Department	Research Areas
Biosciences and Bioengineering	Nanobiotechnology, Medical Devices, Sensors
Biosciences and Bioengineering	Computational Systems Genomics and Multi-Omics Data Integration using Next-Generation Sequencing (NGS) and Advanced Single-Cell Technologies
Biosciences and Bioengineering	Computational Biology
Biosciences and Bioengineering	DNA repair, Sexual reproduction, Genetics
Biosciences and Bioengineering	Tissue engineering
Biosciences and Bioengineering	Lightsheet Microscopy, Single Molecule Microscopy, Optical imaging.
Biosciences and Bioengineering	Structure and Function of GPCRs
Biosciences and Bioengineering	Lightsheet Imaging and Cytometry, Single Molecule Imaging
Biosciences and Bioengineering	Pyrolysis, process intensification, neutraceuticals, solid waste management, catalysis, nanomaterials, quantum dots, separation processes, photochemistry and photocatalysis, semiconductor materials, digestion and fermentation, carbon capture and mineralisation.

Chemical Engineering	Biomass processing (chemical and thermal), semicondutor and nono-material synthesis, bio-oil refining for better quality, solid catalysis using nanocatalyst, neutraceutical purification, process intensification, ultrasound extraction, microwave extraction, microwave and conventional pyrolysis, biochar use, wastewater treatement, soil modification using biochar
Chemical Engineering	CO2 capture in adsorption systems
Chemical Engineering	Molecular Simulations for Industrial Separation Processes; Next-Generation Membranes for Hydrogen Production; Industrial Solvent Recovery; CO_2 Capture and Separation Technologies; Covalent Organic Frameworks (COFs)
Chemical Engineering	Energy Storage (Batteries, Supercapacitors)
Chemical Engineering	Advanced Optical Diagnostics of Nucleate Pool Boiling in Multicomponent Fluids for High-Performance Thermal Management
Chemical Engineering	"Spatiotemporal Optical Investigation of Interfacial Dynamics in Polymer–Plasticizer Systems."
Chemical Engineering	High-Resolution Optical Characterization of Transport Phenomena in Polymeric Materials
Chemical Engineering	Hydrogen storage in the form of hydrates
Chemical Engineering	Energy conversion and storage, Passive carbon capture and utilization
Chemical Engineering	Organ on a Chip through Microfluidics

Chemical Engineering	Microfluidics, Bioengieering, Biomedical Devices
Chemical Engineering	Pyrolysis, process intensification, neutraceuticals, solid waste management, catalysis, nanomaterials, quantum dots, separation processes, photochemistry and photocatalysis, semiconductor materials, digestion and fermentation, carbon capture and mineralisation.
Chemistry	Photocatalytic H2 Production, Photoredox catalysis, Solid state lighting
Chemistry	NASICON-Structured Cathode Materials for High-Performance Sodium-Ion Batteries
Chemistry	Metal–Organic Chemistry, Carbon Capture and Conversion, Porous Materials
Chemistry	Enantioselective synthesis of centrally, axially, and inherently chiral molecules; photo- and electrochemical organic synthesis
Chemistry	Photocatalytic H2 production, Photoredox catalysis, Organic light emitting diode, Sensing of toxic ions
Chemistry	Solid-State Chemistry and Functional Properties of Inorganic Oxide Materials
Chemistry	Organic Synthesis and Catalysis
Civil Engineering	Structural Engineering - Lightweight Concrete structures
Civil Engineering	Behaviour of geosynthetic-reinforced infrastructure in seasonally frozen regions; Studies on avalanche protection barriers

Civil Engineering	Hydrological modelling
Civil Engineering	Structural Dynamics and Earthquake Engineering
Civil Engineering	Development of bioproducts using Environmental Biotechnology for industrial and commerical sectors; Remediation of hospital wastewater using engineered biocultures; removal of emerging contaminants from drinking water; Sludge management for circular bioeconomy in smart cities
Civil Engineering	Advanced Concrete Materials, Durability of Concrete
Civil Engineering	Hydrology and Climate Change, Experimental Hydraulics, Remote Sensing for Water Resources Management.
Civil Engineering	Solid Waste Management, WEEE and ELV plastic management, Recyclability assessment, Resource recovery, Standardisation of microplastic assessment, Microplastics impact and mitigation strategies
Civil Engineering	Cyclic analysis of CFRP concrete elements
Civil Engineering	Environmental Biotechnology, Waste Management in smart cities, Remediation of emerging contaminants of industrial importance, Bioproducts development as per industrial needs using sustainable waste resources
Civil Engineering	Hydrology, Climate Change, Experimental Hydraulics, Satellite Remote Sensing for Water Resources Management
Computer Science and Engineering	Speech and Audio Language Models

Computer Science and Engineering	Machine Learning
Computer Science and Engineering	Resource Allocation in 5G/6G, Systems and Network Security
Computer Science and Engineering	Light Weight and Secure Large Language Models
Electrical Engineering	Speech Processing, Artificial Intelligence & Deep Learning, Signal Processing
Electrical Engineering	Neuro Symbolic Reasoning, Deep Learning, Large Language Models, Uncertainty Quantification, Diffusion Models, Compressive Learning, Quantization-Aware-Training, TinyML
Electrical Engineering	RF Microelectronics, RFIC Design, and Semiconductor Devices
Electrical Engineering	Large Language Model, Artificial Intelligence, Deep Learning, Computer Vision
Electrical Engineering	Design and fabrication of III-Nitride based deep UV photodetector for UV Astronomy (Microelectronics))
Electrical Engineering	Bidirectional Converters (AC-DC and DC-DC), Electric Vehicle Charging Systems, Dual Active Bridge Converters, and Soft-Switched Converters
Electrical Engineering	Control Systems; Robotics and Autonomous Systems
Electrical Engineering	Antennas , RF and Microwave, RF Energy Harvesting
Electrical Engineering	Microelectronics and VLSI Design, Low-Power Circuits and Systems

Electrical Engineering	"Grid following and grid forming converters, Modular Multilevel converters, Renewable Integrated Power Converters and Battery Energy Storage Systems."
Electrical Engineering	Digital VLSI Design and Test, Hardware Security and Trust
Electrical Engineering	Embedded Systems, Wireless Communication (Performance Analysis of Energy Harvesting Cooperative networks)
Electrical Engineering	RFIC (Low Noise Amplifiers, Power Amplifiers, mixers, oscillator, filters, etc.) design
Electrical Engineering	Time-domain solutions for Integration of inverter-based renewable energy sources into grid
Electrical Engineering	Digital VLSI Design, FPGA Implementation and ASIC Chip Design of Post-Processing Tasks for Quantum Key Distribution
Electrical Engineering	RF Microelectronics and Semiconductor Devices
Electrical Engineering	Wireless communication, NOMA, RSMA, Terahertz, IRS,
Electrical Engineering	Intergration of Renewables in Grid and Cyber Physical System in Power System
Humanities and Social Sciences	Social Psychology: Social Stigma, Gender & Sexuality
Humanities and Social Sciences	Development Economics, Financial Economics, Industrial Economics
Humanities and Social Sciences	Financial economics, Environmental economics, Public finance

Humanities and Social Science	Agricultural Economics, Development Economics, Environmental Economics, Applied Econometrics
Humanities and Social Sciences	Sociology, Anthropology, and Cultural Studies
Humanities and Social Sciences	Sound Studies (JRF only)
Materials Engineeing	Development of self-healing oxidation-resistant carbon fiber based ultra high temperature ceramic composites
Materials Engineering	Materials For Advanced Energy Storage Technologies
Materials Engineering	(i) Metal extraction, (ii) e-waste Recycling, (iii) Computational Process metallurgy,
Materials Engineering	Materials for Hydrogen Storage Applications
Materials Engineering	Recycling of aluminum alloys, development of refractory alloys, AI/ML for materials
Materials Engineering	Processing of NdFeB Magnets using indegenous resources
Materials Engineering	Corrosion Science and Engineering
Materials Engineering	Air-Stable Solid Electrolytes for Solid-State Batteries
Materials Engineering	Structure–Property Relationships of Sodium Cathode Materials for Sodium-Ion Batteries

Mathematics	Permutation Polynomials over Finite Fields
Mathematics	Commutative Algebra
Mathematics	Analytic Number Theory
Mathematics	PDE and Numerics
Mathematics	Applied Probability
Mathematics	Number Theory
Mathematics	Algebraic Coding Theory
Mathematics	Algebraic Geometry
Mathematics	Combinatorics
Mechanical Engineering	Gas turbine engines, Liquid rocket engines, Atomization and combustion
Mechanical Engineering	Robotics and Control Systems
Mechanical Engineering	Micro-Machining, Sustainable hybrid Machining, Advanced Abrasive Finishing & Polishing

Mechanical Engineering	Structural Composite Battery Design, HVAC Modelling and Thermal Comfort, Body Armour Design and Manufacturing
Mechanical Engineering	Fluid mechanics and heat transfer in boundary layers
Mechanical Engineering	Experimental and computational fracture mechanics, Fatigue, Hydrogen Embrittlement
Mechanical Engineering	1. Desalination Techniques, 2. Effect of wind on leaf's oscillation dynamics and affect on boundary layers, 3. Development of passive loop for wicks' testing in electronic cooling devices, 4. A filter-less air pollution mitigation technology.
Mechanical Engineering	Advanced Manufacturing
Mechanical Engineering	Dynamics and Vibrations
Mechanical Engineering	1. Thermal hydraulic analysis of two phase flow, 2. Thermal hydraulic analysis of Liquid Metal, 3. Thermal hydraulic analysis of high temperature gas cooled reactor, 4. Thermal hydraulic analysis of supercritical fluid, 5. Neutron kinetics of nuclear reactor, 6. Nuclear coupled thermal hydraulic analysis of reactors
Mechanical Engineering	Computational Mechanics
Mechanical Engineering	Solar Energy, Hydrogen Energy
Mechanical Engineering	Insitu monitoring of Additive Manufacturing, 3D printing of continuous carbon fibre composites, Bioprinting, data driven model based Additive Manufacturing

Physics	Soft Condensed Matter Physics
Physics	Modelling magnetized strongly coupled plasmas
Physics	Non equilibrium statistical mechanics, biophysics
Physics	Transport in correlated electron systems
Physics	First-principles modelling
Physics	First-principles modelling of materials
Physics	Quantum Information and Quantum Computation
Physics	Energy storage, solid state batteries

Interdisciplinary Program (IDP)	Acid Alkaline battery, sodium ion battery **Eligibility Criteria:** **M.Sc. in Physics / Materials Science / Chemistry OR M. Tech. in Materials Engineering / Nanotechnology / Chemical enginnering/ Energy Science and Technology, or any other relevant discipline from a recognized University/Institute.** **The candidate should have a consistently good academic record.** **Candidates must have qualified a recognized national-level examination (e.g., GATE >2500, CSIR-UGC NET, or JEST)**.
Interdisciplinary Program (IDP)	Carbon Neutral Technologies,Sustainable Chemical Transformations, Carbon Capture and Conversion **Eligibility Criteria:** **M.Sc** **Chemistry/Physics or M.Tech in materials Engineering or Chemical Engineering**

Interdisciplinary Program (IDP)	Deep learning in medical imaging **Eligibility Criteria:** **M.Tech /** **B.Tech (from Premiere institute) in Computer science / Electrical Engineering /** **Electronics and Communication/ Biomedical Engineering/ AI / Data Science**
Interdisciplinary Program (IDP)	Tailoring NASICON-Structured Polyanionic Cathodes via Compositional Engineering for Enhanced Sodium-Ion Battery Performance **Eligibility Criteria:** **Applicants should possess an MTech (Chemical Engineering or Materials Engineering preferred) or an MSc in Chemistry, along with a valid GATE score or CSIR-UGC NET qualification.**

Interdisciplinary Program (IDP)	Automated Discovery of Battery Materials through Data-Driven Composition Prediction Algorithms **Eligibility Criteria:** **Candidate should hold a B.Tech (as per institute norms) or an M.Tech in any Engineering discipline.** **Proficiency in Python programming is essential, along with a working knowledge of machine learning methodologies.** **Familiarity with emerging paradigms such as large language models (LLMs) is highly desirable; however, candidates with strong conceptual foundations in data-driven modeling and algorithmic design will also be considered.**

Interdisciplinary Program (IDP)	Materials Science and Electrode Engineering for High-Performance Rechargeable Batteries **Eligibility Criteria:** **A** **Bachelor's or Master's degree in Engineering/Technology in Materials Engineering, Metallurgical and Materials Engineering, Chemical Engineering, Polymer/Plastics Engineering, Mechanical Engineering, or a related discipline, with a strong academic record and a proven understanding of electrochemistry and/or battery technologies;** **OR** **A Master's degree in Science (Physics, Chemistry, or related fields) with a strong academic record and a demonstrated background or proven understanding of electrochemistry and/or battery technologies.**
Interdisciplinary Program (IDP)	AI- and ML-Driven Predictive Modeling and Computational Tool Development for Healthcare toward Precision Medicine **Eligibility Criteria:** **Candidate should be proficient in Python programming and have knowledge of machine learning concepts, including large language models (LLMs), or at minimum possess a solid conceptual understanding of these topics.**