

on

Atomistic & Quantum Computing and Simulation (QATK)

January 16- 20, 2023

under the aegis of

Electronics & ICT Academy
IIT Roorkee



Ministry of Electronics & Information



Technology
Government of India

Experts from Academia/Industry

Prof. V. Singh Poonia, IIT Roorkee

Prof. Sanjeev Manhas, IIT Roorkee

Prof. Tanmoy Pramanik, IIT Roorkee

Prof. Avirup Dasgupta, IIT Roorkee

(Invited Speaker)

Industry Expert from Integrated

Microsystem.

Principal Investigator

Prof. Sanjeev Manhas, IIT Roorkee

Certificates to participants by E&ICT
Academy IIT Roorkee



Class will be delivered through
online platform

Why this course ?

This course will cover the fundamental concepts of density functional theory (DFT), quantum effects in nano-transistors, quantum dots, magnetic RAM, and also cover the area of advanced concept modelling in semiconductor devices. It will also cover the fundamental concepts of semiconductor materials such as band structure, density of states, electron density, flat band structure, etc.

Additionally, we will perform practical calculations for the semiconductor material and device characteristics like band-structure analysis, optimization, current-voltage characteristics, relaxation analysis, density of states, and transmission spectrum calculation. The hands-on will be done by using the Quantum ATK software to explain the workings of a p-n junction diode, a silicon nano-wire FET, absorption, and a molecular device.

Objectives of the course

- To develop the relevant understanding of Atomistic Tool Kit (QATK).
- To develop the ability to build and create the atomic level structure.
- To develop the ability to understand the use of different atomistic calculators (DFT, NRGF, etc.).
- To analyse the different types of properties of the materials (as band structure, density of states, electron density, etc.).
- To understand the device level simulation (NEGF).
- Take advantage of the experiential learning and build your portfolio in a real-world simulation.

Course Features

- Online Sessions
- Lectures from IIT Roorkee, Hands-on
- Expert talks from Academics (IIT Roorkee)
- Doubt clearing sessions
- Access to learning material and tools
- Certificate by E&ICT Academy IIT Roorkee

Focus Areas

- Introduction to Density Functional Theory and Quantum Dot Devices.
- Magnetic Random Access Memory: Materials and Devices.
- Developments in Modeling of Advanced FETs Including Quantum Effect.
- Complete flow of device simulation by using NEGF.
- Quantum Effects in Nano-Transistors.
- Projects and Assignments.

Prerequisites

- Fundamental knowledge of semiconductor device physics and material properties would be helpful

Registration Link

<https://forms.gle/8bymtSjyAsadB9bo8>

Registration Fee

Fees: ₹ 250/participant, non refundable
(Applicable for all)

Note: Refund will be done in case of course cancellation only, with in 20 working days

How to make payment

<https://eict.iitr.ac.in/instruction-for-payment/>

Conference Code: EICTIITR-FDP-23-01

Course Coordinators

- Prof. Sanjeev Manhas, ECE Department, IIT Roorkee

Reach Us:

- Ph.: +91-8874815939, +91- 8700081963
- Email: eict@iitr.ac.in