

Specializations available at IIT Goa for PhD

Areas of Specializations

School of Chemical & Biological Sciences
Area 1: Synthetic Organic Chemistry, Enantioselective Catalysis, Medicinal Chemistry Area 2: Time Resolved Spectroscopy, Physical Chemistry Area 3: Inorganic Chemistry, Organometallic chemistry, Mechanically Interlocked Molecules (MIM)
School of Electrical Sciences
Communication and Signal Processing <ul style="list-style-type: none">- Signal Processing for 4G/5G cellular communication, Non-orthogonal Multiple Access (NOMA) techniques for 5G, Wideband spectrum sensing for Cognitive Radio, Spatial Modulation and Detection algorithm in Massive MIMO Communication, Sparse Representation, Compressed Sensing, Computational Imaging, Error-Correcting Codes, Information Theory. VLSI and Microelectronics <ul style="list-style-type: none">- Analog Mixed Signal Design and Device Modeling, Integrated Circuits and Systems, Integrated Circuits for Analog Signal Processing, Micro/nano fabrication, MEMS devices, Microsensors, Drug delivery, Energy harvesting Power Engineering <ul style="list-style-type: none">- Insulation engineering, Transients in power systems, Plasma-assisted techniques, Design and Modelling of Electrical Machines, Motor Drives and control, Power Electronics for Renewable Energy.
School of Humanities & Social Sciences
Economics
School of Mathematics & Computer Sciences
Mathematics: Numerical Analysis, Partial Differential Equations, Mathematical logic & Set theory Computer Sciences: Computer Architecture (including Architecture for ML/DL Applications), Computer Systems Security (Secure Processors, Secure Memory, Cybersecurity etc.), Computing for Assistive and Medical Technologies, Reconfigurable Computing (FPGA, Hardware Acceleration, HLS), Machine learning theory, applied

statistics, mathematical logic, automata theory, formal methods and verification, algorithms, computational complexity

School of Mechanical Sciences

Fluid and Thermal Sciences,

- Computational fluid dynamics, porous media flows, flow control, fluid-structure interaction, turbulent flows,
- Radiative heat transfer, high Reynolds number flows, bio-fluid dynamics,
- Interfacial sciences, surface wettability and colloids,
- Experimental combustion, combustion characterization of propellants, alternative fuels, metal fuels, ageing of solid energetic materials, solid composite propellants,

Design and Manufacturing,

- Electromagnetic Manufacturing,
- Advanced welding

Industrial Engineering and Operational Research

- Industrial Engineering
- Reliability Engineering
- Multi-attribute decision making

School of Physical Sciences

Experimental Nanophotonics & Quantum Optics

- Fabrication & characterization of 2D semiconductor heterostructures: Schottky barriers for tunnelling and spin-control of single particle and p-n junctions for light emission, detection and photovoltaic applications
- 2D heterostructure-atomic hybrid interface for quantum photonics

Computational Condensed Matter Physics

- First principles electronic structure investigation of transition metal oxides (bulk and heterostructures)
- ab-initio density functional theory- based investigation of complex magnetism
- ab-initio study of novel topological phases

Theoretical Soft Condensed Matter

- Studies in understanding the enhancement of search capabilities, using searchers with extended geometries and communication between searchers.
- Actin phenomenology.

- Limits to measurement of spatial information in biological cells.

Theoretical Nuclear and High Energy Physics

- QCD at high temperature
- Heavy quark diffusion in quark gluon plasma
- Effective field theory
- Color glass condensate and Glasma