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Compendium of Research Specializations at SVNIT, Surat, September 2022

Faculty Research Specializations
Office of the Dean,
Research & Consultancy, SVNIT

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Deputy Director
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Dean, Research & Consultancy
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Dr Meghal Desai
Head, Chemistry
Dr. Suresh Kumar
Head, Civil Engg.
Prof G J Joshi
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Dr Rupa Mehta
Head, Electrical Engg.
Prof Ashish Panchal
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Dr Piyush Patel
Head, Maths & Humanities Engg.
Dr Jayesh Dhodiya
Head, Mechanical Engg.
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Preamble

"**Our vision 2020 is predicated on the belief that human resources are the most important determinant of overall development... ... ...**"
- Former Hon'ble President Dr. A. P. J. Abdul Kalam

The NITs have been given the mandate to play a significant role in the development of nation through the empowerment of human resources with the capacity to explore the available resources and exploit/utilise the existing ones, to improve quality of living and intellect. The SVNIT, Surat also continually makes sustained efforts to contribute meaningfully to the growth and development of the society.

Technology is the key for creating wealth for the country and for the upliftment of the economic and social status of the people of the country. The integrated technological strength consists of talented manpower, technology base and infrastructure for industrial growth. A good combination of these factors leads to a self supporting and prospering society. In order to develop and foster the technological strength, imparting quality technical education and striving to integrate innovative research with the teaching are the two foundation stones that have to be consistently strengthened.

The SVNIT, Surat attaches, therefore, immense importance to the research related activities, besides imparting quality technical education. The research culture at SVNIT consistently gained strength and momentum since being converted to an NIT from the erstwhile REC; as is evident from the statistics about the activities under the R&C office in general and the research profile in particular, mentioned elsewhere in this newsletter.

The Office of the Dean R&C oversees the institute research related activities and strives to act as a facilitatory as well as regulatory authority to ensure smooth functioning of the activities related activities. Acting as a functionally responsible entity in many research related activities, the Dean(R&C) office mainly caters to two principal objectives as follows, amongst others:

1. facilitating the routine functional aspects associated with the administration of the sponsored research projects, consultancy projects and other research related activities.
2. striving to enhance the research activities and encourage the faculty to accelerate the research activities in the institute.

This document is a compilation of the information pertaining to the **faculty research specializations** of the faculty members at SVNIT, Surat.

Faculty Research Specializations and Research Expertises

This document enlists the research specializations of the individual SVNIT faculty member and the real-world problems as well as the research problems; for which a faculty member perceives his/her research expertize can best be deployed to an advantage. This is enlisted department-wise.

Research Specializations & Expertises: Faculty members in the Department of Chemical Engineering

Sr No	Name of the Faculty member & Research Specializations & Indicative List of Research Problems Addressed OR eager to address
	Department of Chemical Engineering
1	Prof. Z. V. P. Murthy, Specialization: Wastewater Treatment; Separation Processes (membrane separations, Adsorption, Electro-coagulation etc.); Nanoscience/Nanotechnology Research Problems: Membrane distillation; membrane distillation-crystallization; membrane bioreactor; pervaporation separation.
2	Prof. P. A. Parikh, Specialization: Catalysis in Refining and Petrochemical Processes Fuels; Biofuels; Decarbonisation Technology; Hydrogen Storage and Transportation; Ammonia as a Fuel; Ammonia Decomposition. Research Problems: Obtaining important and value-added blending compounds for diesel and gasoline, lower alcohol and olefin oligomerization, olefin homologation, Remediation and sustainable catalyst, Photocatalytic degradation of wastewater.
3	Prof. M.Chakraborty, Specialization: Green Chemistry (Ionic Liquid, Microwave synthesis); Separation Processes (Emulsion liquid membrane, Supported liquid membrane etc.); Nanomaterials (Synthesis and application). Research Problems: Synthesis of biofuels and biofuels additive from lignocellulosic compounds; Separation of Endocrine disrupting compounds from wastewater using hollow fibre supported liquid membrane technique; Application of Nanofluid for different applications like drug delivery, heat transfer etc.
4	Prof. Jigisha Kamal Parikh, Specialization: Energy & Environment; Energy Conservation and Efficiency Upgradation; Waste to Energy, Process Design & Evaluation; Environment Audit; Environmanagement System; Colloidal Science & Surface Engineering. Research Problems: Biomass carbohydrates to value added chemicals and fuel components through chemo-catalytic route; Design and development of catalytic system/process for a given molecule; Waste valorization through Integrated biorefinery approach (Lab to Pilot Scale); Design and development of a pilot plant process including scale up studies; Techno-economic evaluation of various processes and plants; Design of controlled drug delivery system including drug-eluting devices mechanism and drug release kinetics; Encapsulation of typical bioactive components; Process development for selective extraction/separation of bioactive components from natural resources; application of Process intensified approach towards establishment of a typical process; Agriculture and food processing (Biobased materials and technology development); Design and evaluation of wastewater treatment strategies.

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Sr No	Name of the Faculty member & Research Specializations & Indicative List of Research Problems Addressed OR eager to address
5	Dr. Chetan M. Patel, Specialization: Nanoparticles production (Wet Nanomilling); Modeling & Simulation of Particulate Systems; Particle Technology (Powder/Particle Size, Shape & flow-ability Characterization, Shape analysis using Image processing, Powder compaction). Research Problems: Production of nano minerals; Nano biomaterials on large scale; Preparation of Nanostructured materials for Lithium ion batteries and supercapacitor; Curcumin Nanoparticles / nanogel for drug delivery; DEM simulation for Pharmaceutical powder filling process.
6	Dr. Meghal A. Desai, Specialization: Natural Products Extraction; Hydrotropic Separation. Research Problems: Application of Design of Experiments for optimization of various parameters in a Process; Extraction of valuable chemicals like essential oil, phenolic extracts, pectin from various biomass; Use of sonication and microwave radiation for improving the existing process; Facilities like microwave and ultrasound enabled vessel, HPLC, GC, etc. can be utilized for solving a problem upon collboration.
7	Dr. Arun Kumar Jana, Specialization: CFD Based Modelling and Simulation Liquid-liquid and gas-liquid multiphase flows; Drag Reduction in Pipeline Transportation; Heterogeneous catalysis in Petroleum Refining and Petrochemicals; Packed and Expanded Bed Operations. Research Problems: CFD Based Modelling and Simulation, Liquid-liquid and gas-liquid multiphase flows; Drag Reduction in Pipeline Transportation, Heterogeneous catalysis in Petroleum Refining and Petrochemicals; Packed and Expanded Bed Operations.
8	Dr. Jignasa V. Gohel, Specialization: Advanced thin film Solar cells; Nanomaterials/Nanocomposite Nanocatalytic degradation. Research Problems: New generation photovoltaic solar cells with high efficiency and low cost; Synthesis and characterization of novel nanomaterials and thin films; Investigation on stability, efficiency and degradation studies of hybrid solar cells; Investigation on novel materials for Energy Storage; Ab initio study of photoelectrochemical applications.
9	Dr. (Mrs.) Alka A. Mungray, Specialization: Membrane separation process, Wastewater treatment, Forward Osmosis (FO), Osmotic Microbial fuel cell (OMFC), Seawater Desalination, Polymer and earthen membrane preparation, Urine treatment, Hydrogel preparation, Polymer blend and nanocomposite, Bio-polymer. Research Problems: Fabrication and testing of various different variety of Polymer and earthen membranes; Development of effective draw agents for forward osmosis process, Modification of Osmotic microbial fuel cell for water, bio-electricity and wastewater treatment, Stacking of OMFCs, Development and application of hydrogels for water production and agriculture, Seawater desalination via forward osmosis, Astronaut's Urine converted to water and fertilizer for long Space mission for ISRO.
10	Dr. A. K. Mungray, Wastewater Treatment (biological treatment); Sludge treatment; Aerobic, Anaerobic processes; Waste to Energy; Nanotechnology; Decentralization; Sustainability Research Problems: Testing of water and wastewater samples; Decentralized wastewater treatment; Bioelectrochemical Fuel Cells and their variants; Electricity generation from wastewater by using Microbial Fuel Cells; Electricity generation in the deep sea sediments; Water and fertilizer recovery from human urine for Sustainable buildings, Biomass to valuable products; Recovery of water and fertilizer from Astronaut's Urine for Space research for ISRO.

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Sr No	Name of the Faculty member & Research Specializations & Indicative List of Research Problems Addressed OR eager to address
11	Dr. Sanjay R. Patel, Specialization: Ultrasound Assisted Separations; Conventional Separations; Polymer Processing. Research Problems: Ultrasound combined with micro-milli channel assisted Crystallization/precipitation; Microfluidics; Nano medicine; Drug Delivery systems; Process intensification using microreactors, ultrasound, and membrane; Quality by Design in Pharmaceutics, Optimization of Processes using Design of experiments; Waste water treatment; Modelling and Simulation.
12	Dr. V. N. Lad, Specialization: Colloidal & Interfacial Engineering; Process Intensification & Process Design; Rheology of Complex Fluids; Microfluidics; Thin Film; Multiphase Systems; Nanotechnology; Advanced Materials. Research Problems: Development of waterproof surfaces; Surface modification of textile; Lab-on-a-Chip devices design and applications for biomedical requirement; Soft materials and their improved flow properties for food; Pharmaceutical and cosmetic applications; Development of Multifunctional Nanomaterials for selected applications; Chemical process design for energy efficient and environment-friendly production; Development of Micro-sensors.
13	Dr. Smita Gupta, Specialization: Membrane separation techniques; Wastewater Treatment; Biochemical Engineering. Research Problems: Organic separation by application of liquid membranes in pervaporation; Microbial Enhanced Oil Recovery.
14	Dr. G. C. Jadeja, Specialization: Neoteric Green Extraction Techniques (Sub/Supercritical) and Pressurized Fluid Extractions; Valuable Chemicals from Renewable Resources (Bio-refinery Concepts). Research Problems: Recovery of high value chemicals from Biomass (particularly fruit and vegetable wastes) employing neoteric solvents
15	Dr. S.K. Sundar, Specialization: Drug delivery systems (Extraction/Encapsulation of bioactive compounds); Microfluidics and Nanotechnology; Colloids and Interfaces / Surfactants / Rheology; Modelling and Simulation; Biochemical Engineering (Fermentation/Enzyme Technology); Energy/Environment. Research Problems: Development of drug delivery systems for pharma, food and cosmetic applications; Pickering emulsions for food applications; Green synthesis of nanoparticles/nanocomposites; Wastewater treatment.
16	Dr. Jogender Singh, Specialization: Process Intensification,Heat Transfer and Fluid flow; Microfluidics,Micro-flow Extraction Processes; Separation Processes; CFD; Modelling and Simulation; Industrial Safety and Hazards Management. Research Problems: Microfluidic devices; Microflow extraction of precious metal from waste streams via process intensification; Process intensification for enhanced efficiency of the cyclone separator; Renewable energy technologies; Process modeling and simulation; Modelling and simulation of the solar pond.
17	Dr. Sarita Kalla, Specialization: Membrane Separation Process and Membrane Fabrication; Process Modeling and Simulation; Desalination and Waste Water Treatment; Process Optimization; Adsorption. Research Problems: Membrane Distillation; Membrane fabrication for different membrane separation processes; Membrane Gas Separation; Wastewater treatment; Microbial Fuel Cells; Grey Water Treatment.

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Sr No	**Name of the Faculty member & Research Specializations** & **Indicative List of Research Problems Addressed OR eager to address**
18	Dr. Vineet Kumar Rathore, Specialization: Contaminated Groundwater Treatment; Nanotechnology, Electrochemical Processes; Solid Waste Management; LCA and Sustainability Studies. Research Problems:Synthesis of nanoparticles through various types of processes and their application for the treatment of water contaminated with dyes, heavy metals and other metalloids; Management of waste generated post water treatment process and environmental assessment of the entire process to make it sustainable.

Faculty Member Research Specializations at the Department of Chemistry

Sr No	Name of the Faculty member & Research Specializations & Indicative List of Research Problems Addressed OR eager to address
1	Prof. Smita Jauhari, Specialization: Corrosion, Polymers and Wastewater treatment. Research Problems: Synthesis of Heterocyclic scaffolds and their biological evaluation; Synthesis of Heterocyclic compounds and their evaluation as a corrosion inhibitors.
2	Dr. Kalpana Maheria, Specialization: Synthesis of materials; Ion-exchange Waste water treatment and Catalysis. Research Problems: Design, preparation, characterization and applications of inorganic and hybrid materials (zeolite / mesozeolites based catalysts and ion exchangers and TMA salts based catalysts and ion exchangers) for organic synthesis (via MCRs); synthetic fuels, biomass valorization and waste water treatment (for heavy, toxic and precious metals' removal, color removal and pharmaceutical waste removal).
3	Dr. Premlata Kumari, Specialization: Organic Synthetic chemistry; Natural product extraction; Wastewater treatment. Research Problems: Designing and synthesis of reaction intermediates and bioactive compounds against various diseases like tuberculosis, cancer, bacterial infections, fungal infections, etc. Extraction of natural products from various medicinally important plants; development of HPLC methods for chemical markers of medicinal plants. Biogenic synthesis of nanoparticles using plant extracts and their applications such as biological property, dye discoloration, antibiotic removal, and metal detection.
4	Dr. Naved Malek I., Specialization: Synthesis; Physical Properties of Polymers. Research Problems: Development of stimulii-responsive Ionogel (ionic Liquid-based hydrogel) for smart drug delivery.
5	Dr. Bharatkumar Dholakiya, Specialization: Polyester resin for specialty applications; Biofuels-Ultra efficient biodiesel manufacturing. Research Problems: Development of polymeric cement from PET waste for construction application.
6	Dr. Suban K. Sahoo, Specialization: Inorganic; Supramolecular Chemistry; Molecular Modeling. Research Problems: Exploring new chemistry (mainly recognition, sensing and biosensing applications) with vitamin B6 cofactors by adopting nano and supramolecular concepts.
7	Dr. Suresh Kumar, Specialization: Miniaturized Extraction Techniques and Capillary Electrophoresis; Functional Nanomaterials,MALDI- and ESI- Mass Spectrometry; Plasmonic and Fluorescent Nanosensors,Biosensing; Bioimaging and Drug Delivery,Green and Environmental Chemistry. Research Problems: Synthesis of functional nanomaterials for analytical method development (Miniaturization and visual readouts); Biocompatible materials for drug delivery and biomedical applications.
8	Dr. Ketan C. Kuperkar,

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Table 2 – *Continued from previous page*

Sr No	**Name of the Faculty member & Research Specializations & Indicative List of Research Problems Addressed OR eager to address**
	Specialization:Surfactant Science, Polymer Chemistry; Metal Corrosion, Waste water treatment; Materials Science, Soft Condensed Matter; Computational Chemistry. Research Problems: Exploring the solution behavior and micellization phenomenon using Surfactants and Polymers for evaluating their biological applications.
9	Dr. Ritambhara Jangir, Specialization: Materials Synthesis and Applications Catalysis. Research Problems: Fabrication of COF-membranes for various purposes.
10	Dr. Togati Naveen, Specialization: Metal Catalyzed C-H Functionalization Using Transient Directing Groups; Heterocycles Synthesis via C-H Functionalization; Metal Catalyzed Functionalization of Unactivated sp3 C-H Bonds; Photoredox Catalysis; Hypervalent Iodine Chemistry; Metal free C-H Functionalization. Research Problems: Late stage functionalization of drug molecules via visible-light photo redox catalysis.
11	Dr. Lata Rana, Specialization: Coordination chemistry, Synthetic inorganic chemistry, Catalysis(homogeneous and heterogeneous), and Bio-inorganic chemistry. Research Problem: Synthesis of immobilized compounds, functionalized graphene oxide, and magnetic nano-particles for functional mimicking activity, dye degradation, and catalysis.
12	Dr. A Sivaiah, Specialization: Research areas: Organic synthesis, Inorganic Supramolecular chemistry, Nano/Bio sensors & Biomaterial applications. Research problems: Synthesis of fluorescent supramolecular Inorganic/organic frameworks for recognition of biomolecules in biological systems to provide diagnosis for the disease.
13	Dr. Subrata Dutta, Specialization: Organic synthesis, Bio-organic and medicinal chemistry. Nucleic acid chemistry. Research Problems: Synthesis of NIR dye for biomedical applications; DNA and peptide-based catalysis; Design and synthesis of small molecule drugs for Alzheimer's and Parkinson's diseases; Point - of - Care detection of viral RNA, antibody, and antigen.
14	Dr. Arup Kumar Ghosh, Specialization: Environmental Chemistry; Computational Chemistry; Instrumentation; Spectroscopic Analysis; Atmospheric Chemistry Research Problems: Photodissociation and photofragmentation studies of atmospheric pollutants; Design and development of gas/vapour sensitive materials (with varied morphological shapes for effective degradation and sensing of atmospheric pollutants; Investigation of reaction kinetics of volatile organic compounds with catalysts/sensors; Instrument Development for chemical analysis using spectroscopic and mass spectrometric methods; Electronic structure and energy calculations of molecules, clusters, and ions.

Faculty Member Research Specializations at the Department of Civil Engineering

Sr No	Name of the Faculty member & Research Specializations & Indicative List of Research Problems Addressed OR eager to address
1	Prof. C. D. Modhera, Specialization: Structural dynamics and Earthquake engineering; Health monitoring of structural concrete; Special concrete and relevant applications to the field; Proof checking of structural design and drawings for various civil infrastructures; Design of concrete mixes for various structures and rigid pavements. Research Problems: Proof checking of structural design and drawings for various civil infrastructures; Condition assessment of various RCC and steel existing structures; Design of concrete mix of rigid pavement and various civil concrete structures; Third party inspection of various civil projects; Corrosion assessment and remedial measures of RCC existing structures; Development of new concrete mix with supplementary cementitious materials; Development of Geo polymer concrete for high strength concrete mix; Behavior of high strength concrete mix; Design and vetting of special RCC structures.
2	Prof. J. N. Patel, Specialization: Water Resources Engineering; Geo-spatial Technologies; Computational Techniques. Research Problems: Groundwater Management using Transdisciplinary Approach(Rainwater Harvesting and Groundwater Recharge; Optimized storm water management with water saving; Economical design of Storm Water Drainage System; Flood Management and River Training; Irrigation Water Management using IoT; Agriculture Water Management using Hydrogel; Conjunctive use of Surface water and Groundwater; Solving Water Resources Engineering problems using Geospatial Technologies; Optimization of water resources engineering problems using Soft Computing Techniques; Reservoir Operating Policy; Design of canal lining and its economics; Design of Hydraulic Structures; Water Saving with Economical Solutions; · Reclamation of Saline Soil; Flood Plain Management; Plan for using Solar Energy and Wind Energy in Irrigation management; Control of Seawater Intrusion in Coastal Aquifers; Techniques of Desalination of Seawater economically; Design of Hydroponic and other related methods for farming using less water; Integration of Solar Energy, Wind Energy, Surface water and Groundwater for Green house and Poly House Farming and Irrigation; Management of Waste water and Seawater for Irrigation; Water Management for Industries; TPI for all Water Resources Engineering Projects); Training and Services for all Water Resources Engineering Projects
3	Prof. P. L. Patel, Specialization: Experimental and numerical investigations on transport of sediments and bed level variations in Alluvial rivers; Prediction of sediment yield and morphological studies of Alluvial rivers; Hydrodynamics of natural rivers; Stochastic approaches in modelling of turbulence in rigid and mobile boundary channels; Hydrodynamic modelling of floods; Hydrological modelling in assessment of water availability in the basin; Multi-objective approaches in optimal irrigation planning; Spatial and temporal variability of climatic and hydrological parameters in river basins; Inflow prediction into reservoirs. Research Problems: Morphological changes in planform and bed level variations of alluvial rivers; CFD analysis of Hydropower projects to solve their specific problems; Analysis and design of water distribution and storm water drainage system; Efficient design of hydraulic structures.
4	Prof. Atul K. Desai, Specialization: Structural Dynamics, Soil Structure Interaction, Fiber reinforced soil, Machine Foundations, Geo Textile, Roller compacted concrete for Rural Road development; Turbo Machinery Frame Foundation, Fiber Reinforced concrete & its damping, Bridge engineering, Wind induced oscillation in structure, energy dissipation, Earthquake engineering & structural forensic, Pile raft foundation, Beam-column joint, Bridges subject to seismic loading, Synthetic time history analysis; Analysis and designing of tall structure (such as microwave towers, chimney, cooling tower, steel structure).

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Sr No	Name of the Faculty member & Research Specializations & Indicative List of Research Problems Addressed OR eager to address
	Research Problems: Tornedo, cyclone modelling in CFD for improving Tall building resistance against winds; Fiber reinforced mortar and plaster for improvement in seismic performance of tall buildings with Infill wall effects, PT Beam and Slab behaviour with infill wall; Use of waste plastic mineral water bottle for improvement in concrete strength. (Patent already taken); To find speed of high-speed bullet train on cable stayed bridges for avoiding dynamic Resonance; To find 3 dimensional most innovative dynamic computer model for high speed bullet train passing above earthen embankments. (Already applied for Patent for testing equipment); Determination of pile capacity using new O - cell technology; Seismic Performance of extremely large span hybrid cable stayed suspension bridges; Use of plastic waste as Geo cell for high altitude mountain cold climate desert soil improvement of "Spiti area" in Himalaya. (Already applied for Patent); Development of new technology for Rural PQC (Pavement Quality Concrete) road for Indian village; Seismic performance of different types of buildings in Surat and development of Fragility damage index; Dynamic Behaviour of tall hybrid and monopole wind mills-towers; Determination of seismic R factor (Response reduction factor) for different types of bridges; Development of blast resistance barriers for protection of buildings; Computer modelling of Nuclear Reactor Shell and foundation in Indian condition with dynamic loading.
5	Prof. C. H. Solanki, Specialization: Sub Soil Characteristics Prediction in Geo-technical Engineering Ground improvement techniques Geo-environmental Engineering Research Problems: Valorization of industrial byproducts for the potential utilization as the construction materials; Utilization of waste of tyre shred for the improvement of weak subsoils; Seismic hazard mapping of using MASW and SASW test methods; Performance of mechanically stabilized earth walls; Reinforcement, backfill and surcharge effects; Reinforced granular column for deep soil stabilization; Liquefaction hazard mapping; Eiber reinforced clay soil; Rapid assessment of compressibility parameters; Bio char and its applications in geotechnical engineering; Effect of degree of saturation on strength properties of soil using geo cells; Solutions for foundations on problematic soils.
6	Prof. G. J. Joshi, Specialization: Urban Transportation Planning; Traffic Flow Modeling; Public Transport Planning; Regional Planning. Research Problems: Development of strategies for sustainable urban transportation systems; Development of framework for evaluating sustainability of urban transportation system; Efficacy of road safety engineering measures; Effectiveness of road signs to convey desired information to road users in rural areas User perception - compliance based study; How to enhance riderships for operating mass transit systems in cities?; Comprehensive evaluation of transit accessibility and level of service; Traffic flow state assessment based on travel time variability based congestion measure; Efficacy of intersection improvement strategies with respect to traffic facility operation.
7	Prof. Krupesh A. Chauhan, Specialization: Urban Planning; Urban design; Urban infrastructure planning; Housing; Road Safety; Pavement Design. Research Problems: Rural/ Urban/ Regional Planning & Design; Urban Infrastructure Planning & Management; Green Building & Smart City Project - Rating /Auditing/ Performance Evaluation.
8	Prof. M. Mansoor Ahammed, Specialization: Environmental Engineering; Household water treatment; Anaerobic waste treatment; Health-related water microbiology. Research Problems: Greywater treatment and reuse; Anaerobic treatment of organic fraction of municipal solid waste; Household water treatment; Reuse of water treatment residual.

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Sr No	Name of the Faculty member & Research Specializations & Indicative List of Research Problems Addressed OR eager to address
9	Prof. P. G. Agnihotri, Specialization: Application of Geospatial Technology; Flood Mitigation; Water Resources Engineering. Research Problems: Preparation of flood mitigation plan for flood prone zone; Disaster Management under GIS Environment; Ground Water recharge and exploration.
10	Prof. Rakesh Kumar, Specialization: Utilization of Slags, Geo synthetic, Chemical Stabilizers, Cement, Fly ash, lime and Others Non-Conventional Materials for Subgrade, Subbase and Base Engineering; Use of LWD, FWD, and others NDT instruments for QA & QC of Pavement; Planning, design, and implementation of Public Bus Transit (BRTS); Pavement Engineering (Design, Construction, Evaluation, Maintenance, and Rehabilitation); Highway Economics Analysis using HDM-IV and others Softwares Research Problems: Application of NSV for functional evaluation of pavement; FWD for structural evaluation of pavement.
11	Prof. R. A. Christian, Specialization: Air pollution; Fuzzy Logic application to environmental engineering. Research Problems: Air Pollution control and mitigation; CEMS and ETS for industries; Waste water treatment especially sewage; STP design; Environmental Audit Work.
12	Prof. Sandip A. Vasanwala, Specialization: Computer aided structural analysis Engineering; Mechanics Structural analysis; Computer applications in civil engineering; Neural network application in structural engineering; Earthquake resistance design of structures; Performance evaluation & capacity based design of concrete structures; Preliminary design of structures Neural application for preliminary design of space structures. Research Problems: Vetting of Structural Design and Drawing of High rise residential Concrete Building Structures; Structural Proof checking of Tensile structures; Proof checking for Design of foundations of High mast tower; Condition assessment of Over Head water tank and High rise / Medium rise concrete residential / commercial building structures; Proof checking of structural design of concrete bridges- Proof checking of Box Culvert structures;
13	Prof. S. M. Yadav, Specialization: Hydraulics of Alluvial Rivers; Application of Soft Computing Techniques in WRE Surface Hydrology; Hydrodynamics of Natural River Irrigation; Planning & Management Reservoir Operation, Sediments & Sediment Yield Sea Water; Intrusion & Ground Water Quality Modeling; Construction Management. Research Problems: Design and executed long distance pipeline successfully. Part of design and execution of world's biggest water supply network; Analyzing flood mitigation measures for the central Indian Rivers like Ganga, Gandak and Ghaghara; Interested in the collaborative research and consultancy work in the area of hydrodynamic modelling of floods and advanced flood forecasting techniques.
14	Prof. V. L. Manekar, Specialization: Sediment Laden Flow Modelling and Simulation; Ago-Climatic Modelling; Hydrodynamic Flood Modelling; Impact of LULC & Climate Change on Water Resources. Research Problems: Presently working on the estimation of the factors contributing runoff which is essential component of the hydrological processes for its efficient management.
15	Dr. Ashish Dhamaniya, Specialization: Dynamic Traffic Flow Modeling; Highway Capacity and Level of Service; GIS and GPS applications in Transportation Engineering; Pedestrian Flow Modelling and Facility Design; Road Safety; Pedestrians and Motorists.

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Sr No	Name of the Faculty member & Research Specializations & Indicative List of Research Problems Addressed OR eager to address
	Research Problems: Automation of Toll Plaza Operations; Dynamic Toll Pricing Framework; Data extraction and evaluation using Artificial Intelligence; Road Safety Implementation Framework; Transport integration tools for supply chain management
16	Dr. Dilip A. Patel, Specialization: Construction project management; Construction technology; Contract, dispute, and claim Management; Project appraisal, risk management, and feasibility study; Quality and safety management. Research Problems: Asset management by developing building information modeling (BIM); Developing construction safety and quality audit manual for construction; Application of latest demolition and non dig techniques; Preparation of construction demolition and waste management plan; Enhancement of bridge resilience and its asset management; Enhancement of water infrastructure resilience and its asset management; Digitalization of intangible and tangible heritage structures and their conditions assessment; Application of information technology in construction project management; Building services.
17	Dr. Gaurang R. Vesmawala, Specialization: Earthquake Engineering; Structural Health Monitoring; Optimum design of space structures; Neural network applications in structural engineering and computer analysis; Design of structures. Research Problems: Neural network applications in Structural Engineering; Digital image correlation techniques in Structural Engineering; Seismic design of steel-beam column joint with fuse details; Concrete with waste utilization.
18	Dr. K. D. Yadav, Specialisation: Environment Engineering:- Solid and Hazardous Waste, Composting, Vermicomposting, Ecological Sanitation, Organic waste Management, Greywater treatment, Flower waste utilisation , Garden waste disposal , Constructed Wetland, Bio- remediation and Leachate Treatment Research Problems: Composting and Vermicomposting of organic waste, Flower waste management-Conversion of waste to neutrient rich manure, Greywater treatment , Usr constructed wetlands technology, Analysis and Design of STP & ETP, Reuse of Greywater for non potable purpose, Analysis and design of MSW and Hazardous waste landfill, Leachate treatment, Environmental Audit work, Monitoring and Analysis of Industry performance.
19	Dr. P. V. Timbadiya, Specialization: Surface water hydrology; River analysis system; Hydrodynamic (Flood) modeling; Morphological Study of River; Fluvial Hydraulics; Dam Break Analysis; Water Distribution Network; Design and Analysis; Design of Storm water drainage; system and its analysis; Design of Sewerage Network and its analysis; Design of Canal; Climate Change Impact Study; Surface water hydrology; River analysis system; Hydrodynamic modeling. Research Problems: Study on Climate Change impact on Water Resources of basin; Local Scour around tandem and staggered bridge piers; Urban Flood modelling using 2D hydrodynamic modeling and quantification of Hazard, Vulnerability and Risk.
20	Dr. Satyajit Patel, Specialization: Utilization of Industrial solid wastes in Civil Engineering Constructions, Geo-environmental Issues, Soil stabilization, Ground improvement, Geo-synthetics for road pavements. Research Problems: Technology development for manufacturing angular shaped high strength fly ash aggregates for use in construction activities as a replacement of natural stone aggregates; Ground improvement using non-conventional materials for road pavements on clayey subgrade.
21	Dr. S. R. Suryawanshi, Specialization: Computational Mechanics; Analytical Modelling of Structural Concrete; Flexural and Non-Flexural Behaviour of Concrete Structures.

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Sr No	Name of the Faculty member & Research Specializations & Indicative List of Research Problems Addressed OR eager to address
	Research Problems: Utilization of C & D Waste as per UN agenda of Holistic Sustainable Development and NITI Ayog (GOI) Targets; Structural Health Monitoring Through IoT (Internet of Things); Fire Performance of the Structures; Analysis and Design of Special Structures such as High Rise Buildings, Bridges, Bunkers, Silos, Oil and Water Tanks etc.; Repair, Rehabilitation and Retrofitting of concrete structures; Design and Numerical Analysis of Concrete Structures for Other than Gravity Forces; Mix Proportions of Special Concretes.
22	Dr. Shriniwas S. Arkatkar, Specialization: Heterogeneous Traffic Flow Modeling and Simulation; Traffic Operation and Management; Transportation Systems Planning,Design and Operation; Public Transportation and Sustainable Transportation; Road Safety and Simulation. Research Problems: Intelligent Transportation Systems; Advanced Data collection methods for crash risk estimation; Human factors and implications in the design
23	Dr. Yogesh D. Patil, Specialization: Earthquake engineering; Fiber reinforced concreteSteel & reinforced concrete beam-column joint and design of steel structures. Research Problems: Polymer Modified Concrete using various additives and fillers; Utilization of waste plastic like PET, Polypropylene, PVC, Agricultural Waste like CNSL, POFA, etc.; Industrial Waste like FlyAsh, Red mud, Glass Powder, GGBS, etc.; Behavior of different studs in shear and tension (Composite Beam/ Bridges).
24	Dr. Anant Parghi, Specialization: Seismic analysis and design; Smart materials and their structural application (Shape memory alloys, Nano materials); Seismic retrofitting of steel and masonry structures; Recycle/reuse of industrial wastes for structural applications; Finite element analysis; Structural dynamics; constitutive relationship application of advanced composites materials-fiber reinforced polymer(FRP); Sprayed-Fiber reinforced polymer multi-criteria optimization and statistics. Research Problems: Use of suitable 3-D printing concrete; Use of recycled aggregate concrete in the road construction; Use of advanced composites Fiber reinforced (FRP), and superelastic shape memory alloys (SMA) rebar in the infrastructures; Forensic investigation structures; Application of sprayed-fiber reinforced polymer for the retrofitting of existing deficient infrastructures; Testing of large-scale structural elements under seismic loads; Seismic risk and hazard analysis of existing infrastructures; Destructive and nondestructive testing of structural elements
25	Dr. Bhaven N. Tandel, Specialization: Noise pollution modelling and mapping; Health impact of noise pollution; Air quality modelling and mapping; Indoor air quality; Odour pollution; EIA & Environmental legislation. Research Problems: Integrated road traffic noise mapping in urban Indian context; Evolutionary computation based modelling of human work efficiency in a traffic noise environment; Mitigation strategies for urban road traffic noise with special emphasis on silence zones; Modelling of vehicle driver behaviour and road traffic noise correlation; Modelling of cognitive task learning of school / college children exposed to traffic noise environments; Mapping PM 2.5 and PM 10 for Indian urban cities using real time data from low cost sensor networks; Indoor environmental quality of naturally ventilated classrooms; Development and comparison of ambient air quality prediction models using multiple linear regression and artificial neural networks.
26	Dr. Patel Chetankumar Ramanlal, Specialization: Transportation Planning; Town Planning; Traffic Planning; Geospatial Solutions.

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Table 3 – *Continued from previous page*

Sr No	Name of the Faculty member & Research Specializations & Indicative List of Research Problems Addressed OR eager to address
	Research Problems: Application of GIS, Big Data and IoT in Urban Planning; Freight Transportation and its Impact on urban mobility; E-Mobility and Autonomous vehicles for developing nation; Land Management Policy for Mega Project at peri urban areas; Women Empowerment in Urban Planning; Climate change mitigation strategies for compact urban areas; Dron and BIM to manage urban infrastructure
27	Dr. Ganesh D. Kale, Specialization: Effect of Climate Change on Hydrology Rainfall Runoff Modelling; Application of GIS and Remote Sensing in Water Resources Engineering; Application of GA, Fuzzy-Logic and ANN in Water Resources Engineering; Optimization in Water Resources Engineering. Research Problems: Hydrologic and hydraulic modelling of the Panchganga River basin (Water Resources Engineering); Prioritization of divisions, districts and blocks of the Rajasthan state for groundwater management; Investigation of factors affecting significant trends in Groundwater levels of blocks of the Rajasthan state (Water Resources Engineering); Analysis of stormwater drainage system of Southwest Zone of the Surat city in the context of climate change (Water Resources Engineering); Estimation of future streamflow of the Upper Godavari River Basin by using the SWAT model (Water Resources Engineering).
28	Mr. J. B. Patel, Specialization: Ground Improvement Research Problems: Reliability assessment of Reinforced soil wall for flood hazards; Hybrid retaining wall; Tiered Reinforced soil wall; Pseudo static, pseudo dynamic and dynamic analysis of earthen dam.
29	Dr. B. Kondraivendhan, Specialization: Pore structure characterization and modeling of pore size distribution of cement based materials; Effect of pozzolanic materials addition/replacement in cement based system; Strength and durability studies on cement based material; Studies on reinforced concrete corrosion; Repair and rehabilitation of concrete structures. Research Problems: Chloride, sulfate and carbon-di-oxide induced rebar corrosion in concrete; Alkali Activated Concrete; LC3- an alternative binder in Cement based materials; Limestone concrete; Determination of ITZ of cement based materials; Utilization of EAF slag in concrete Geo-ferrocement confinement.
30	Dr. Namrata D. Jariwala, Specialization: Helth related issues in solid waste mangement practice; Environmetal Education; Environmet and health; Air pollution. Research Problems: Comparison of indoor air quality and outdoor air quality in industrial environment; Source apportionment study; Heavy metal analysis of air borne particles; Aerosols and particulate matter measurements using remote sensing data; Correlation of particulate matter concentration with temperature profile of area; Monitoring of surface water quality using remote sensing data; Assessing health risk of workers using poor indoor air quality.
31	Dr. Tailor Ravin Maheshkumar, Specialization: Urban Infrastructure Planning; Pavement Design and Assessment. Research Problems: Preparing Town Planning Scheme for optimize land utilization; Preparing redevelopment plan for old city areas to balance various impacts of urbanization through Local Area Planning; Performing social impact assessment of various projects; Accessing city's future growth opportunities considering most influential factors through Geospatial Techniques; Urban Infrastructure planning and monitoring; Heritage area conservation planning; Redefining Green space Index evaluation for different climatic and geographical conditions; Predicting optimum carrying capacity for city development considering available natural resources and city resilient capacity; Accessing city security through IoT and Geospatial Technologies; Accessing quality of life of city residents through measurement of various indices like QLI, Poverty Index etc.; Applying different approaches to optimize value capture for various urban infrastructure projects.

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Sr No	Name of the Faculty member & Research Specializations & Indicative List of Research Problems Addressed OR eager to address
32	Dr. Shailendra kumar, Specialization:Ground Improvement Techniques; Soil Stabilization; Reinforced Earth & Geosynthetics and Geotechnical Earthquake Engineering. Research Problems: Pullout capacity of granular pile; Liquefaction remedial measures; Remedial measures for contaminated soil.
33	Dr. (Mrs.) Shruti J. Shukla, Specialization: Geo-technical engineering and soil improvement techniques; Pursuing research in the field of piled raft foundation. Research Problems: Durability of Commercial Waste Bagasse Ash and Ground Granulated Blast Furnace Slag Stabilized High Plastic Clay; Reduction of Lateral Earth Pressure on Retaining Wall By Expanded Polystyrene (EPS) Geofoam Inclusions; Behaviour of Cohesive Soil Reinforced With Waste Tyre Fibres; Experimental Investigations on the Mechanical Properties of Sand stabilized With Colloidal Silica; Detailed Study of Different Types of Backfill Material Used In Geotechnical Engineering.
34	Dr. Amit J. Solanki, Specialization: Pavement Materials; Pavement Design and Analysis; Pavement Evaluation and Maintenance. Research Problems: Design of bituminous mixes in order to achieve superior performance with advanced characterization techniques; Design of pavements using non-conventional materials.
35	Dr. Ankesh Kumar, Specialization: Machine Foundation; Soil Dynamics; Rock Mechanics; Analysis of Underground Structures; Physical and Numerical Modelling; Numerical Methods in Geotechnical Engineering; Slope Stability (rock/soil); Blast/Impact Loading in Geo-Materials. Research Problems: Dynamic response of machine foundation resting on weathered and highly fractured rockmass; Support design for tunnels in squeezing ground condition; A novel approach for the prediction of the strength of anisotropic rock under true triaxial stress condition; Creep behaviour of soft rocks Effect of extreme environmental conditions on the strength of rock and rockmass.
36	Dr. Jitesh T. Chavda, Specialization: Computational Geomechanics; Deep Foundations; Deep Excavations; Use of PIV Technique in Geotechnical Engineering; Physical Modelling in Geotechnical Engineering; Seismic Hazard Analysis; Dynamic Soil Properties; Constitutive Modelling in Geotechnics; Conservation of Heritage Structures. Research Problems: Site Specific Seismic Hazard Analysis for Gujarat state for Heritage Conservation; Heritage Impact Analysis; Finite element analysis of Geotechnical problems; Numerical simulations of Large Deformation problems in Geotechnical Engineering; Experimental and Numerical Evaluation of 3D arching in Soil; Development of Transparent soil for PIV analysis; Advancement in Image processing for Geotechnical Applications; Experimental geotechnics, Geophysical tests, MASW and Microtremor test
37	Dr. Kashyap A. Patel, Specialization: Structural Engineering, Steel-concrete Composite Structures; Reinforced Concrete Structures; Bridge Engineering; Structural Health Monitoring; Rehabilitation and Retrofitting. Research Problems: Concrete cracking modeling using smeared crack approach(Tension stiffening modeling, Time dependent (creep and shrinkage) analysis, Effect of flexibility of shear connectors on composite structures, Finite element modeling using commercial software, Artificial neural network application in structural engineering, Fire performance of structures, Application of FRP composites in construction, Blast engineering); Metro rail construction and management.

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Sr No	**Name of the Faculty member & Research Specializations** & **Indicative List of Research Problems Addressed OR eager to address**
38	Dr. Smaranika Panda, Specialization: Air Quality Management; Air Quality Modelling; Urban and Industrial Air Quality Monitoring; Carrying Capacity Studies; Chemical characterization of Particulates; Indoor Air Pollution; Exposure Analysis; Health Risk Assessment; Source Apportionment; Receptor Modelling. Research Problems: Air quality monitoring using low cost sensors: performance evaluation in various environmental scenarios; Quantification of pollutant concentrations using remote sensing and GIS; Designing Carrying Capacity based Air Quality Management framework for industrial clusters; Personal exposure & health risk assessment of street vendors in contrasting land uses of Surat; Emission inventory of exhaust and non-exhaust air pollutant emissions for Surat city.
39	Dr. Tamizharasi G, Specialization: Earthquake Engineering; Structural Dynamics. Research Problems: Structural Analysis: Static and Dynamic (Linear and Nonlinear); Structural Design: Earthquake Engineering (Reinforced Concrete Structures); Behaviour of buildings under earthquake shaking; Checking the compliances given in building code provisions.
40	Dr. Vishisht Bhaiya, Specialization: Seismic Vibration Control and Anti-Seismic Devices; Probabilistic Framework for Seismic Design and Performance Assessment; Uncertainty Modelling in Dynamical System; Discrete Element Modelling Rehabilitation & Retrofitting; Disaster Mitigation and Management with respect to Multihazard events. Research Problems: Bending, Buckling and free vibration analysis of composite plates; Wind Vibration Control of Tall Structures; Performance Assessment of Structures using Artificial Intelligence.

Research Specializations & Expertises:
Faculty members in the Department of Computer Science and Engineering

Sr No	Name of the Faculty member & Research Specializations & Indicative List of Research Problems Addressed OR eager to address
1	Prof Anupam Shukla, Director of the institute Specialization: Soft Computing AI Speech Processing Biomedical and Bio-informatics
2	Prof Dhiren R Patel, Specialization: Information Security, Access Control, Blockchain, Explainable AI. Research Problems: Designed and implemented large scale identity and access control systems (e.g. AIEEE/CCB centralized admission system for NITs, JoSAA centralized admission (and seat allocation) for IITs and NITs, On-line Examination System for VJTI Mumbai, Blockchain for LBSNAA Masoorie (for cafeteria, accommodation, transport usage)); Designed an Advanced Framework for Hidden Link Analysis and Trust Management on Social networks; Blockchain and DLT based supply-chain management, single source of truth and immutable data store, Supporting SDGs – Food Security, Climate change and others; Cyber Security and Risk Management framework for critical systems, Intrusion Detection Systems; Explainable AI – Fairness, Accountability, Trust and Ethics in AI (FATE).
3	Prof Devesh C Jinwala, Specialization: Information Security & Privacy; Information Security & Privacy in Resource Constrained Environments; Machine Learning for Information Security and Privacy; Requirements Specifications and Analysis. Research Problems: Mitigation of Denial of Service Attacks in the Wireless Sensor Network and the IoT Protocols; Key Aggregate Searchable Encryption with various properties like Query Expressiveness, Conjunctive key word search, search over multi-owner data, improving the query performance, multi-delegated search, Search result verifiability; Aggregate Searchable Encryption With Result Privacy; Encrypted data ordering with functional encryption and Break-the-glass access control in Key Aggregate Searchable Encryption in the Cloud; Decentralized Context-aware Access Control mechanisms for the IoT systems; Resolution of Conflicts in the Non-functional requirements; Static Analysis of the Source code for resolution of the Security Vulnerabilities, using tools like SonarQube, Coverity Scan; Software modeling, verification and analysis using tools like Atlas, Alloy Analyzer, the language Z; Applications of the Wireless Sensor Networks in the implementation of Secure Cyber Physical Systems in Environmental Engineering domains – stress, strain in civil structures, moisture control in a field, etc.; Privacy issues in the Cyber Physical Systems.; Applications of Generative Adversarial Networks with a focus on the Cyber Physical Systems; Adversarial Machine LEarning and issues
4	Prof Mukesh A Zaveri, Specialization: Computer Vision, Multimedia Processing - (Image Processing, Audio and Speech Processing); Internet of Things; Wireless Sensor Network; Natural Language Processing; Machine Learning; Visual Cryptography; Biometric and Forensic Analysis. Research Problems: Humor identification; Skin cancer detection; Target detection and tracking; Video analytics: Surveillance, Summarization; Machine translation; Speech recognition; Biometric multi modality based recognition; Deep learning based multimedia processing; Multi biometric based authentication; Internet of things based resource optimization; 3D scene creation and image restoration.
5	Shri Rakesh P Gohil, Specialization: Image and Video Processing; Machine Learning; Internet of Things; System Programming and Embedded Systems.

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Table 4 – *Continued from previous page*

Sr No	Name of the Faculty member & Research Specializations & Indicative List of Research Problems Addressed OR eager to address
	Research Problems: Use of Machine learning techniques for Image and Video Optimisation; Video tracking; Video Captioning; Video Stabilization; Human act detection using image/video processing; Analytics of video for monitoring of traffic; Recognition of Human activity through neural network; Content based sampling; Image and video Captioning; IOT based smart agriculture; IOT based emergency health monitoring system; IOT based home automation; IOT based Efficient transportation systems; Development of web server using SOC; Smart lighting solutions for smart cities; IOT based multi-parameter patient monitoring system.
6	Dr Rupa G Mehta, Specialization: Big data analytics; Social media data analysis; Document analysis and recommendation. Research Problems: Expert system for legal document analysis and recommendation; Identifying influencing person/events for specific domain of the society based on the social media data; Sentiment analysis of the societal domain and prediction of action/reaction related specific event using the activity on the social media; Developing efficient solution for Smart city development, like ML based efficient garbage collecting system for Smart city; Study impact of various parameters for the scholarly rank generated by various scholarly platforms like Research Gate.
7	Dr Krupa N Jariwala, Specialization: Human Computer Interaction; Cognitive Computing; AI; Machine Learning; Image understanding. Research Problems: Gaze based task detection using low grade video cameras; Accessibility and usability study for autonomous vehicles; Reinforcement Learning to generate trading signals for financial analysis; Time Series forecasting & modeling for stock price prediction; Automated question generation and grading system; Efficient Route optimization; Forgery detection techniques in images and videos; Content Based image retrieval of building floor plan images; Text recognition from multimodal documents.
8	Dr Dipti P Rana, Specialization: Data Mining; Machine Learning; Soft Computing; Big Data Analytics; Pattern Recognition; Natural Language Processing; Database Management System; Web Application; Computer Organization. Research Problems: Development of novel machine learning algorithms for big data; Development of novel data preprocessing and machine learning algorithm for imbalanced data; Analysis and development of big data structure, storage, access and retrieval issue; Solution for mining based on Utility; Discovery of semantic and pragmatic information using NLP; High performance solution for big data applications; Novel solutions for Social media platforms like News, Scholarly Platform, etc.; Improvement of Societal needs using big data solutions for Health, Education, etc.; Recommendation systems for professions like Health, Legal, e-commerce, government departments, etc.; Design of IoT based software solutions for Agriculture, Disease, etc.; Innovation with temporal and geospatial big data; Design of innovative visual web application.
9	Dr Udai Pratap Rao, Specialization: Information Security & Privacy; Privacy in Location Based Service; Big Data Privacy; Security and Trust management in Online Social Networks (OSNs); Security and Privacy in Internet of Things (IoT) and Cyber Physical Systems (CPSs); Blockchain; Distributed Computing.

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Table 4 – *Continued from previous page*

Sr No	Name of the Faculty member & Research Specializations & Indicative List of Research Problems Addressed OR eager to address
	Research Problems: Privacy Enhancing Technologies for Edge-Envisioned Environment (Smart Cities & Smart home); Provable privacy solutions for vehicular edge environment; Privacy-preserving trajectory publishing; Secure-multi party computation for spatial privacy; Homomorphic encryption for enhanced location privacy preservation; Defending Topology Inconsistency Attacks in Low Power and Lossy Networks (LLNs); Sybil Attack Detection and Mitigation in Internet of Things (IoT); Designing Methods of Secure and Reliable Communication in IoT Networks; Designing White Box Encryption Schemes for Constraint IoT Devices; Designing Lightweight Authentication Techniques for Cyber-Physical Systems (CPSs); Decentralization in IoT using Blockchain Technology; Defense Mechanism to Protect Users from Profile Cloning Attack on Online Social Networks (OSNs); Sybil attack detection mechanism in Online Social Networks (OSNs); A Trust Inference Approach for Online Social Networks (OSNs); Scalable anonymization techniques for privacy preserving Big Data Analytics; Container security.
10	Dr Bhavesh N Gohil, Specialization: Security and Performance issues in distributed/cloud/edge/fog computing. Research Problems: Intrusion detection/prevention in cloud/edge computing; Load balancing in cloud/edge computing; Energy efficient task and VM allocation/scheduling in cloud/edge/fog computing; VM migration in cloud/edge computing.
11	Dr Sankita J Patel, Specialization: Information Security and Privacy; Secure Computation; Privacy Preserving Data Publishing; Security and Privacy Issues in Online Social Networks; Security and Privacy Protocols for Internet of Things; Security and Privacy Issues in Cyber Physical Systems; Biometric Cryptosystem; Blockchain Technology; Software Requirement Specification and Analysis. Research Problems: Secure Authentication Protocols for Distributed Internet of Things, Prevention of Privacy Attacks for Online Social Network Data Publishing; Machine Learning Approaches for Detection and Prevention of Distributed Denial of Service Attack; Methods for Securing Fingerprint Templates for Biometric Authentication in Single/Multi Cloud Environment; Template Protection and Key Generation Techniques for Multimodal Biometric Systems; Secure Authentication Protocols for Low Power Wide Area Networks of Cyber Physical Systems; Protocols for Device Authentication in 5G Cellular Networks; Leveraging Blockchain technology for various application domains; Secure Multiparty Computation protocols for Private Computation at cloud servers.
12	Dr Balu Parne, Specialization: Security in Mobile Communication Networks; Authentication and Key Agreement in M2M Communication / Internet of Things; Information Security and Privacy, Security in IoT based Applications; Blockchain Technology; Security in E-commerce and Social Networking. Research Problems: Authentication and Key Agreement Protocols for 5G Communication Networks; Lightweight Secure and Privacy Preserving Authentication Protocols for IoT based Applications; Group based Authentication Protocols for IoT based Applications; Machine Learning based Approach for Security in Social Networking and E-commerce; Secure Key Establishment in Smart Grid Technology; Data Security and Privacy in Smart Grid Technology; Secure Authentication and Key Agreement Protocols for Low Power Wide Area Network (LPWAN); Blockchain enabled Public Key Infrastructure based Solutions for Internet of Things (IoT).
13	Dr Keyur J Parmar, Specialization: Information and network Security and Privacy; Cyber Security; Encrypted data processing in Wireless Sensor Networks/Internet of Things; Information Security & Privacy in Resource Constrained Environments such as WSNs / IoT; Security protocols for key distribution in WSNs/IoT; Cryptography, Blockchain Technology; Security and Privacy Issues in Blockchain Technology; Security and privacy issues in Web/Android applications.

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Sr No	**Name of the Faculty member & Research Specializations** & **Indicative List of Research Problems Addressed OR eager to address**
	Research Problems: Design and analysis of security algorithms and protocols to prevent security attacks in resource-constrained Wireless Sensor Networks (WSN) and Internet of Things (IoT); Applications of cryptography in the area of Security, blockchain technology, WSNs, etc.; Encrypted data processing in WSNs/IoT; Key distribution protocols for resource constrained Wireless Sensor Networks (WSN) and Internet of Things (IoT); Design, analysis, and development of novel applications of Blockchain Technology and Smart Contracts; Security and privacy issues in Blockchain technology and smart contracts; Security and privacy issues in Web/Android applications.
14	Dr. Alok Kumar, Specialization: Wireless Sensor Networks; IoT; Information/Network Security; Blockchain. Research Problems: Secure and Reliable Multicasting Protocol of IoT devices; Distributed Attribute Based Encryption; Combinatorial design based key pre-distribution schemes.

Faculty Member Research Specializations at the Department of Electrical Engineering

Sr No	Name of the Faculty member & Research Specializations & Indicative List of Research Problems Addressed OR eager to address
1	Prof. S.N.Sharma, Specialization: Mathematical control theory; Dynamical systems; Stochastic processes; Stochastic filtering; Algebra; stochastic differential equations. Research Problems: Unresolved nonlinear control problems; Applications of methods of systems theory and control; Contemplating classical control results and their significance for today's research.
2	Prof. A.Chowdhury, Specialization: Electrical Machines; Drives; Power system. Research Problems: Design of Impedance source converters for Renewable energy and Electrical vehicle; Design of Special Machines, Design of Machines for Renewable Energy and Electrical Vehicle; AI/ML applications to condition monitoring of Electrical Machines.
3	Prof. A.K.Panchal, Specialization: Si nanostructures for improving efficiency of Si based solar cell technology thin film optical; Structural and electrical characterization; Comparision studies of different solar PV technologies. Research Problems: I Would like to work on the design and development of photovoltaic-battery charging systems and its control for fast energy transfer for EV charging stations.
4	Prof. V.A.Shah, Specialization: Power Electronics & its applications; Power system Hybride Electric Vehicles; Micro controller & its applications. Research Problems: Design, control and energy management of battery supercapacitor hybrid power source for electric vehicles; Modelling of Energy storage devices; Fault tolerance mode operation of multiphase induction machine; Regenerative Braking of Induction Motor; Fast battery charging station design and control with a solar based reserve energy storage system; Impact analysis of EV on Power Grid.
5	Dr. Mahmadasraf A. Mulla, Specialization:Electrical Drives; Power Converters; Power Quality; Renewable Energy. Research Problems: Development of Commercial Grade Static Var Generator (SVG); Development of Static Dynamic Voltage Regulator; Development of Battery Management System and Chargers; Development of High-Voltage (11 kV) Capacitor and Inductor Switching using Thyristors.
6	Dr. P.Kundu, Specialization: Application of Digital Signal Processing in High Voltage Engineering; Partial Discharge and Condition Monitoring; Electromagnetic Field Computation using Finite Element Method. Research Problems: High voltage testing and diagnosis of electrical equipments; High voltage laboratory design; Development of insulation systems.
7	Dr V.Mahajan, Specialization: Power system stability; FACTS devices. Research Problems: Artificial intelligence; Cyber security of Smart grid; machine/deep learning for smart grid; Artificial neural network; fuzzy logic; cyber security related encryption/decryption; Restructuring and deregulation; renewable energy sources and its role in smart grid; power system operation and planning; reliability engineering; power system reliability evaluation.

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Sr No	Name of the Faculty member & Research Specializations & Indicative List of Research Problems Addressed OR eager to address
8	Dr. H.G.Patel, Specialization: Control systems; Automation; Stochastic process. Research Problems: Design of Industrial Automation System with PLC, SCADA and/or Industrial Drive; Design of Control and Power circuits for ETP, STP or any Industrial plant.
9	Dr. Rakesh Maurya, Specialization: Multi-phase Induction Motor Drive; High Power Factor Converters; Power converters for EV battery charging; Resonant DC-DC Converters, Custom Power Devices; Power Converters for Power Quality Improvement. Research Problems:Green Electric Battery Charging Solutions with features of reduced power density.
10	Dr. S.R.Arya, Specialization: Custom Power Devices and its Application; Power Electronic Converters for high performance system; Electric Vehicles Technology; Control of Electric Drives system; DC/DC Converters and Soft Switching Technique; Power Quality and Optimization Algorithms; Soft Computing and Adaptive Algorithms; Distributed Power Generation System and Smart Grid Technology. Research Problems: Power quality: Custom power devices and its control; Hybrid renewable energy system specially Solar and wind under microgrid concept; Design and application of multi port output converters; Solar Powered Electric Rickshaw; Battery charging and drives control.
11	Dr. Mahesh Aeidapu, Specialization: Power Electronics; Hybrid Renewable Energy Systems; Optimization. Research Problems: Grid integration of renewable energy systems; Development of novel meta-heurisitc optimization techniques; Optimal sizing and energy management strategies for hybrid renewable energy systems.
12	Dr. S. Tolani, Specialization: Digital Control of Power Electronic Converters; Microgrid and Power Quality Electric Drives. Research Problems: Low-Cost Digital Control of Power Electronic Converters; Design and Control of Isolated Bidirectional Battery Chargers for EV and SST Applications; Multi-phase DC-DC Converters for Automotive Applications.
13	Dr.R. Radhakrishnan, Specialization: tate estimation; Nonlinear filtering; Target tracking. Research Problems:Application of state estimation algorithms in process monitoring and control.
14	Dr. Kunisetti. V. Praveen Kumar, Specialization: Power Electronics; Electrical Drives; Multi-level inverters and Application of Renewable energy to Electrical Drives. Research Problems: Multi-level inverters, Grid Tied converters; Open ended induction motor drives, Electric drives for vehicular applications.
15	Dr. Gangireddy Sushnigdha, Specialization: Control systems; Optimal control theory; Meta heuristic algorithms. Research Problems: Application of optimal control theory; Development of novel evolutionary optimization techniques; Development of path planning algorithms and AI based control schemes.

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Sr No	**Name of the Faculty member & Research Specializations & Indicative List of Research Problems Addressed OR eager to address**
16	Dr. J. Venkataramanaiah, Specialization: Advanced Switching Techniques; Multilevel Inverters; FACTs Devices; Grid Tie Inverters; High power Converters. Research Problems: Advanced converters with reduced part count; Fuzzy and Neural network based switching algorithms for Multilevel Inverters; MLI for polyphase applications.
17	Dr. Suresh Lakhimsetty, Specialization: Power Electronics & amp; Drives. Research Problems:High-Gain Converters, Multi-Level Inverters, Multi-Phase Machines.
18	Dr Sukanta Haldar, Specialization: Next-Generation Electric Vehicle Technology, Intelligent Electric Traction Drive Systems for EV, Electric Drives; Power Electronics, Machine Learning/Deep Neural Network (DNN) /ANN based control for EV. Research Problems: Wide Band Gap Device Based Next-Generation Intelligent Electric Traction Drive System for Electric Vehicle Application, Next-Generation Electric Vehicle Technology; WBG (SiC & GaN) Inverter Development for EV Application; Intelligent Electric Traction Drives System for EV; Machine Learning/Deep Neural Network (DNN) /ANN based control; Efficient PMSM Drives, Multi-Level Inverters; Power Converter Developments ; Battery Management System.
19	Dr. Akanksha Shukla, Specialization: Power system planning and analysis, Integration of distributed low-carbon technologies, Modern distribution system, Microgrids operation and planning, AI and ML applications to Power system. Research Problems: Data driven based modelling and management of distribution system with low-carbon distributed technologies (renewable, storage, EVs), Charging infrastructure planning and operation, Operation and planning of grid connected and stand-alone microgrids, Uncertainty modelling, Artificial intelligence and machine learning applications to Power system.

Faculty Member Research Specializations at the Department of Electronics Engineering

Sr No	Name of the Faculty member & Research Specializations & Indicative List of Research Problems Addressed OR eager to address
1	Prof. Jignesh N. Sarvaiya, Specialization: Image Processing; Image Registration; Deep Learning; Medical Instrumentation. Research Problems: Bio Impedance Measurement; Deep learning in Healthcare.
2	Prof. (Mrs) Upena. D. Dalal, Specialization: Wireless Communication techniques; 5G technology; Wireless systems; Optical wireless; Signal processing. Research Problems: SDN in VANET; Intelligent Medical IOT; Cellular planning with Machine Learning; 5G Terchnology.
3	Dr Anand Darji, Specialization: CDMA; Mobile Communication. Research Problems: IoT based Smart Automatic Parking System; IoT based Early Flood Detection System; IoT based Smart Agriculture System; Design implementation of Antenna for 5G.
4	Dr. (Ms.) Jigisha N. Patel, Specialization: Signal Processing; Wireless Communication Image / Video Coding. Research Problems: Image compression; Signal Detection /Estimation using deep learning.
5	Dr. Piyush N. Patel, Specialization: Optical Communications and Networks; Photonics Devices & Sensors; Microwave Antenna and Wavegudes; Metamaterial based Sensors Optical, RF, Metamaterial based Sensors & Biosensors. Research Problems: Wearable RF Sensors; Metamaterial based Sensors; Optical Sensors.
6	Dr. (Mrs.) Rasika N. Dhavse, Specialization: Micro - Nano Electronics; VLSI Design;Bio Medical Measurement System. Research Problems: Paper and pencil based sensors; Novel semiconductor devices; Bio impedance measurement system; Digital Filter Design for biological measurements.
7	Dr. (Ms.) Shilpi Gupta, Specialization: 5G Technology; Massive MIMO Detection Techniques; Antenna Design for 5G Applications; Waveform Designing for MIMO Radar; Free Space Optics; Fiber Optic Sensors. Research Problems: Design and implementation of optical wireless communication link; Deep learning based Wireless system; Design implementation and Fabrication of Antenna for MIMO/ 5G applications; Long Period Fiber Bragg Grating/ Fiber Bragg Grating sensors.
8	Dr. Zuber M. Patel, Specialization:HDL/FPGA based design; VLSI Design of RISC microprocessors; FPGA/ASIC Design of wireless transceiver hardware; Embedded Systems. Research Problems: Autonomous drone for plant inspection; LDPC decoding hardware based on deep learning algorithm; Custom RISC-V CPU design for low energy devices; Intelligent accident detection and alerting system.

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Sr No	Name of the Faculty member & Research Specializations & Indicative List of Research Problems Addressed OR eager to address
9	Shri. Naresh B. Kanirkar, Specialization: CDMA; Mobile Communication. Research Problems: IoT based Smart Automatic Parking System; IoT based Early Flood Detection System; IoT based Smart Agriculture System; Design implementation of Antenna for 5G.
10	Dr. Prashant K. Shah, Specialization: LMI Based Improved Stability Criteria (DSP based) Research Problems: Digital Signal and Image Processing; Adaptive and Nonlinear filtering; Artificial Intelligence application; LMI Based Improved Stability Criteria (DSP based).
11	Dr. Abhilash S. Mandloi, Specialization: Fibre Optics Optical Communications; Optical Networks; Free Space Optics; Photonic Devices, Integrated Optics. Research Problems: Design of optoelectronic circuits; Optical transmitter and receiver design; Design of signal conditioning systems for sensors.
12	Dr. Abhishek Acharya, Specialization:Physics & Modeling of Nano-Scale Devices; Device-Circuit Interactions in Nano-Scale Transistors; Wide Bandgap Semiconductors and 2D Materials for Devices & Circuits. Research Problems: Design and Modelling of Solar Cell for High Energy Efficiency; Modeling of High Voltage (40-60V) N /P LDMOS devices; Realization of high quality Gallium Nitride epitaxial FinFET devices for power electronics.
13	Dr. Kishor P. Upla, Specialization: Machine/Deep Learning; Object detection/recognition; Multi-spectral and hyperspectral image processing; Image Restoration; Bio-medical Image Fusion; Information Fusion; Multi-Resolution Image Fusion/Pan-Sharpening; Image Super – Resolution. Research Problems: Image fusion using MS and Pan images (Pan-sharpening) and fusion of other modalities; Image Super-resolution for visible and thermal images; Night vision surveillance; Low-resolution face recognition; Image restoration; No-reference Image quality assessment; Video Deblurring.
14	Prof. Pinalkumar J. Engineer, Specialization: FPGA based system design; VLSI architecture for real-time signal/image processing; High performance embedded computing Embedded and real-time systems. Research Problems: Robots for Precision agriculture; FPGA implementation of Communication System; Edge Computing for Computer VIsion applications; Smart Camera for Visual Sensor network; Multicore processor architecture for Computer Vision applications; High performance embedded computer vision; FPGA based Embedded CNN architecture; High Performance Embedded Computing for Computer Vision; Embedded Control for robotics and automation.
15	Dr. (Mrs.) Shweta N. Shah, Specialization: Wireless Communication; Satellite Communication, Navigation system, Mobile Communication and standards; Digital Video Broadcast and standards; Cognitive Radio; NavIC/IRNSS. Research Problems: Satellite based Navigation process and solution, especially for signal quality, Indoor and Outdoor navigation model development; NavIC based product development for commercial or for research based; Jamming/Spoofing identification and mitigation; SDR based system development; Intelligent Traffic management system as a complete solution; GIS based application development; Mapping of infrastructure with more precision based on NavIC+GPS; Wireless Communication for infrastructure development; Landslide monitoring using GNSS with application; Wireless data analysis using deep learning, Anti drone system.

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Sr No	Name of the Faculty member & Research Specializations & Indicative List of Research Problems Addressed OR eager to address
16	Prof. Golak Santra, Specialization: Patch AntennaMicro-strip filte. Research Problems: Gain and Efficiency enhancement of Electrically Small Antenna using Metamaterials; Electrically Small Antenna for portable and wearable devices; Efficient Millimeter wave antenna for 5G applications; Optical Antennas and Nano Antenna for short range Indoor application.
17	Prof. Mehul C. Patel, Specialization: Digital Signal Processing using VLSI Research Problems: Design & Implementation of scalable and high-speed Image processing algorithm design on FPGA platform; Design & Implementation of high speed and scalable encryption and decryption standard for Security application; Design and implementation of communication systems on hardware platforms; Design and development of various protocols for high speed communication over channel; Scalable and optimum design of f SDR and NFV protocol; FPGA/ASIC Design of wireless transceiver hardware.
18	Dr. Deepak Joshi, Specialization: Metaheuristics; Analog Circuits: Design and Optimization; Computational Intelligence; CAD for VLSI. Research Problems: Many - objective optimization for real world problems, preferably in VLSI design.
19	Dr. Kamal Captain, Specialization: Cognitive Radio; Signal Processing; Statistical Signal Processing; Wireless Communication; Machine Learning. Research Problems: Cognitive radio for improving spectrum utilization; Modulation classification in wireless communication.
20	Dr. Kirti Inamdar, Specialization: Microstrip Patch Antenna design using Metamaterials; Wearable Antennas. Research Problems: Metamaterial based antenna designing; Wearable Antennas; Development of RF active and passive devices.
21	Dr. Nithin Chatterji, Specialization: Device Simulation and Modelling, Semiconductor device physics, Solar Photovoltaics, Memory devices (DRAM). Research Problems: Modelling of solar cells for indoor photovoltaic applications; Modelling of Tandem solar cells.
22	Dr. Raghvendra Pal, Specialization: Wireless ad hoc Networks; Vehicular ad hoc Networks; Machine Learning for wireless communication; Medium access control. Research Problems: Optimal cognitive channel selection using deep learning in Vehicular adhoc Networks; Efficient channel utilization in the Internet of Vehicles; Clustering in the Internet of Vehicles; • Analyzing the impact of various Machine learning algorithms on the performance of Internet of Vehicles; Prototype designing for the Internet of Vehicles using Raspberry pi.
23	Dr. Shivendra Yadav, Specialization:Modeling and simulation of Micro Nano Semiconductor Devices; Application and Design of Nano Devices for Biomedical Applications; Linearity and High Frequency Parameter Analysis of Hetero-material Nano Semiconductor Devices; Modeling and simulation of Negative Capacitance in Ferroelectric Thin Films.

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Table 6 – *Continued from previous page*

Sr No	**Name of the Faculty member & Research Specializations** & **Indicative List of Research Problems Addressed OR eager to address**
	Research Problems: Modeling and Simulation of Micro Nano Semiconductor Devices; Design of Nano Device Sensors for Biomedical Applications; Linearity and High Frequency Analysis of Hetero-Material Devices; Modeling and Simulation of Negative Capacitance in Ferroelectric Thin Films.
24	Dr. Suman Deb, Specialization:Signal Processing,Speech Processing,Speech based Health Analysis; Emotion Analysis based on Speech and Image,Speech Pathology Detection; Voice Conversion/ Speaker Identity Conversion,Pattern Recognition. Research Problems: Person's Emotion detection from speech; Speech based health Analysis; Different disease analysis from the speech signal, Heart rate analysis from the speech signal;
25	Dr. Suresh Dahiya, Specialization: Wireless Channel Model, Massive MIMO System, Satellite based navigation. . Research Problems: Development of FPGA based GNSS receiver for spinning systems, GNSS based attitude determination.
26	Dr. Vivek Garg, Specialization: Optoelectronic Devices (Photovoltaics, Photodetectors); Quantum Technology (Imaging, Sensing and Communication); Energy Storage Devices (Supercapacitors and Fuel Cells); Modelling of Nanoscale Devices; Optical Communication. Research Problems: Ultrathin Photovoltaic Devices; Quantum Imaging and Sensing; Nanoscale Devices for biosensing application; Quantum communication; 2D material based Supercapacitor; New material excavation for Energy Harvesting and storage.

Faculty Member Research Specializations at the Department of Mechanical Engineering

Sr No	Name of the Faculty member & Research Specializations & Indicative List of Research Problems Addressed OR eager to address
1	Prof. R. Venkata Rao, Specialization: Advanced engineering optimization techniques and their applications to the problems of design; Manufacturing and thermal engineering; CAD/CAM/FMS/CIMS; Concurrent Engineering; Sustainable Manufacturing; Design of Mechanisms. Research Problems: Design optimization of thermal systems and devices; Design optimization of mechanical components; Parameters optimization of sustainable manufacturing processes; Application of optimization algorithms to smart manufacturing systems.
2	Prof. H. K. Raval, Specialization: Metal Forming Analysis; Metal Cutting; Advance Manufacturing Processes; Computer Aided Manufacturing & C.I.M. Research Problems: Sheet metal forming analysis like deep drawing, plate rolling; Incremental sheet forming; Forming of Tailor Welded Blank for automobile application; Computer Aided Manufacturing with CNC FANUC programming; Bulk metal forming analysis like forging, rolling etc.; Metal cutting with Advanced Manufacturing processes.
3	Prof. D. P. Vakharia, Specialization: CAD-CAM; Tribology and Machine Design. Research Problems: Computer Aided Design and Analysis of Machine Elements; Tribological analysis of Bearing elements; Enhancement of fatigue life of bearing elements using theoretical and experimental techniques.
4	Prof. K. P. Desai, Specialization:Cryogenics; Manufacturing Science; Unconventional Machining Processes. Research Problems: Cryogenics and modern manufacturing processes.
5	Prof. Jyotirmay Banerjee, Specialization: Computational Fluid Flow and Heat Transfer; Multiphase Flow and phase change applications; Turbomachine. Research Problems: Recurrence analysis for identification of two-phase flow regimes in industrial pipes; Design and optimization of Latent Heat Storage systems; Development of accurate numerical algorithms for complex multiphase flows; CFD analysis to depict Vortex rope formation in hydro turbomachines; Dispersion of effluents in lakes and oceans using two-phase jets; Nucleate and flow boiling analysis for cooling of small scale thermal systems.
6	Prof. A. A. Shaikh, Specialization: Composite Material; CAD/CAE; Reverse Engineering.

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Table 7 – *Continued from previous page*

Sr No	Name of the Faculty member & Research Specializations & Indicative List of Research Problems Addressed OR eager to address
	Research Problems: Development of smart material/shape memory polymer composites (Investigating Shape recovery of Polymer based smart material/smart carbon fibre composite/ Three phase composites with Nano constituents. Material characterization of developed Nano composites); Developing 3D cavities/Microchannel using Laser (Micro Machining, Investigating requirement of Various Raster shapes and Mc process parameters for various shapes to make molds using multi pass concept for industrial applications); Reverse Engineering for shape evaluation for additively build shape memory Polymer (Investigation of surface defects (NDT) of composites and smart material. Development of digital model from physical model); Mechanics of Composites (Experimentation and computational mechanics for CFRP composite patches and Glass-Kevlar hybrid multilayer thermoplastic thermoset system. Investigation of dynamic impact loading and ballistic tests, damage evaluation for structural and defense); 3D cavities for customized shapes for developing micro moulds; Hybrid / multi pass by AWJ on composites.
7	Prof. Shailendra Kumar, Specialization: AI Applications in Sheet Metal Forming; Press Tool Design; Incremental Forming; Non-traditional Machining; Computer Aided Process Planning (CAPP); CAD/CAM/CIM Manufacturing Processes. Research Problems: 3D Printing of Polymeric parts; 3D Printing of Metallic parts; Incremental Sheet Forming; Non-traditional Machining.
8	Prof. T. N. Desai, Specialization: Six Sigma; Total Quality Management; Industrial Engineering. Research Problems: Application of TQM Techniques; Application of Six Sigma technique for quality improvement; Application of Lean Sigma technique for productivity improvement.
9	Dr. B. M. Sutaria, Specialization: Tribology; Heat Transfer; I.C.Engine; Thermal Engineering. Research Problems: Fuel injection strategies, combustion performance and emission characteristics of a diesel engine; Investigation of Tribological characteristics of I C Engine pumps and machines; Failure and Dynamic Analysis of Laminated; Composite and Sandwich Structures.
10	Dr. A. D. Parekh, Specialization:Refrigeration & Air Conditioning; Fluid flow & Heat Transfer Turbo machines. Research Problems: Performance optimization of automobile air conditioning using R1234yf refrigerant as a replacement to R134a; Improvement of heat transfer using anofluid/NanoParticles in Vapour Compression Refrigeration system; Experimental and numerical investigation of Heat transfer coefficient and frictional pressure drop for two phase flow through mini channel; Experimental and Numerical investigation of Vortex tube refrigeration system; Experimental and Numerical investigation of Vortex tube refrigeration system; Experimental and thermodynamics analysis of Cascade refrigeration system.
11	Mr. M. B. Maisuria, Specialization: Thermal Engg.; Energy system; Heat exchanger. Research Problems: Nano Fluid and Heat Exchanger.
12	Mr. D. B. Gohil, Specialization: Mechatronics; Robotics; Advanced Manufacturing Process. Research Problems: Application of mechatronics / robotics / advanced machining processes in development of new systems or upgradation of existing systems.
13	Dr. D. I. Lalwani, Specialization: Machining; Optimization; Condition Monitoring.

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Table 7 – *Continued from previous page*

Sr No	Name of the Faculty member & Research Specializations & Indicative List of Research Problems Addressed OR eager to address
	Research Problems: Prediction of Johnson-Cook material model parameters using Oxley theory; Optimization of mechanical engineering problems; Fault diagnosis of rotating machinery.
14	Dr. (Miss) Jyoti Menghani, Specialization: Corrosion Engineering; Thin films; Physical Metallurgy of Al alloys; Tribology. Research Problems: Development of Corrosion; Erosion and Wear-resistant thermal Spray coating; Development of polymer composites for brake pad material; Development of metal matrix composites by casting technique; Welding of Ferrous and Nonferrous metals; Friction stir processing; Surface Characterization of Material.
15	Dr. Ravi Kant, Specialization: Supply Chain Management; Sustainable and Green Supply Chain Management; Reverse Logistics; Lean Six Sigma; Knowledge Management; Multi Criteria Decision Making Methods. Research Problems: Reverse logistics for Medical Waste Management; Implementation of Circular Supply Chain in Manufacturing Industries; Sustainable Supply Chain Innovation in Manufacturing Industries; Sustainable and Green Supply Chain Management practices in the Small and Medium Scale Enterprises.
16	Dr. Beena D. Baloni, Specialization: Turbomachiens; Jet propulsion; Compressible fluid flow. Research Problems: Subsonic Wind tunnel testing with test section size 600x600 cm 2 upto velocity 12m/s; Onsite testing of in house developed SV series wind turbine (Design Patent approved) blades for SHAWT; Development of class 1 C.F. Pump testing facility.
17	Dr. Purnanand V. Bhale, Specialization: Alternative Fuels; I.C. Engines; Energy Conservation; Management and audit; Non-Conventional Energy Systems. Research Problems: Design and Development of Solar Assisted Heat Pump based PV/T system; Design and Development of Solar Assisted Biogas Reformer Unit; Installation of Scheffler Solar System of 16 Sq Mt for Cryogenics Applications; Engine Testing on Variable Compression Ratio Engine for alternate Fuels for combustion characteristics; Engine Endurance Testing with alternate fuels; Consultation to civic body related Municipal Solid Waste Management sites for Manure and RDF; Consultation for HVAC Systems for Energy Efficiency and Performance Analysis of Cold Storages and Auditoriums, Specific Buildings (Energy &amp, Buildings); Development of Biodiesel Plants of small to Large Size; Design and Development of Large size Biogas plant for bottling Purpose based on rice husk, maize straw, kitchen waste and agro residues (Environment Section of Civil Dept); Sewage based Biogas Power Plant (with civil Department); Energy efficient Cook Stoves; Use of aquatic biomass for material and energy applications; Use of alternate fuels in cook stoves; Material Compatibility of Metals, Non Metals and Elastomers components of Engine System with alternate fuels from long term compatibility point of view; Consultation for use of Refused Derived Fuels Pallets for Coal fired boilers and Cement kilns; Design and Development of Low cost onion storage for farmers with hybrid cooling; Low Cost Solar PV Panels Cleaning Mechanisms; Fire safety audits of Public Transport Utilities; Energy Audits of Industrial Utilities (As a BEE Certified Auditor); Characterization of all types of solid, liquid and gaseous fuels for engine and furnace applications; Thermoelectric Generators; Technology Transfer for Small size kitchen waste/ Cow Dung based biogas plant for canteen or hostel mess up to 10 Cubic Meter with Modular FRP design for hotels and educational institutions; Energy Storage; Consultation for Electric Buses for public Transport; Life Cycle Assessment of Power Plant (Energy System) with cradle to grave approach (With Environment Section of Civil Dept); Innovative Hot Water Solutions using energy integration and renewable energy for process industry; Consultation for AC and Non AC MIDI Buses for Civic Body; Consultation for Engine Powered Aquatic De-Weeders for Rivers; Consultation for Engineering aspects of Vehicle Mounted Suction; Jetting and Recycle Facility for cleaning chocked Sewer Lines (with Environment Section of Civil Dept); Steam Lines and Boilers Utilities

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Sr No	Name of the Faculty member & Research Specializations & Indicative List of Research Problems Addressed OR eager to address
18	Dr. Hemantkumar B. Mehta, Specialization: BTMS; Two-phase flow and heat transfer; Microscale flows; Pulsating Heat Pipe and Heat Sink; Optimization of Thermal Systems; Radiative Heat Transfer; Finite Time Thermodynamics. Research Problems: Development of Cryogenic and Hybrid Pulsating Heat pipe; Loop Heat Pipe based Battery Thermal Management System; Flow boiling in Single Layered and Double Layered MCHS; Development of Thermo-acoustic heat engine for hybrid vehicles; Development of Correlations for next generation Hybrid nanofluids.
19	Dr. Harshit K. Dave, Specialization: Additive Manufacturing Professes; 3D printing filaments & raw materials; hybrid composites; unconventional machining processes; micro machining processes; modeling & optimization of manufacturing processes. Research Problems: 3D printing of polymer/metal parts for various applications; Design for Additive Manufacturing; Design and development of AI enabled robots for day today applications; Application of AI and ML in manufacturing processes.
20	Dr. R. D. Shah, Specialization: Fluid Flow; Heat Transfer; Numerical Methods. Research Problems: Upward Swirl Combustor; Inverse Diffusion Flame; Heat Transfer Augmentation; Porous media Combustion.
21	Dr. A. V. Doshi, Specialization: Micro Hydro Turbine; Fluid Machines. Research Problems: Performance verification of radial flow centrifugal pumps; Hydraulic analysis of low specific speed pump as turbine for power generation and energy recovery systems; Micro hydro turbine performance evaluation.
22	Dr. Bade Mukund H, Specialization: Energy Management & Efficiency; Energy Modelling; Process Integration; Pinch Analysis; Heat exchanger and network analysis; Fluid Mechanics & Fluid Machines; Thermal System Analysis; Heat and mass transfer; Fuel Cell Technology. Research Problems: Energy Model-based benchmarking of Stenter Machine used in Textile Dying Houses; Hydrodynamic analysis of Pump as Turbine; Energy Modelling of Building; Energy Analysis of Spray Dryer and Performance Improvement by Energy Recovery; Energy model-based analysis of thermal systems, Heat Exchanger Design and Analysis.
23	Dr. Sandeep Soni, Specialization: Machine Design; Tribology and Bearing Design; Hydrodynamic/Hydrostatic Lubrication; Materials Characterization, Finite Element Analysis of Machine Components; CAD-CAM; Analysis of Steam Turbine; Wear of Machine Components. Research Problems: Design of Machine Components for Friction and Wear; Nano-Lubrication in Machine Members; Analysis of Ball and Rolling Contact Bearings; Simulation of Hydrodynamic Bearings; Development of Polymer Composites for Brake Pad Material;
24	Dr. Dinesh Singh, Specialization:Decision Making in the manufacturing environment. Research Problems: Friction Stir Welding (FSW) process; Surface composites by Friction stir processing.
25	Dr. Manish Rathod, Specialization: Heat & Mass Transfer; Phase Change Process; Heat Exchanger.

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Sr No	Name of the Faculty member & Research Specializations & Indicative List of Research Problems Addressed OR eager to address
	Research Problems: Design optimization of thermal systems and devices; Development of PCM slurry as effective HTF; Application of Micro encapsulation of PCM; Synthesis and Characterization of Nanofluid; Synthesis and Characterization of Nano encapsulated PCM used in building, solar, transportation applications.
26	Dr. Vivek D. Kalyankar, Specialization: Manufacturing Process; Optimization Techniques; Casting Material Science. Research Problems: Ni-Based hard facing as an alternative of Co-based Stellite; Hardfacing for P91 grade steels; Development of high temperature wear resistant NiCrSiBC; Hardfacing approach with identified buffer layer on P91 steel; Recommendations of suitable buffer layer material for cladding and substrate under consideration; Investigation on creep behavior of engineering materials; Consultation for welding related problems to industrial products; Significance of metallurgical changes developed in the cladded surface deposited by welding process; Dissimilar welding of advanced grade sheet materials for automobile applications; Mechanical and metallurgical characteristics of NiCrBSi overlay surface on 304SS with and without WC reinforcement; Influence of PTAW process parameters and Co-Cr overlay characteristics with SS 316L substrate material; Parameters optimization of welding process for advanced grade steel using advanced optimization techniques; Application of advanced optimization techniques to engineering problems.
27	Dr. Achchhe Lal, Specialization: Deterministic Finite Element Analysis and Stochastic Analysis and Modeling of Aerospace Engineering Structures; Functionally Graded Material Structures; Smart Material Structures; Deterministic FEM and Stochastic analysis of Free and forced vibration; Buckling; Bending; Stability; Failure and Dynamic Analysis of Laminated Composite and Sandwitch Structures; Deterministic Finite Element Analysis and Stochastic Analysis of Pressure Vessel modeling; Structural Analysis and Modeling of Nanomaterial and Structures. Research Problems: Development, Characterization and Performance Evaluation of Multi-phase Composite Panels.
28	Dr. Shailesh N. Pandya, Specialization: Manufacturing Processes & Design, Structure-property correlation in manufacturing processes, Industrial Engineering, Tribology of materials (Fiction & wear), Heat treatment. Research Problems: Wear behavior of stir cast Al metal matrix composites; Hybrid investment casting process; Thermal modeling of Wire Arc Additive Manufacturing (WAAM) process; Design and analysis of tools and fixtures for FSSW process.
29	Dr. Vimal Patel, Specialization: Machine design and dynamics; Fluid machines; Refrigeration and air conditioning; Metal forming – Tailor welded blanks. Research Problems: Development of Numerical Model to study thermal analysis of laser irradiated biological tissue phantom; Development of Numerical model to study transport phenomena in open cell foam; Performance evaluation of fire fighter fabric.
30	Dr. Vikram Rathod, Specialization: Renewable Energy; Biogas & its application; Gas Engine performance & Emission; Turbomachines. Research Problems: Biogas Upgradation and application; Biogas plant design and development; Horizontal Axis Wind Turbine Design and Analysis; Biomass cook stove; Biomass Gasification and application; Solar Green House Active dryer; Solar Thermal collector; Gas Engine performance and analysis; Gas Turbine compressor design.

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Sr No	Name of the Faculty member & Research Specializations & Indicative List of Research Problems Addressed OR eager to address
31	Sh. A. B. Makwana, Specialization: Heat Exchanger C.F.D. analysis Fuel Cell. Research Problems: Liquid/gas combustion system; Solid gas flow of granular material; Heat transfer enhancements.
32	Sh. Anil Mahto, Specialization: Robotics; Machine Design, Finite Element Method; CAD/CAM. Research Problems: Robotics; Kinematic Analysis of Parallel Manipulators; Analysis of Laminated Composite Structures.
33	Sh. Nikunj G. Patel, Specialization: pressure Vessel Design; Conditioning Monitoring; Energy Analysis & Bench Marking Research Problems: Energy analysis and Benchmarking.
34	Dr. Vipul M. Patel, Specialization: Radiation Transport in Participating Media; Fluid Flow and Heat Transfer in Porous Media; Radiation Therapy, Bio-heat Transfer; Computational Fluid Dynamics. Research Problems: Development of Numerical Model to study thermal analysis of laser irradiated biological tissue phantom; Development of Numerical model to study transport; Phenomena in open cell foam; Performance evaluation of fire fighter fabric.
35	Dr. Naresh Yarramsetty, Specialization: Experimental Heat Transfer, Numerical Heat Transfer, Heat pipes, Refrigeration and Air conditioning. Research Problems: Development of a heat sink coupled with a heat pipe for efficient thermal management of electronic components, Development of a pulsating heat pipe-based hybrid pyramid type solar still for productivity enhancement, Design and development of a jet impingement experimental set up for turbine blade cooling.
36	Dr. Amit Kumar, Specialization: Solar Thermal Desalination System; Solar Powered Atmospheric Water Generation; Solar Thermal Desiccant Air Conditioning; Adsorption Refrigeration; Solar Air and Water Heating; Solar Drying; Sensible and Latent Heat storage. Research Problems: Design & Development of solar powered atmospheric water generation system using desiccant bed and desiccant wheel; Design & Development of solar powered desiccant air conditioning system; Development of solar desiccant dryer; Design & Development of solar thermal desalination system; Design & Development of Evacuated tube solar air heater integrated with Heat Storage Unit.
37	Dr. Prabhansu, Specialization: Gasification; Heat Transfer,; Solar thermal. Research Problems: Optimization of tracking device for concentrating PV panel; Enhancement in solar powered air conditioners through better heat transfer techniques; Study of major water pollutants from the Ganga river and the rural vicinity; Design of HVAC systems; Solar assisted pyrolysis and gasification of sewage sludge.
38	Dr. Mulay Amrut Shrikant, Specialization: Sheet metal forming, CNC technology, Multi criterion decision making, Process optimization, CAD-CAM.

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Sr No	Name of the Faculty member & Research Specializations & Indicative List of Research Problems Addressed OR eager to address
	Research Problems: Optimization of electrical process paraters in incremental forming process; Multistage incremental forming strategy for DC04 and TiGr2 alloy; To investigate best CAM strategy for production of quality component this can help to depute Incremental forming technology in industry; Yield locus generation of cruciform specimen: Simulation and Experimental study.
39	Dr. Biranchi Narayan Sahoo, Specialization: Casting, Metal matrix composite/ Nano composite; Lightweight materials, Plasticity and deformation behavior of materials; Microwave Processing, Forming; Machining; Tribology. Research Problems: Development of light weight high entropy alloy through casting processing; Microwave casting of ferrous and non-ferrous materials; High temperature deformation behavior study of Mg alloys and composites; Development of ultra-fine/ nano grained materials through rolling process; Micro forming of composite materials.
40	Dr. Nikhil A. Baraiya, Specialization: Combustion; Thermoacoustics instability; Combustion diagnostics; Alternate fuels; Thermo-fluid dynamics; Heat transfer. Research Problems: Development of hydrogen-enriched fueled combustor; Development of fuel flexible engines; Development of micro gas turbine combustor for auxiliary power units; Thermo-acoustics instabilities in gas turbine combustors; Combustion diagnostic in engines; Development of supersonic combustors; Non-linear Dynamical systems; Turbulence modelling and flow instabilities; Flow instabilities in turbo machines.
41	Dr. Rohit Tamrakar, Specialization: Rotor Vibrations; Vibration Analysis; FEM; CAD Modelling; Energy Harvesting through Vibration. Research Problems: Design and Development of micro energy harvester; Energy harvesting through smart fabrics; Dynamic analysis of rotors containing longitudinal cracks.
42	Dr. Pallvita Yadav, Specialization: Manufacturing Processes; Advanced Machining Processes. Research Problems: Hybrid machining Process; Numerical and Experimental investigations of Electro-chemical Discharge Machining Process; Modelling and Optimization of Non-Traditional Machining Process; Polymer Nanocomposites Materials.
43	Dr. Sumit Khare, Specialization: Solid Mechanics; Vibrations; Plates and Shells; Fiber-Reinforced Polymer Composites. Research Problems: Vibration analysis of plates and shell like structures; Design Simulation and Modeling of mechanical components; Development of Numerical Model to study CNT based Composites; Vibration analysis of mechanical components.
44	Dr. Rohan Rahul Pande, Specialization: Biomass cookstove; Heat transfer; Thermodynamics; Nanofluids. Research Problems: Investigations on Gasification of Refused Derived Fuel (RDF); Numerical and Experimental investigations on combustion characteristics of Refuse Derived Fuel (RDF); Production of a Potential Fuel Source from Waste; Design and analysis of natural draft cook stoves; Computational analysis of combustion systems.
45	Dr. Rayasam Srilakshmi, Specialization: Fracture mechanics; Finite element analysis; Computational Fracture and Damage Mechanics; Study of Fatigue behaviour of aircraft panels; Dynamic response of damaged panels.

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Sr No	Name of the Faculty member & Research Specializations & Indicative List of Research Problems Addressed OR eager to address
	Research Problems: Numerical and Experimental Investigations on damage behavior of stiffened composite panels; Experimental fatigue behavior of cracked cylindrical rods; Smart materials- study; Dynamic Crack growth analysis of curved panels.
46	Dr. Neeraj Srivastava, Specialization: Solidification processing of light alloys; Composites and foams using conventional and non conventional solidification techniques; Microstructural and Mechanical Characterizations; Mechanical metallurgy. Research Problems: Development of light alloys and composites for automobiles and aerospace applications; Development of high strength metal foams and their composites for shock absorbing applications; Design and development of new lightweight Aluminium alloys for high temperature applications. Metal matrix nanocomposites; Light weight entropy alloys; Biomaterials.
47	Dr. Rajesh Chaoudhary, Specialization: Heat transfer in nanofluids; Ventilation systems in the buildings; Refrigeration and Air – Conditioning Systems; Computational Fluids Dynamics; Plastic and Biomedical waste management Research Problems: Hybrid nanofluids (Characterization and stability analysis of hybrid nanofluids, heat transfer enhancement using the hybrid nanofluids in the industrial applications); Temperature-controlled air-flow ventilation system to prevent infection in the buildings; Design and development of a hybrid Biomedical waste treatment system; Computational modeling of fluid flow and heat transfer in a Battery Thermal Management System.
48	Dr. Krishna Kishore Mugada, Specialization: Friction stir welding and processing; Dissimilar metals joining; Resistance spot welding; Cold Metal Transfer; Hybrid welding and joining; Microstructure and materials processing; Wire arc additive Manufacturing. Research Problems: Wire arc additive manufacturing of Inconel and Titanium alloys; Dissimilar Al-Ti welds using solid state joining process; Mathematical modeling of friction stir welding process; Numerical simulation of GMAW process; Machine learning in resistance welding process; AI/ML in fusion and solid state welding processes.
49	Dr. Amit Kumar, Specialization: Mechanical Metallurgy; Processing (texture relationship, Deformation and thermo-mechanical processing); Microstructure-mechanical property correlation; Welding of Metals and Alloys. Research Problems: Bulk metal forming analysis like forging, rolling etc.; Incremental sheet forming of two phase alloys; Welding analysis of metals and alloys; Design and development of ultra-fine/ nano grained materials through rolling process; Microstructure and Texture evolution during deformation based manufacturing processes; Prediction of deformation texture using crystal plasticity models; Recrystallization behavior of materials.
50	Dr. Raju Prasad Mahato, Specialization: Additive Manufacturing; Welding and Joining; Material Processing; Industry 4.0 in Manufacturing. Research Problems: Mechanical and Micro-Structural Behavior of Laser Based Direct Energy Deposited and Wire Arc Additive Manufactured Ti-6Al-4V; Friction stir welding of Dissimilar Materials; Development of Industry 4.0 module for Friction Stir Welding.
51	Dr. Ram Singar Yadav, Specialization: Advanced Machining Processes; Unconventional Machining; Hybrid Machining; Conventional Machining Processes; Advanced Engineering Materials.

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Sr No	**Name of the Faculty member & Research Specializations** & **Indicative List of Research Problems Addressed OR eager to address**
	Research Problems: Hybrid Grinding: Development and Experimental Investigations; Hybrid Finishing: Development and Experimental Investigations; Development of Intelligent Machining System and Experimental Investigations.
52	Dr. Sarote Kamlesh Arun, Specialization: Bio-Fuels; I.C. Engines; Alternate Energy Sources; Renewable Energy. Research Problems: Mechanical and Micro-Structural Behavior of Laser Based Direct Energy Deposited and Wire Arc Additive Manufactured Ti-6Al-4V; Friction stir welding of Dissimilar Materials; Development of Industry 4.0 module for Friction Stir Welding.
53	Dr. Sunil Kumar, Specialization: Plasticity; Metal Forming; Severe Plastic Deformation Mechanics of Materials; Research Problems: Conventional and advanced sheet metal forming processes (Deep drawing, incremental forming, micro forming, Tailored blanks); Severe plastic deformation (SPD) processes(Hybrid SPD processes (CGP followed by cold rolling, ECAP followed by cold rolling)); Plasticity (Advanced anisotropic yield criteria, constitutive modelling using dislocation density, Bauschinger effect); Lightweight materials for automotive applications(Aluminum alloys, magnesium alloys, metal matrix composites).
54	Dr. Susanta Behera, Specialization: Composites; Smart Materials and Structures Analytical and Numerical Methods Research Problems: Performance evaluation of Polymer Composite Gear; Smart hybrid plate Analysis (Static and Dynamic); Modelling, Simulation and Analysis of smart structures; Artificial prosthetic design and Analysis;
55	Dr. Yogendra Kuwar, Specialization: Thermal and heat transfer; Refrigeration and air conditioning; Cryogenics. Research Problems: Design and analysis of automotive air conditioning for low GWP refrigerants; Design and analysis of refrigerator and air conditioning system for low GWP refrigerants; Study of various mixtures of refrigerants for vapor compression system; Thermodynamic analysis of Claude refrigeration system for low temperature application; Design and analysis of crycoolers: Stirling and GM types; Cryogenics method for CO 2 separation from various; mixtures; Design and analysis Cryogenic heat pipe; Non-conventional refrigeration: Magnetic refrigeration, Vortex flow refrigeration, thermoelectric refrigeration system; Heat transfer in two phase flow; Heat transfer in compact heat exchangers; Waste material utilization for solar concentrator collector for food application.

Faculty Member Research Specializations at the Department of Applied Mathematics & Humanities and Social Sciences

Sr No	Name of the Faculty member & Research Specializations & Indicative List of Research Problems Addressed OR eager to address
1	Prof. V. H. Pradhan, Specialization: Fluid dynamics in porous media with relevance to ground water flow and petroleum recovery; Numerical techniques. Research Problems: To develop Burger's model for viscoelastic fluids to observe the viscoelasticity effects by obtaining the travelling wave solutions; To modify Boussinesq equation arising in stream aquifer interaction problems by an exponential decaying function; To study the effect of sedimentation for non-conservative materials in contaminant transport equations; Numerical simulation of Boundary layer flow equations for porous plates and/or for Micropolar fluids/Power law fluids/Nanofluids; Application of Optimal control theory to enhanced oil recovery; To develop mathematical models for reservoir simulation.
2	Prof. Neeru Adlakha, Specialization:Mathematical and Computational Biology; Bioinformatics/ Biomathematics / Biocomputing; Data mining; Finite element modeling Research Problems: Developing computational and systems biology models to study calcium dynamics in Myoctes with special relevance to disorders of heart; Developing computational and systems biology models to study calcium dynamics in hepatocytes with special relevance to disorders of liver; Developing computational and systems biology models to study calcium dynamics in Beta cells with special relevance to disorders of Pancreas; Developing computational and systems biology models to study calcium dynamics in T lymphocyte cells with special relevance to immunity disorders; Developing computational and systems biology models to study calcium dynamics in astrocytes and neuron cells with special relevance to neuronal disorders; Developing computational and systems biology models to study human thermal systems with special relevance to cancer and physical exercise; Modelling above mentioned biological problems as initial boundary value problems involving fractional differential equations; Developing Finite element, finite volume, cubic splines, analytical and hybrid numerical and analytical approaches for the solution of above mentioned problems.
3	Dr. Hemantkumar P. Bulsara, Specialization: Techno innovation to Techno entrepreneurship through Techno Business incubation; Marketing; Entrepreneurship Strategy; Supply Chain Management(SCM); General Management. Research Problems: Consumer Behavior; Branding, Green Branding, Political branding; Developing Business Strategy; Marketing Strategy; Digital Marketing; Commercialization of Technology innovation; Innovation and Entrepreneurship; Social Entrepreneurship; Techno-entrepreneurship; Technology Business Incubation; Women entrepreneurship; Digital pedagogy.
4	Dr. Sushil Kumar, Specialization: Mathematical modeling; Bio-mechanics; Fractional Differential equations; Moving Boundary Problems; Bio-mechanics; Numerical Techniques; Radial Basis Functions; Chebyshev Polynomials Research Problems: Mathematical modelling and simulation of partial and fractional differential equations arising in the modelling of heat transfer process in biological systems using Chebyshev polynomials and Radial basis functions; Mesh-free method for thermal therapies; Mesh-free and spectral method for the solution of differential equation; Semi analytical method for the solution of non-linear fractional differential equations.
5	Dr. Jayesh M. Dhodiya, Specialization: Advance Operation Research; Optimization Technique; Mathematical Modeling and Simulation; Knowledge Based System; Data Mining.

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Sr No	Name of the Faculty member & Research Specializations & Indicative List of Research Problems Addressed OR eager to address
	Research Problems: Development of quality timetabling algorithm for any organization; Development of mathematical model based software with which we can understand mute and deaf people language; Effective solution code (Code) of multi objective optimization problem through evolutionary approach; To study the Nanofluids as an effective coolant in refrigerators, cars etc. by developing its mathematical model.
6	Dr. Urvashi Kausal, Specialization: Post Modern Fiction; Indian English Fiction and Feminist Literature; Themes in Diaspora literature. Research Problems: New Woman in the Writings of Shashi Deshpande and Manju Kapur; Indo-Caribbean Candian Literature; Place and Space in the novels of M.G. Vassanji; Literature on 1971 Bangladesh War from Pakistan and Bangladesh; Life lessons from Indian Mythology; Study of Employability Skills of Engineers; Non-Verbal Communication and Intercultural Communication; Re-Orientation in Movies adapted from Indian Diaspora Fiction.
7	Dr. Twinkle R. Singh, Specialization: Fluid flow through Porous media; Non-linear partial differential equations; Burger's equation; Groundwater recharge phenomenon; Analytical approximate Methods; Mathematical Modeling. Research Problems: Study on Problems related to environment engineering and its impact for society; Study on problem, related to current strategy of economics during COVID 19; Analysis of Reactions of pandemic during COVID; Study on strategy of world for forthcoming development with mathematical point of view.
8	Dr. Ranjan Kumar Jana, Specialization: Special Functions and Integral Transform; Operations Research; Mathematical Physics; Fractional Calculus; Mittag-Leffler function; Numerical Weather Prediction; Ramanujan's Mathematics. Research Problems: Study and investigate properties, inequalities and applications of Hypergeometric function in Mathematical Physics; Probability and distribution theory, theory of integral transforms and fractional Calculus; Study and formulate Green Supply Chain; Management models in imprecise environment; Inventory Modeling of different types with deteriorating items; Data Assimilation approach to develop geospatial database of model inputs and simulation of land surface fluxes.
9	Dr. Ramakanta Meher, Specialization: Differential Equations; Fractional Differential Equations; Fluid Dynamics; Fluid flow through Porous Media; Approximation theory; Numerical Analysis. Research Problems: Uncertainty Quantifications in porous media; Modelling and simulations of Heat and Mass transfer problems in porous media; Recovery rate of Hydrocarbon reservoir problems; Delay Differential Equations; Study of fractional calculus in differential and integral equations; Functional differential equations with infinite delay.
10	Dr. Indira P. Debnath, Specialization:Mathematical Programming Problems; Non-smooth Optimization; Fractional Programming problems; Interval-Valued Optimization; Generalized Convexity; I-fuzzy/Fuzzy Optimization; Variational Control Problems Research Problems: Optimality conditions & Duality for Interval-valued optimization problems under generalized convexity assumptions; Studying on Enhanced Interval-optimization problems; Minimax programming problems and their optimality conditions.
11	Dr. Shailesh Kumar Srivastava, Specialization: Approximation Theory; Trigonometric Fourier Approximation; Summability Methods; Real/Functional Analysis.

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Table 8 – *Continued from previous page*

Sr No	**Name of the Faculty member & Research Specializations** & **Indicative List of Research Problems Addressed OR eager to address**
	Research Problems: Analysing the approximation properties and determining the degree of approximation (error/order of approximation) of functions and their conjugates belonging to some Lipschitz classes using different summability methods on their trigonometric Fourier series and conjugate series; Studying the properties and behaviour of strong convergence of numerical sequences and Fourier series; Double Fourier series.
12	Dr. Raj Kamal Maurya, Specialization: Reliability Theory and Survival Analysis; Estimation under various Censoring; Competing Risk; Optimum Plan. Research Problems: Currently working on Compound Optimal Design under Censored Data for lifetime model.
13	Dr. Amit Sharma , Specialization: Algebraic Coding Theory(Constructions of error-correcting codes such as linear codes over finite rings, skew codes, quantum codes). Research Problems: Error correcting codes using skew polynomials.
14	Dr. Sudeep Singh Sanga, Specialization: Queueing Theory. Research Problems: Control policies for queueing Models.
15	Dr. Saroj Yadav, Specialization: Fluid Dynamics. Research Problems: Mathematical modeling of phenomena arising in fluid flow through porous media including dynamic capillary pressure effect.
16	Dr. Vaishali Dhingra, Specialization: Time Series Analysis; Econometrics; Quantitative Analysis; Stock Market; Portfolio Management; Financial Management. Research Problems: Marcro-economic analysis specifically time series analysis and applied research.
17	Dr. Sourav Gupta, Specialization: Linear Water Wave Theory; Integral Equations; Numerical Analysis. Research Problems: Working on the problems of scattering of surfacewater waves by a pair of unequal thin permeablevertical barriers with non-uniform porosity. The plates are present in a fluid region may comprise of two fluids of different densities (two fluid medium). The method of solution is based on Generlized Hybrid Fourier Transform known as Havelock's expansion theorem.

Faculty Member Research Specializations at the Department of Applied Physics

Sr No	Name of the Faculty member & Research Specializations & Indicative List of Research Problems Addressed OR eager to address
1	Prof. Kamlesh N. Pathak, Specialization: Upper Atmospheric Science; Earthquake Prediction; GPS Technology. Research Problems: Gravitational Wave astronomy; General Relativity of Exotic Structures; Atmospheric Aerosols; Atmospheric water vapor; Remote Sensing of Earth resources.
2	Dr. Dimple V. Shah, Specialization: Semiconductor; Crystal growth; Thin Films; Photovoltaic Materials. Research Problems: Micro Hardness Measurement of Bulk Samples; Gas sensing properties of Thin Films; Fabrication of nanomaterials using Autoclave (Hydrothermal method); Thin films by spin coating method.
3	Dr. Vipul Kheraj, Specialization: Thin Films and Materials Science; Semiconductor Optoelectronic Devices. Research Problems: Laser based materials processing for optoelectronic devices; Investigations on degradation pathways for thin film solar PV in off-shore conditions; Optimisation of experimental processes for fabrication of perovskites based thin film solar cells; Biomedical instrumentations and automation; Optoelectronic and opto electrical spectroscopy for materials diagnosis and testings.
4	Dr. Debesh R. Roy, Specialization: Density Functional Theory; Atomic Clusters & Nanostructures; Physics of the Materials; Nano-Biophysics. Research Problems: DNA and inorganic electronics; 2D materials for toxic gas sensing, thermos electrics and energy storage applications; Cluster assembled materials for semiconductor applications; Toxicity prediction through QSAR methods under DFT for medicinal applications; Metal oxides and chalcogenides, and their antimicrobial activity
5	Dr. Lalit Kumar Saini, Specialization: Theoretical Condensed Matter Physics; Strongly Correlated Electronic Materials; Topological quantum nano Materials. Research Problems: Electronic-structure calculation and quantum Monte Carlo(QMC) simulation; Nano-, 2D and Bulk Materials; Coulomb drag in Bilayer systems.
6	Dr. Y. A. Sonvane, Specialization: Computational Nanoscience; Density functional Theory 2D Materials; Nanomaterials & Nanofluids; Biological Materials. Research Problems: Perovskite-based materials for solar cell applications; 2D Materials for Thermoelectric; Toxic Gas sensor and Battery and Super capacitor applications; Hydrogen Storage, photo catalysis and water splitting applications; Synthesis of oxide based Nanoparticles & Nanofluids for heat transfer applications; Graphene like Materials for Energy & Charge; Storage Applications; Modeling of nanoscale materials using density; functional theory;
7	Dr. Shail Pandey, Specialization: Pulsed microwave generated plasma; Plasma diagnostics: Electrical method and Optical Emission Spectroscopy; Cold atmospheric pressure plasma physics and interaction with various surfaces Research Problems: Atmospheric pressure plasma physics and applications; Physics of Plasma interaction with different surfaces; Optical Emission Spectroscopy of plasmas; Physics of Microwave generated plasmas and applications.

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Table 9 – *Continued from previous page*

Sr No	**Name of the Faculty member & Research Specializations** & **Indicative List of Research Problems Addressed OR eager to address**
8	Dr. Himanshu Pandey, Specialization:Condensed Matter Physics, Materials Science (Computational and Experiment). Research Problems: Heusler alloys and exploration of their versatile applications by ab-initio modeling and experimental investigations; Waste-water treatment and gas sensing applications of nanoparticles.
9	Dr. Mithun Karmakar, Specialization:Plasma Wave Breaking, Plasma Based Particle Accelerator, Whistler Waves, Particle in Cell (PIC) simulation. Research Problems:Plasma wave Breaking, Beam Driven Plasma wave.
10	Dr. Ms. Dipika Patel, Specialization: Nuclear reaction study at near the Coulomb barrier energies; Study of Break-up and Transfer effects on the fusion fission and scattering mechanisms using weakly bound nuclei; Continuum Discretized Coupled Channels (CDCC) and Coupled Reaction Channels (CRC) Calculations. Research Problems: Nuclear Reaction dynamics using stable and unstable weakly bound nuclei
11	Dr. Vikas Kumar Ojha, Specialization:Theoretical High Energy Physics, Quantum Chromodynamics, Proton Spin Puzzle. Research Problems:Proton Spin Puzzle, Proton Radius Puzzle.
12	Dr. Sharad Kumar Yadav, Specialization:Plasma Physics(Nonlinear dynamics of plasma especially focused on turbulence and others nonlinear phenomena in plasma),Soft Condensed Matter (especially interested to understand the structural and dynamical properties of complex liquids such as room temperature ionic liquids, and also others conventional liquids.). Research Problems:Development of direct numerical simulation (DNSs) of Magneto-hydrodynamics (MHD) and Hall Magneto-hydrodynamics (HMHD) plasma turbulence at high Reynolds numbers.