

LIST OF INTERDISCIPLINARY PROJECT PROPOSALS

Proposal No.	Project Title
1.	A Sustainable Approach for Treating Industrial Wastewater and Producing Biofuel Using Microalgae by Integrating Indigenous Membrane Technology
2.	Unfolding the ability of low methylated pectin derivatives with varying degree of methylation from agro waste in alleviating gastrointestinal tract infections
3.	Thermal Management of High Heat Flux Electronic Device of High-Power Electronic Module (HPEM) Within the Size Constraint at an Ambient Of 55 °C
4.	A Neural Networks based signal processing algorithm development for Structural Health Monitoring and Water Quality analysis using radar sensors.
5.	Intelligent UAV flight planner through deep learning for agricultural applications
6.	Microwave Sensor Development for Quantification of Microplastic Concentration in Aqueous Environment
7.	Design and development of remotely guided long-range aerial drones with low-noise for Inspecting Power system infrastructure
8.	Structural, Electrical, Magnetic, and Mechanical Characterization of Micro and Nano Particulate Reinforced Metal Matrix Composites
9.	Rebar Bending in Construction Practice – A boon or bane from the Prospect of Rebar Corrosion Behaviour
10.	Development of FeCoV based High Entropy Alloys for Memory Applications

PROPOSAL NO. – 1

Title of the Proposal	A Sustainable Approach for Treating Industrial Wastewater and Producing Biofuel Using Microalgae by Integrating Indigenous Membrane Technology
Supervisor - I	Dr. V. Sudarshana Deepa , <i>Biotechnology</i>
Supervisor - II	Dr. Vinoth Kumar Raja , <i>Chemical Engineering</i>
E-mail IDs:	sudarshanadeepa@nitandhra.ac.in , vinoth@nitandhra.ac.in
Abstract	The dual challenge of wastewater management and sustainable energy production are critical concerns for the modern world. This proposal presents an innovative approach that concurrently addresses both issues by utilizing microalgae while diligently incorporating membrane technology for biomass harvest. Firstly, viable microalgae <i>Dunaliella salina</i> will be utilized for both wastewater treatment and biodiesel production because of its ability to accumulate a very high quantity of lipids inside its cell by utilizing various industrial wastewater containing organic pollutants as the substrate. Secondly, a microfiltration membrane technology using a low-cost bentonite ceramic membrane will be employed to simultaneously remove organics in the wastewater and recover value-added resources in the form of microbial lipids as an energy-rich product. In addition, lipids accumulated will be extracted and characterized for biofuel production potential. Thirdly, the retention of biomass and lipid yields and the environmental impact will be optimized and assessed, respectively, further demonstrating this approach's sustainability. It will be targeted to provide a promising solution for treating wastewater from the food and beverage industries, paving the way for scalable and greener eco-friendly biofuel production that contributes to the circular economy.
Keywords	Biofuels; Membrane Technology; Microalgae; Wastewater Treatment
Relevant Publications	<ol style="list-style-type: none"> 1. Elangovan B, Detchanamurthy S, Senthil Kumar P, Rajarathinam R, V. Sudarshana Deepa*. Biotreatment of Industrial Wastewater using Microalgae: A Tool for a Sustainable Bioeconomy, <i>Molecular Biotechnology</i>, 11-24, 2023. 2. N.A. Azeez, S.S. Dash, S.N. Gummadi, V. Sudarshana Deepa*, Nano-remediation of toxic heavy metal contamination: Hexavalent chromium [Cr (VI)], <i>Chemosphere</i>, 266, 129204, 2021. 3. S.S. Sringari, Vinoth Kumar Raja*, Treatment of food processing industries wastewater using a novel Fuller's earth clay-based tubular ceramic membrane, <i>Water Science & Technology</i>, 88 (10) (2023), 2533-2546. 4. M.A. Sundaramahalingam, S. Karthikumar, R.S. Kumar, K.J. Samuel, S. Shajahan, V. Sivasubramanian, P. Sivashanmugam, P. Varalakshmi, A. Syed, N. Marraiki, A.M. Elgorban, Vinoth Kumar Raja*, I.G. Moorthy, An intensified approach for transesterification of biodiesel from Annona squamosa seed oil using ultrasound-assisted homogeneous catalysis reaction and its process optimization, <i>Fuel</i>, 291 (2021) 120195.
Essential Qualifications required	M.E. / M.Tech. / Equivalent Degree in Biotechnology / Chemical Engineering / Any other relevant branch of Engineering and Technology (OR) M.Sc. / Equivalent Degree in Biotechnology / Any other relevant branch of Engineering / Technology / Science
Desirable Qualifications required	M.E. / M.Tech. Degree in Biotechnology / Chemical Engineering / Any other relevant branch

PROPOSAL NO. – 2

Title of the Proposal	Unfolding the ability of low methylated pectin derivatives with varying degree of methylation from agro waste in alleviating gastrointestinal tract infections
Supervisor - I	Dr. Tingirikar Jagan Mohan Rao, <i>Biotechnology</i>
Supervisor - II	Dr. Amarendar Reddy M, <i>Chemistry (School of Sciences)</i>
E-mail IDs:	tjmr@nitandhra.ac.in , amarendar@nitandhra.ac.in
Abstract	The multidrug resistance nature of pathogens is increasing significantly with time and is a major health concern. Therefore, there is an urgent need to develop potential therapeutic strategies to address the current challenges. Recently, low methylated pectin (LMP) extracted from pectin-rich sources grabbed the attention due to their unique functional properties. However, the functional properties of pectin greatly depend on the degree of methylation (DM). The effect of DM and its stability to intestinal conditions have not been probed. This work aims to produce different degree of LMPs from fruit peel waste and test their efficacy in preventing gastrointestinal tract infections.
Keywords	Low methylated pectin; Antimicrobial; Antiadhesive; Agro waste
Relevant Publications	<ol style="list-style-type: none">1. Tingirikari JMR. In-Vitro Prebiotic Analysis of Microbiota Accessible Pectic Polysaccharides. <i>Curr. Microbiol.</i> (2019) 76:1452–14602. Kumar V, Tingirikari JMR. Degree of methylation: A key to the functional properties of low methylated pectin derived from pectin rich agro waste. <i>Food Biosci.</i> 2023 56:103386.3. David NA, Razan A, Ilanit BSK, Sergei R, AR M, Liraz C. Biopolymers from a bacterial extracellular matrix affect the morphology and structure of calcium carbonate crystals. <i>Cryst. Growth Des.</i> 2018, 18, 9, 5582–5591.
Essential Qualifications required	First class in M.Sc. Chemistry/Biotechnology/allied branch/ M. Tech Biotechnology
Desirable Qualifications required	First class in M.Sc. Chemistry/Biotechnology/allied branch/ M. Tech Biotechnology with GATE/NET

PROPOSAL NO. – 3

Title of the Proposal	Thermal Management of High Heat Flux Electronic Device of High-Power Electronic Module (HPEM) Within the Size Constraint at an Ambient of 55 °C
Supervisor - I	Dr. P. Dinesh Sankar Reddy, <i>Chemical Engineering</i>
Supervisor - II	Dr. Santhosh Kumar Gugulothu, <i>Mechanical Engineering</i>
E-mail IDs:	pdsreddy@nitandhra.ac.in ; santoshgk1988@nitandhra.ac.in
Abstract	To carryout thermal design and analysis of 4*16 high power electronic module which will be used in EW system for armed forces. HPEM consists of 4 identical planks of electronic module stacked together. Each plank has printed circuit board and 16 array of electronic devices which are assembled together to form a single unit. Further the devices are to be mounted on a Co-Mo-Co (1:4:1). The horizontal and vertical pitch of electronic device in an array is 9.6 mm.
Keywords	Heat flux; HPEM; electronic device and PCM
Relevant Publications	<ol style="list-style-type: none">1) Teja, P.N.S., Gugulothu, S.K., Reddy, P.D.S. and Barmavatu, P., 2024. Effect of orientation and nanoparticle addition of a encapsulated phase change material on heat transfer in a packed bed thermal energy storage system–A numerical analysis. <i>Journal of Energy Storage</i>, 78, p.110023. (SCI; IF:9.4) https://doi.org/10.1016/j.est.2023.1100232) Teja, P.N.S., Gugulothu, S.K., Reddy, P.D.S., Deepanraj, B. and Sundar, L.S., 2023. Computational Investigation of the Influencing Parameters on the Melting of Phase Change Material in a Square Enclosure with Built in Fin and Al₂O₃ Nanoparticles. <i>Applied Thermal Engineering</i>, p.120942. (https://doi.org/10.1016/j.applthermaleng.2023.120942)3) Narasimha Siva Teja, P., Gugulothu, S.K., Dinesh Sankar Reddy, P. and Deepanraj, B., 2022. Numerical investigation of nanoparticles dispersion on forced/mixed convective flows and heat transfer in a lid-driven stepped cavity configurations. <i>Proceedings of the Institution of Mechanical Engineers, Part E: Journal of Process Mechanical Engineering</i>, p.09544089221127617. (https://doi.org/10.1177/09544089221127617)4) Teja, P., Gugulothu, S.K., Reddy, P., Das, M. and Deepanraj, B., 2022. Mixed convective heat transmission of laminar flow field in a mono/dual moving lid-type square figured cavity packed with diverse aqueous-based nanofluids. <i>Applied Nanoscience</i>, pp.1-17. (https://doi.org/10.1007/s13204-022-02621-4)
Essential Qualifications required	B.Tech. (Mechanical or Chemical Engineering); M.Tech. (Mechanical or Chemical Engineering)
Desirable Qualifications required	M.Tech. (Mechanical or Chemical Engineering)

PROPOSAL NO. – 4

Title of the Proposal	A Neural Networks based signal processing algorithm development for Structural Health Monitoring and Water Quality analysis using radar sensors.
Supervisor - I	Dr. Talari Reshma, <i>Civil Engineering</i>
Supervisor - II	Dr. Puli Kishore Kumar, <i>Electronics and Communication Engineering</i>
E-mail IDs:	reshma@nitandhra.ac.in , pulikishorek@nitandhra.ac.in
Abstract	Radio-frequency (RF) sensing technologies play a critical role in our society as they enable the exchange of information between the physical and the cyber domains. Among the existing wireless sensing methods, microwave and millimeter-wave radar systems are highly regarded, owing to their capacity for direct measurement of range and velocity, resilience to changes in environmental lighting conditions, and affordability. This proposal addresses radar-based remote sensing for structural health monitoring and water quality assessment.
Keywords	SAR; Remote Sensing; RF Technologies; Structural Health Monitoring; Water Quality
Relevant Publications	<ol style="list-style-type: none">1. Nagaraju L, Puli Kishore Kumar, “Enhanced single-snapshot 1-D and 2-D DOA estimation using Particle Swarm Optimization”, <i>Traitement du Signal</i>, International Information and Engineering Technology Association (IIETA), Vol. 40, No. 3, pp. 1267-1273, June 2023. https://doi.org/10.18280/ts.4003452. S. S. Lanka, Nagaraju L, Puli Kishore Kumar, “High-Resolution FMCW SAR Imaging Based on Compressive Sensing Framework”, 2023 Signal Processing Symposium (SPSymo), organized by MIKON Foundation, Warsaw University of Technology (WUT), and Wroclaw University of Technology, 26-28 September 2023, Karpacz, Poland.3. V. Shiva Chandra, T. Reshma, K. Bhavana, S. Apsana (2022) “Assessing the Change in Impervious Area of a Rapidly Urbanized Saroor Nagar Watershed – A Geomatics Approach”, <i>International Conference on 9th Civil Engineering Conference in the Asian Region organised by the Asian Civil Engineering Coordinating Council (ACECC), from September 21-23 in Goa.</i>4. A Chaitanya Kumar and T Reshma (2017), “4D Applications of GIS in construction Management”, <i>Advances in Civil Engineering</i>, http://doi.org/10.1155/2017/1048540
Essential Qualifications required	M.Tech. in ECE or Civil Engineering
Desirable Qualifications required	M.Tech. in Microwaves, Communications and Radars, Remote Sensing, Advanced Communications

PROPOSAL NO. – 5

Title of the Proposal	Intelligent UAV flight planner through deep learning for agricultural applications
Supervisor - I	Dr. Nagesh Bhattu Sristy, <i>Computer Science and Engineering</i>
Supervisor - II	Dr. Sri Phani Krishna Karri, <i>Electrical Engineering</i>
E-mail IDs:	nageshbhattu@nitandhra.ac.in , sriphani@nitandhra.ac.in
Abstract	<p>The project is focused on developing a fully automated drone designed specifically for agricultural monitoring and inventory estimation. This drone utilizes advanced deep learning models for autonomous navigation, independent of human input. The software component is built around a sophisticated CNN-Transformer-based, multi-headed deep learning model. This model is engineered for dual purposes: detecting anomalies and planning paths across agricultural fields. It efficiently handles multiple tasks—navigation, anomaly detection, and crop inventory estimation—by maintaining feature commonality, which significantly reduces the computational burden typically associated with intensive feature extraction.</p> <p>When anomalies are detected, the model communicates these findings along with pertinent details to the control station. The path planning aspect of the software uses video input to predict the drone's navigational maneuvers. It integrates the anomaly detection data with multiple sensor inputs (including IMU, GPS, and gyroscope) to enhance decision-making accuracy.</p> <p>To optimize the computational efficiency of the inference models, the system employs techniques such as knowledge distillation and quantization. These methods streamline the model by eliminating weights that do not contribute to performance, ensuring faster processing.</p>
Keywords	Autonomous Drone; flight control; deep learning; edge computing; data fusion
Relevant Publications	<ol style="list-style-type: none">1. N. S. Krishna, S. N. Bhattu, D.V.L.N. Somayajulu, N.V.N. Kumar, K.J.S. Reddy, GssMILP for anomaly classification in surveillance videos, <i>Expert Systems with Applications</i> 203, 1174512. RS Sankuri, NB Sristy, SPK Karri, Performance Analysis and Anomaly detection of Power Distribution Insulators using Deep Learning Techniques 2023 International Conference on Computer, Electronics & Electrical Engineering & their Applications (IC2E3)3. L.N. Sastry Varanasi, Sri Phani Krishna Karri, Enhancing non-intrusive load monitoring with channel attention guided bi-directional temporal convolutional network for sequence-to-point learning, <i>Electric Power Systems Research</i>, Volume 228, 2024,110088, ISSN 0378-77964. A. Rajamallaiah, S. P. K. Karri and Y. R. Shankar, "Deep Reinforcement Learning Based Control Strategy for Voltage Regulation of DC-DC Buck Converter Feeding CPLs in DC Microgrid," in <i>IEEE Access</i>, vol. 12, pp. 17419-17430, 2024
Essential Qualifications required	Master's degree in Engineering/Technology or a Master's degree by Research in Engineering/Technology in appropriate branches.
Desirable Qualifications required	Knowledge in Deep Learning, Drone Controller Design, Python Programming

PROPOSAL NO. – 6

Title of the Proposal	Microwave Sensor Development for Quantification of Microplastic Concentration in Aqueous Environment
Supervisor - I	Dr. S. Yuvaraj, <i>Electronics and Communication Engineering</i>
Supervisor - II	Dr. Baranidharan S, <i>Civil Engineering</i>
E-mail IDs:	yuvarajs@nitandhra.ac.in ; baranis@nitandhra.ac.in
Abstract	As an emerging contaminant, microplastics (MPs) have been quantified in the environment through sophisticated analysis ((SEM, TEM, FTIR) which necessitates an arduous effort, considerable time, and a high cost. These inadequacies warrant a quick, accurate, sensor system for detecting MPs in aqueous media. Microwave sensors work based on the principle that propagation of the electromagnetic waves in the circuit changes with the medium properties (dielectric permittivity and permeability) due to the interaction of the circuit's fringing electric field with the surrounding material. To enhance sensor sensitivity, the authors propose developing a wide band (0.5-6 GHz) differential microwave sensor based on split ring resonators (SRR) for detecting MPs in water.
Keywords	Microwave Sensor, Non-Contact Sensing, Microplastics, Detection, Water
Relevant Publications	<ol style="list-style-type: none">1. <i>Imran Basha Syed*</i>, Baranidharan S and Yuvaraj S (2024), "An Integrated Approach for Nitrate and Phosphate Detection Using Squared SRR Microwave Resonator" 2nd International IEEE Applied Sensing Conference (APSCON 2024), 22-24th January 2024, BITS Pilani K K Birla Goa Campus, Goa, India (Poster). (DOI: 10.1109/APSCON60364.2024.10466156)2. M. V. Rao, J. Malik, S. Yuvaraj, and M. V. Kartikeyan, (2024) "A Novel Approach for the Generation of OAM Beam with High Mode Purity using the Reflect array," <i>Optik</i>, vol. 296, pp. 17557(1-12) DOI: https://doi.org/10.1016/j.ijleo.2023.1715573. Vijaykumar Sekar and Baranidharan S (2023) "Occurrence, Quantification and Characterization of Microplastics in Godavari River, India" <i>Case Studies in Chemical and Environmental Engineering</i>, Vol. 8, 100542. (ISSN: 2666-0164) (https://doi.org/10.1016/j.cscee.2023.100542)4. Vijaykumar Sekar and Baranidharan S (2023) "Preliminary Evidence of Microplastics in landfill leachate, Hyderabad, India" <i>Process Safety and Environmental Protection</i>, Vol. 175, 369-376 (https://doi.org/10.1016/j.psep.2023.05.070) (ISSN 0957-5820)
Essential Qualifications required	B.Tech./M.Tech. in Electronics and Communication Engineering or Relevant Fields
Desirable Qualifications required	B.Tech./M.Tech. in Electronics and Communication Engineering or Relevant Fields

PROPOSAL NO. – 7

Title of the Proposal	Design and development of remotely guided long-range aerial drones with low-noise for Inspecting Power system infrastructure
Supervisor - I	Dr. Karthikeya Sharma, <i>Mechanical Engineering</i>
Supervisor - II	Dr. Sankar Peddapati, <i>Electrical Engineering Department</i>
E-mail IDs:	tkn@nitandhra.ac.in ; sankarp@nitandhra.ac.in
Abstract	The remotely guided long-range aerial drones finds applications in defense, land surveying, inspecting power infrastructure in transmission and other surveillance applications. In power systems, the Corona effect (ionization of air) causes interference with communication and reduction in transmission line efficiency. For detection of Corona effect, silent operation with high thrust capabilities and powering the remotely operated drones is a great challenge but it is important. Hence, this work aims to develop remotely guided long-range aerial drone with low-noise for inspecting power system infrastructure with PV power docking feature. The silent operation is achieved through innovative blade designs and muffler arrangements. The proposal also customizes the drone skeleton facilitating power system infrastructure inspection tools with PV docking feature.
Keywords	Aerial Drone; Low-noise blades; PV power docking; Power system Inspection
Relevant Publications	<ol style="list-style-type: none">1. Effect of REGR (Reformed Exhaust Gas Recirculation) on the performance and emissions of a diesel engine: A Numerical study Alexandria Engineering Journal (2017), Elsevier2. Homogeneous Charge Compression Ignition (HCCI) Engines - A review Archives of Computational Methods in Engineering. Springer3. K. Sundareswaran*, V. Vigneshkumar, P. Sankar, S. P. Simon, P. Srinivasa Rao Nayak and S. Palani, "Development of an Improved P&O Algorithm Assisted Through a Colony of Foraging Ants for MPPT in PV System," IEEE Trans. Ind. Inform., vol. 12, no. 1, pp. 187-200, Feb. 2016. doi: 10.1109/TII.2015.2502428.4. K. Sundareswaran*, P. Sankar, P. S. R. Nayak, S. P. Simon and S. Palani, "Enhanced Energy Output From a PV System Under Partial Shaded Conditions Through Artificial Bee Colony," IEEE Trans. Sustain. Energy, vol. 6, no. 1, pp. 198-209, Jan. 2015. doi: 10.1109/TSTE.2014.2363521
Essential Qualifications required	B.E./B.Tech. and M.E./M.Tech. in Electrical Engineering or Mechanical Engineering or allied branches.
Desirable Qualifications required	Knowledge in CAD software's or Ansys or MATLAB

PROPOSAL NO. – 8

Title of the Proposal	Structural, Electrical, Magnetic, and Mechanical Characterization of Micro and Nano Particulate Reinforced Metal Matrix Composites
Supervisor - I	Dr. Veeresh Kumar G B, <i>Mechanical Engineering</i>
Supervisor - II	Dr. J Krishnamurthy, <i>Physics (School of Sciences)</i>
E-mail IDs:	veereshkumargb@nitandhra.ac.in ; krishnamurthy@nitandhra.ac.in
Abstract	<p>Recently there has been more focus on the development of metal matrix composites (MMCs) reinforced with ceramic particulates due to enhanced performance over conventional materials. The enhancement in the performance may be attributed to the combined effects of good bonding, grain refinement, enhanced dispersion with dislocation strengthening, and better load transfer, which are assisted by the inclusion of reinforcements. After going through several research articles, it was noticed that there is a lack of information available related to the different strengthening mechanisms related to the improvement in the performance of MMCs and the structural changes in the reinforced materials due to the addition of reinforcement particulates with more focus to physics of the materials. As the near-zero coefficient of thermal expansion property is a required MMC characteristic property for many applications, it is interesting to study the effect of temperature on the structural, electric, and magnetic properties of the matrix host material in MMCs. Further, the frequency & temperature variation of dielectric permittivity of reinforcement material in the proposed MMCs will be investigated to examine the performance of host matrix and reinforced materials as magnetic and dielectric sensors, respectively.</p>
Keywords	Composites; Transport Properties; Magnetic Properties; Structure; Mechanical Studies.
Relevant Publications	<ol style="list-style-type: none"> 1. K. Chinna Maddaiah, Veeresh Kumar G B, Ramakrishna Pramod, “Studies on the Mechanical, Strengthening Mechanisms and Tribological Characteristics of AA7150-Al₂O₃ Nano-Metal Matrix Composites”, Journal of Composites Science. 2024, 8, 97. https://doi.org/10.3390/jcs8030097. 2. K. Chinna Maddaiah, G.B. Veeresh Kumar, “Mechanical Characterization of AA357 MMC with Reinforcement of Si₃N₄”, Volume 51, Issue 5, Journal of Testing and Evaluation - https://doi.org/10.1520/JTE20220519. Published Online: 03 March 2023. DOI: 10.1520/JTE20220519 3. Kumar, G.B.V. and Panigrahy, P.P. Nithika, S., Pramod, R. and Rao, C.S.P. "Assessment of mechanical and tribological characteristics of Silicon Nitride reinforced aluminum metal matrix composites". Composites Part B: Engineering. vol.175, 2019. 4. Magnetic complexity, magnetodielectric effect, and DFT calculations on correlation driven Gd₂CoMnO₆ insulator, by <i>C.H. Prashanth</i>, Indukuru Ramesh Reddy, Kartick Tarafder, D. Chandrasekhar Kakarla, H.D. Yang, Venimadhav Adyam, <i>Krishnamurthy Jyothinagaram</i>, Journal of Magnetism and Magnetic Materials, Vol. 563, 169880 (2022).
Essential Qualifications required	M.Tech. (Manufacturing/Production/Material Science/Design) or M. Sc. (Physics/Material Science)
Desirable Qualifications required	M.Tech. (Manufacturing/Production/Material Science/Design) or M. Sc. (Physics/Material Science)

PROPOSAL NO. – 9

Title of the Proposal	Rebar Bending in Construction Practice – A boon or bane from the Prospect of Rebar Corrosion Behaviour
Supervisor - I	Dr. Raffi Mohammed, <i>Metallurgical & Materials Engineering</i>
Supervisor - II	Dr. Shaik Mahabu Subhani, <i>Civil Engineering</i>
E-mail IDs:	raffimohammed@nitandhra.ac.in ; subhani@nitandhra.ac.in
Abstract	Rebar bending is a common practice followed in civil engineering construction projects. Due to this practice, rebars will experience a certain level of plastic deformation before they are used in construction. This will lead to macrostructural changes in terms of the formation of dissimilar surfaces on the rebar. In addition to this, bent rebars will also experience microstructural changes due to plastic deformation phenomena. Hence, it is important to realize the electrochemical behaviour of the rebar, which undergoes metallographic changes due to pre-induced plastic deformations. Meanwhile, blended (binary and ternary) and alkali-activated mortar systems are moving towards reducing carbon footprint by utilizing industrial and agricultural by-products in the construction industry. This study will be directed towards a comparative analysis of rebar bending on the corrosion behaviour of various systems, such as ordinary Portland concrete systems, blended concrete systems, and alkali-activated concrete systems. This study will help to highlight the special care that needs to be paid to bent rebars from the prospect of corrosion behaviour. Hence, the outcome of this work will be helpful in designing a system that can counter the negative effects associated with rebar bending in the prospect of corrosion.
Keywords	Rebar bending, corrosion; blended (binary and ternary) and alkali-activated mortar systems
Relevant Publications	<ol style="list-style-type: none"> 1. <i>Surjan Sheik, Raffi Mohammed, Atmaramudu Tirumalla, Arun Kumar Gurralla, “Correlative Analysis of Morphology–Mechanical–Corrosion Behavior of Conventional Nickel-Based and Nitrogen-Alloyed Nickel-Free Austenitic Stainless Steels”, Journal of Materials Engineering and Performance (Springer), 2022. (https://doi.org/10.1007/s11665-022-07171-y)</i> 2. <i>Surjan Sheik, Raffi Mohammed, Kiran Teeparthi, Y. Raghuvamsi, “Machine Learning–Based Prediction of Intergranular Corrosion Resistance in Austenitic Stainless Steels Exposed to Various Heat Treatments” in the Journal of The Institute of Engineers India: Series D, 2024. , (https://link.springer.com/article/10.1007/s40033-024-00675-y)</i> 3. Kumar Gedela Santhosh, Sk M. Subhani, A. Bahurudeen. “Cleaner production of concrete by using industrial by-products as fine aggregate: A sustainable solution to excessive river sand mining.” Journal of Building Engineering, 42(2021), 102415, doi.org/10.1016/j.jobbe. 4. Kumar Gedela Santhosh, Sk M. Subhani, A. Bahurudeen. “Recycling of palm oil fuel ash and rice husk ash in the cleaner production of concrete-A review” Journal of Cleaner Production, 354 (2022), 131736, doi.org/10.1016/j.jclepro.2022.131736.
Essential Qualifications required	M.Tech. in Engineering
Desirable Qualifications required	B.E./ B.Tech./M.Tech. (Metallurgical Engineering, Metallurgical & Materials Engineering, Civil Engineering)

PROPOSAL NO. –10

Title of the Proposal	Development of FeCoV based High Entropy Alloys for Memory Applications
Supervisor - I	Dr. R. Sunil Kumar, <i>Metallurgical & Materials Engineering</i>
Supervisor - II	Dr. Ramudu Machavarapu, <i>Physics (School of Sciences)</i>
E-mail IDs:	sunil.rajulapati@nitandhra.ac.in ; ramudu@nitandhra.ac.in
Abstract	<p>High-entropy alloys (HEAs) represent a novel class of materials with exceptional mechanical, thermal, and chemical properties. Despite their promising attributes, the magnetic behavior of HEAs remains relatively unexplored. This project proposes to investigate the magnetic properties of HEAs, aiming to elucidate the underlying mechanisms and explore their potential applications in magnetic devices. The study includes characterization of the structural and magnetic properties of selected HEAs, understanding the influence of composition and microstructure on their magnetic behavior, and establishing theoretical models to predict new HEAs. The methodology involves alloy development, microstructural characterization, magnetic property measurements, and understanding mechanism through theoretical modeling. The expected outcome would be the identification of HEAs with superior magnetic properties. This research is significant as it can contribute to the development of next-generation magnetic materials with enhanced performance and functionality.</p>
Keywords	High Entropy Alloys; Powder Metallurgy; Mechanical Alloying; Magnetic Properties; Structural Characterization
Relevant Publications	<ol style="list-style-type: none"> 1. Rajulapati, S. K., et.al., (2016). Studies on alloying process of a ferritic/martensitic oxide dispersion strengthened (ODS) steel prepared by mechanical alloying of elemental powders. <i>Powder Metallurgy</i>, 59(5), 350–358. 2. Sunil Kumar Rajulapati, et.al., Effect of directional anisotropy on mechanical properties of 9Cr Ferritic/Martensitic ODS steels processed by mechanical alloying and powder forging, <i>Materials Today Communications</i>, Volume 37, 2023, 107220. 3. M. Ramudu, et.al., Investigations on structural, magnetic and calorimetric properties of $\text{Co}_2\text{FeSi}_{1-x}\text{B}_x$, ($x=0-0.5$) Heusler alloys: Role of boron, <i>J. Magn. Magn. Mater.</i> 490(2019) 165528. 4. M. Ramudu, et.al., Structure, magnetic properties and electrical resistivity of $\text{Co}_2\text{FeSi}_{1-x}\text{Ga}_x$ Heusler Alloy thin films, <i>J. Magn. Magn. Mater.</i> 418 (2016) 42-47. 5. M. Ramudu, et.al., Half-metallicity in Heusler type $\text{Fe}_2\text{Cr}_{1-x}\text{Co}_x\text{Si}$ alloys, <i>J. Phys. D: Appl. Phys.</i> 49 (2016) 055001 (8 pp)
Essential Qualifications required	Masters in Materials Science and Engineering / Metallurgy / Manufacturing / Physics
Desirable Qualifications required	Masters in Materials Science and Engineering / Metallurgy / Manufacturing / Physics