus on hands-on lab exercise on designing of devices, circuits and systems for biomedical applications.
- to create an academic and research network between scientific communities and the opportunity for participants to interact with experts in related domain.

Important Dates:

Registration Deadline	10th June 2023
Confirmation to Participants by email	15th June 2023
Commencement of Course	10 th July 2023 (Offline)

Topics to be covered (tentatively):

Devices:

- BioMEMS.
- Lab on chip for biomedical applications.

Circuits:

- Signal acquisition for biomedical signals
- Flexible circuit technologies for biomedical applications
- Circuits and Systems for Wearable Technologies.
- Biomedical Applications with Using Embedded Systems.

Systems:

- Drug delivery systems .
- Design and developing of handheld diagnostic tool for Biomedical applications .

Special topics:

- Present and future of medical devices (expert lecture by doctor).
- Machine Learning techniques for biomedical applications
- Hardware security in medical devices.
- Use of intelligent IoT in medical devices.
- Energy Harvesters for wearable/implanted devices.

Topics for hands-on training sessions:

- Design of signal acquisition circuits for biomedical applications.
- Acquire the real time ECG signal and analyze the acquired ECG (Electrocardiogram) signal in presence of different artefacts using LabVIEW.
- Detection of the Pulse due to change in the blood flow volume: measure the pulse or heart rate of the patient.
- Interface Vernier Hand Dynamometer sensor and measure the muscle strength of your hand using LabVIEW.
- Interface Vernier Hand Grip sensor and measure the heart rate using LabVIEW.
- Design of low cost biomedical systems
- Etc.

Target Participants:

M. Tech/MS students, research scholars/professionals, faculty members (without PhD) working/planning to work in future in the area of biomedical application domain. Specialization: Electronics and Communication Engineering, Electronics and Instrumentation Engineering, Electrical Engineering, Biomedical Engineering, or related branches will be given preferences to attend this course.

Speakers:

Prof. Soumen Das, IIT Kharagpur
Prof. Suman Chakraborty, IIT Kharagpur
Prof. Debiprasad Priyabrata Acharya, NIT Rourkela
Prof. Chirasree Roy Chaudhuri, IEST, Shibpur
Prof. Sudeendra Kumar K, PES University
Prof. Kunal Pal, NIT Rourkela
Prof. Kishor Sawrbadekar, IIT BHU
Prof. Niladri Bihari Puan, IIT Bhubaneswar
Prof. Debdoot Sheet, IIT Kharagpur
Prof. Gorachand Dutta, IIT Kharagpur
Prof. Mirza Khalid Baig, NIT Rourkela
Prof. Earu Banoth, NIT Rourkela
Prof. Saptarshi Chatterjee, NIT Rourkela
Prof. Ayas Kanta Swain, NIT Rourkela

Selection criteria and intimation:

Limited seats!!!

Selection will be based on

- (1) Statement of Purpose (SOP)
 - (2) Specialization of previous/present degree
 - (3) First Come First Serve Based
- Shortlisted candidates will be intimated by email.

Certificate:

Certificate will be provided to the registered participants upon successfully completing the course.

Facilities:

Travel allowance Train 3rd AC/Sleeper class/Bus fare (as per GOI rules) will be provided to the selected candidates (Ticket/Fare copy submission must)

Shared accommodation and food will be provided to all the selected candidates for the entire workshop duration.

Registration Form:

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

<https://forms.gle/FA5141NotWUpqsis6>

Format for NOC:

Date _____

To Whom It May Concern,

This letter is to certify that *[Student's Full Name]*, a *[UG/PG/PhD]* student of Dept. of *[Name of the Department]* from *[School/Institution Name]*, has sought permission to attend a workshop titled **“Emerging Devices, Circuits & Systems for Next Generation Biomedical Applications”**, which is scheduled to take place from 10th July to 16th July 2023 at **NIT Rourkela**.

We hereby confirm that we have no objection to the student attending the workshop and encourage their participation in such educational events that can further enhance their knowledge and skills.

Signature of the applicant

Date and place.

Recommended and forwarded

Signature of the Head of the Department / Head of the Institution with seal.

Registration fee:

- **NIL for students / faculty members without PhD**
- **12,000 for professionals (including food and accommodation, excluding TA)**

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

Coordinators:

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Department of ECE, NIT Rourkela



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