M.Tech. Chemical Engineering

1. CO_2 Separation Using Advanced Separation Techniques
2. Development of synthetic polymer-fly ash composites.
3. Techno-economic analysis of geothermal solar hybrid desalination system.
4. Computational fluid dynamics study of multi-phase flow in a colloid system.
5. Development of low cost nano material for Phosphorus Removal and Recovery.
6. Broad area: Investigation on intensified CO_2 capture using novel alkanolamine solvent.
7. Experimental and Modeling study on the equilibrium CO_2 solubility in aqueous Polyamine activated blended amine system for Post combustion CO_2 capture.
8. Use of graphene oxide-based composite material in modification of polysulfone membrane and its application in wastewater treatment.
9. Molecular Dynamics (MD) Simulations studies of anionic polyelectrolytes in poor solvent mixtures.
10. Experimental and modelling analysis of activated physical solvents for CO_2 absorption.
11. Synthesis and characterization of functionalized Graphene Oxide and its application for the modification of polymeric membrane.
12. Ionic liquid supported membranes for CO_2 separation from CH4 (Bio Gas/Natural Gas applications)
13. Nano enhanced PCMs for low temperature thermal management application.
14. Environmental Application of Nanomaterials.
15. Synthesis of hybrid composites using biomass and synthetic plastics.
16. To develop a control relevant model from experimental data.
17. Broad area: On the Kinetics and mass transfer modeling of CO_2 absorption in activated and ended solvents.
18. Kinetic study of CO_2 absorption in aqueous blended amines for post combustion CO_2 capture.
19. Mitigation of fouling in o/w emulsion ultrafiltration process using hydrophilic polymer coated on polysulfone membrane
20. Molecular Dynamics Simulations Studies of block co-polymers in aqueous solutions - Effect of block length and charge density.
21. Experimental & modelling analysis of activated ionic liquid solvents for CO_2 absorption.
22. Synthesis of lignin based hydrogel for water treatment.
23. MOF mixed matrix membranes for CO_2 separation from CH4 (Bio Gas/Natural Gas applications)
24. Nano enhanced PCMs for medium temperature thermal management application
25. Catalytic Dehydration of Methanol to DME - Experimental and Simulation Studies
26. Process optimization and kinetic Studies of hydrothermal liquefaction process for biofuel production.
27. Performance & application of Process Intensification techniques for biodiesel production.

M.Tech Civil Engineering (Infrastructure Engineering and Management)

1. Development of 6D Energy Model by Application of BIM
2. Application of BIM as a tool of Sustainable Development
3. Project risk Management of Solar Power Parks
4. Application of Internet of Things (IoT) for Project Monitoring
5. Integrated BIM based IoT Model for Asset Monitoring of Infrastructure Projects
6. Development of Fuzzy Critical Chain Project Management (FCCPM) Model for Infrastructure Projects
7. Integrated Project Delivery and BIM Model for Project Monitoring and Control.
8. BIM based Lean Management for Infrastructure Projects.

M.Tech Electrical Engineering (Power Systems)

1. Optimal control of distributed generators in modern power system
2. Multi-objective optimization based model predictive control: Application in power system
3. Optimal sizing and placement of distributed generators in distribution network
4. State estimation techniques: Application in power system
5. Inertial Emulation from Wind Turbine Generating Systems
6. Small Signal Stability Analysis of Power System having high penetration of renewable energy sources
7. Enhancement of Micro Grid Stability
8. Optimal Scheduling of Micro grid with renewable energy sources
9. Coordinated control of off shore wind farm and on shore HVDC for power system damping
10. Parameter estimation of dynamic generator state variables
11. Optimal placement of PMUs for network observability
12. State estimation in low observable distribution networks
13. Modeling and control of FACTS
14. Small signal modeling and stability analysis of HVDC systems
15. Power Quality Improvement of grid integration of Renewable Energy Sources (RES)
16. Optimal design of 1200kV UHV AC Transmission line considering Electrostatic fields and Corona effects
17. Design and development of SVC for reactive power compensation and Voltage Profile Improvement.
18. Short circuit and Harmonics analysis of distribution system with RES
19. Analysis and design of an electric motor used for Electric Vehicles (EVs)

20. Design and analysis of maximum power point tracking system for wind energy/solar energy conversion system.
21. Standalone operation of DC microgrid using Artificial Intelligence
22. Grid integration of renewable energy sources
23. Design and Analysis of an Integrated DC-DC Converters with MPPT for Standalone Hybrid Renewable System
24. Simulation and analysis of hybrid renewable energy system

M.Tech Energy Systems (Focused on Solar Energy)

1. Thermal management modelling and systems for lithium ion batteries.
2. Industrial pollution effect on solar photovoltaic module performance
3. Potential Induced Degradations of photovoltaic modules and their remedy
4. Feasibility of Solar based Battery Swapping Station
5. Effect of inverter temperature over photovoltaic plant performance.
6. Performance and technical analysis of solar powered E rickshaw using flexible PV module
7. Performance and validation of encapsulant materials on PV Modules
8. Extensive Study on MicroGrid : Feasibility & Optimization Techniques
9. Anti-soiling photovoltaic module technologies
10. Solar desiccant air conditioning
11. Vapor absorption system based solar air conditioning
12. Thin film PV modules performance enhancement
13. Hybrid energy storage system (HESS) in E – Motorcycle/ EV
14. Application of supercapacitors in EV
15. Optimization of Thermal Losses for Industrial Rooftop Solar PV Power Plant
16. Forecasting models for Grid Stabilization
17. Designing of photovoltaic based EV charging Infrastructure
18. Functional nanomaterials for solar cells and energy storage
19. Photovoltaic module recycling
20. Decentralised PV generation and microgrids

M.Tech Environmental Engineering

1. Understanding air pollution around landfill site: a source apportionment and receptor modeling approach
2. Understanding soil pollution around landfill site using receptor modeling approach
3. Plastic waste utilization as construction material

4. Manufacturing of new construction material for reducing ambient air pollution
5. Technovations in treating wastewater with nanofibre and grafted polymer
6. Recovery of metals from E-Waste: A comparison of bio-hydrometallurgy with conventional method
7. Life cycle assessment of integrated steel plant
8. Preparation of sulfur composite material for manufacturing of corrosive resistance building structures using petrochemical solid waste
9. Treatment of pharmaceutical industry wastewater using ultrasound cavitational reactor
10. Degradation of ammonical nitrogen from fertilizer wastewater using electro assisted Fenton catalytic process
11. Assessment of bio-toxicity for industrial wastewater treated by advance treatment process
12. Treatment of greywater by pulse ultrasound sonication: a novel approach
13. Application of Numeric Modeling and Remote Sensing for Urban Air Quality Assessment and forecasting
14. Big Data Application for Environmental Management
15. Urban Heat Island effect for Ahmedabad city: Modeling, Mapping and Mitigation
16. Sick Building Syndrome: Modeling and Monitoring Indoor Air Quality
17. Groundwater Vulnerability: Assessment through multiple techniques
18. Designing Bioreactors for effective solid waste management
19. Low cost techniques for removal of Arsenic from Ground Water
20. Application of Geoinformatics for assessing the impact of Canal Network on agricultural productivity
21. Solid Waste Management: Policy Framework to Community Engagement
22. Wastewater Treatment using natural coagulants

M.Tech Mechanical Engineering (Design)

1. Use of regression and clustering algorithms for wind-solar resource assessment
2. Numerical modelling of 3D/4D composite plate subjected to Ballistic Impact Loading Progressive Damage modelling of Structure in Blast Loading
3. Experimental and numerical Investigation on Tensile Behaviour of a Plate containing multiple holes
4. Composite based Design and Development of Bio-inspired Armours Experimental Investigation of Tensile Behaviour of Additive Manufactured Plates
5. Optimization of additive manufacturing processes parameters using machine learning
6. Prediction of tool wear during friction stir welding using Machine learning
7. Cracks detection of railway tracks using unmanned aerial vehicle (drone).
8. Surveillance of social distancing of public during outbreak of nCOVID-19 pandemic using unmanned aerial vehicle (drone).

9. Nonlinear flutter analysis of sandwich functionally graded piezoelectrc plate subjected to thermo-elctro-mechanical load.
10. Nonlinear active vibration control of electro active polymers subjected to in-plane harmonic excitation.
11. Fault Diagnosis Using Image Processing and Machine Learning Techniques. Tool Condition Monitoring Using Acoustic and Vibration Signature analysis.
12. Analysis of parallel and inclined slider bearing operating with Electri-rheological Lubricant.
13. FEM and CFD analysis of journal bearing operating in turbulent regime. Effect of porous layer on dynamic performance of hydrostatic thrust bearing

M.Tech Mechanical Engineering (Manufacturing Technology)

1. Development of bimetallic cylinders (Austenitic Stainless Steel AISI321+AA2219, AISI321+Ti-6Al-4V and AISI304L+Ti-6Al-4V) through friction welding route with suitable inter layers.
2. FSW of thin sheets
3. Mechanical Behavior of Materials
4. Friction Stir based Additive Manufacturing of different materials
5. Investigation of Electrochemical Discharge Machining Process.
6. Novel coating strategy for cutting tool
7. Magnetic Pulse Welding (MPW) of AISI 321 stainless steel to AA2219 Aluminium alloy
8. Developing super plasticity in non-ferrous alloy
9. Additive Manufacturing
10. Wire Arc Additive Manufacturing of Inconel Alloy
11. Experimental Investigation of Quartz machining using ECDM process.
12. Machining of reinforced fibre composites
13. Friction and Friction Stir Welding of metal to plastics
14. Friction stir processing of non-ferrous alloy
15. Corrosion of Materials
16. Additive manufacturing using Selective Laser Sintering processes
17. Study of Zirconia machining using ECSM process
18. Development of welding techniques for alloy steels (collaboration with ITW)
19. Surface texturing
20. Ultrasonic welding of dissimilar plastics and plastics to metal,
21. Super plastic behaviour of copper using FSP,
22. A-TIG, FB-TIG & FZ-TIG for P91 and LAFM steels
23. Ultrasonic welding of non-ferrous alloy

M.Tech Mechanical Engineering (Thermal Engineering)

1. Utilization of Phase Change Materials for thermal regulation of a building for hot and dry climate of Gujarat.
2. Design and development of a constant temperature thermal chamber for solar drying applications.
3. Development and experimental investigation of hybrid liquid + solid desiccant added vapour compression based air-conditioning system
4. Development and experimental investigation of nano fluid based heat pipe for the localized cooling application
5. Thermal modelling and optimization of acoustic refrigeration system
6. Development and experimental investigation of acoustic refrigeration system
7. Multi-Physics, Multi-scale Simulation of Transport phenomena in phase-change thermal processes.
8. Parametric analysis and CFD simulation for Energy Storage Systems.
9. Grain-Structure modelling and comparison with experimental results in Solidification processes.
10. Instability and sensitivity analysis of complex fluid flows using Open FOAM.
11. Global instability and control of transitional and turbulent flows past airfoil using MATLAB.
12. Design and development of integrated Batch-RO/ FO unit for water desalination with minimum specific energy consumption
13. Design and development of thermal energy driven- high recovery, cascade Reverse Osmosis system
14. Thermal management of lithium-ion batteries for electric vehicles
15. Phase Change Material (PCM) -Supported Humidification-Dehumidification Desalination Systems
16. Design development and investigations of generator for novel vapour absorption refrigeration system
17. Investigations and analysis of heat transfer enhancement methodologies for flat plate absorber
18. Analytical and experimental investigation of impeller geometry on the performance of centrifugal pump
19. Application of Process Intensification techniques for production of Aviation fuel using non-edible feedstock.
20. Application of Castor plant for co-production of biogas, bio-ethanol, biodiesel and value added bio-chemicals: A bio-refinery approach

M.Tech Nuclear Science and Technology

1. Feasibility and application of plasma for disinfection or killing bacteria from water.
2. Sterilization of items like food, vegetable and cloths etc on affordable cost using low dose of radiation.
3. Affordable techniques for disinfecting an area using plasma and UV radiation.
   Development of new varieties of seeds for more yield and nutrient values.
4. Radio-tracer application in chemical and petrochemical industry for enhance productivity at lower cost.
5. Application of radioisotopes in pharmaceutical for producing target-based medicine.
6. Radiation technology for medical tomography, diagnosis and treatment in healthcare industry.
7. Application of machine learning and artificial intelligence in nuclear power industry.
8. Research related to next generation reactor like small modular reactor and molten salt reactor.
9. Power generation using Fusion technology at Institute of Plasma research at Gandhinagar.
10. Research related to advance nuclear fuel technology like accident tolerant fuel.
11. Simulation of passive safety system of advanced nuclear reactors.
12. Technical challenges and social issue related to nuclear security and Non-Proliferation for peaceful use of atomic energy.
13. Advanced Instrumentation and control for improvement of reliability of nuclear power plant.
14. CFD analysis of advanced coolant like liquid sodium used in fast breeder reactor.

M.Tech Petroleum Engineering

1. Petrophysical characterization and Pore network modelling of Heterogeneous reservoirs
2. MEOR
3. Study on Methane storage in Gas Hydrates
4. Heavy Oil reservoir Management
5. Understanding Well bore stability using pore pressure prediction from seismic and well log
6. Nanoparticles-aided polymer flooding for enhanced oil recovery
7. of heterogeneous reservoirs
8. Carbonated low salinity water injection for enhanced oil recovery
9. Development of water based drilling fluid system for shale formation
10. Studies on Nanographene as surfactant carrier for EOR

11. Customized surfactant identification for enhanced oil recovery from hydrocarbon reservoirs of different crude oil composition: an experimental approach
12. Hydrogeochemistry characteristics of produced waters from oil wells in Cambay Basin
13. Numerical Feasibility Study of Applying Higher Order Discretization Schemes in Reservoir Simulation Models
14. Development of nanoparticles-stabilized polymer gel system for water shut-off application
15. Chemical characterization of heavy crude oil in molecular level and their implications in the upstream petroleum industry
16. Corrosion of oil-water mixed transportation pipelines - Factor Analysis.