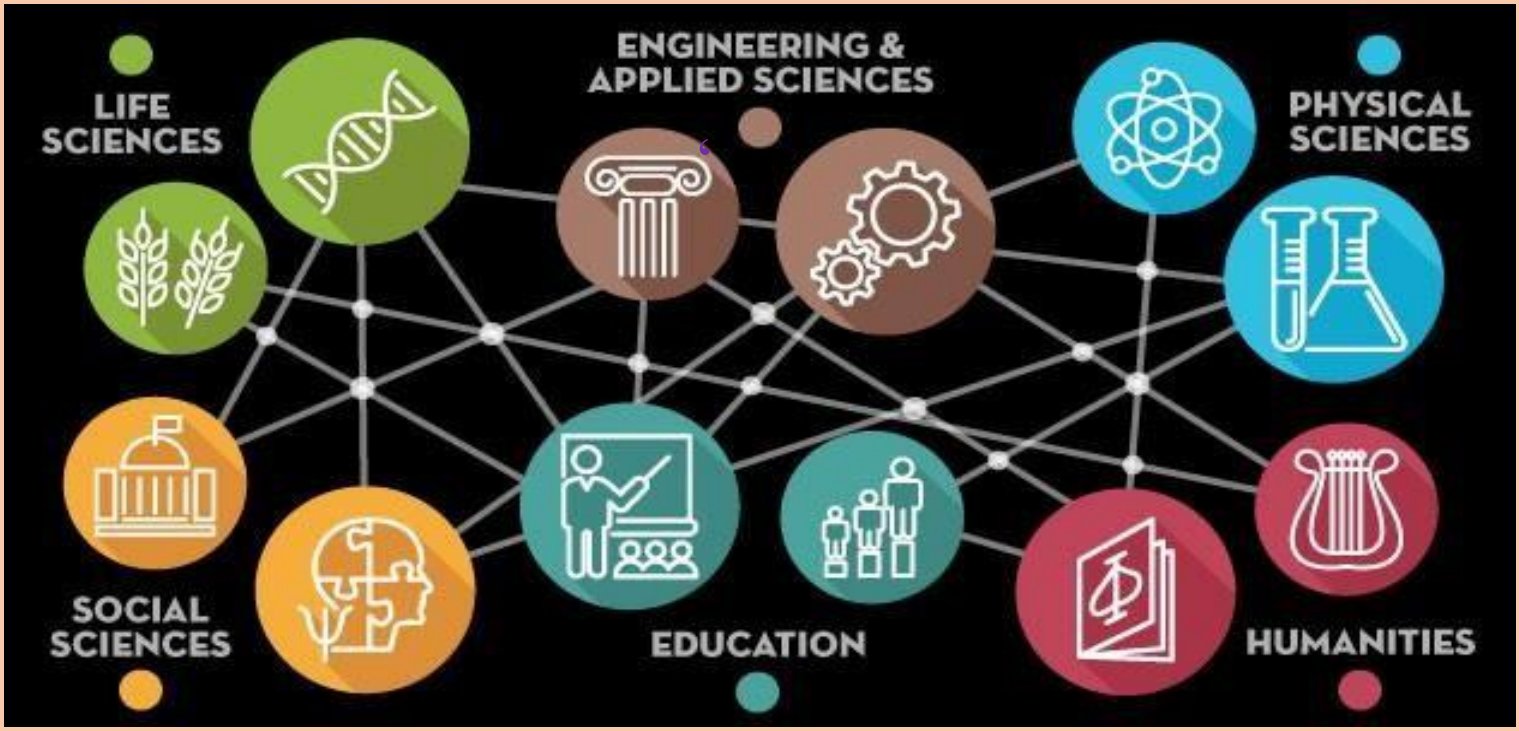
Indian Institute of Information Technology Design and Manufacturing Kurnool

Information Brochure

Ph.D. admissions
January 2027 Session

PhD Programs under
Centre for Interdisciplinary Programs (CIP)



About the Centre for Interdisciplinary Programs (CIP):

The Centre for Interdisciplinary Programs (CIP) at IIITDM Kurnool announces Interdisciplinary (ID) PhD programs for enthusiastic aspirants exploring the interface of various science and engineering disciplines. The ID PhD Program involves rigorous course work (12 or 24 credits depending on the academic background of students) followed by research work in an interdisciplinary research topic leading to a doctoral thesis.

Eligibility Criteria for Full-Time Ph.D.:

Applicants holding Master's degree:

- **Minimum Educational Qualifications:** Applicants must possess with a M.Tech/M.E/M.Sc., M.A.) (Research) degree in Engineering/Technology with from any recognized institute, with a minimum CGPA of 7.5/10 or 70% for UR/OBC/EWS categories and CGPA of 7.0/10 or 65% for the SC/ST/PwD categories.
- **Screening and Selection:** Entrance Test and/or Interview.

Direct admission to PhD with Graduation (B.E. / B. Tech. /B.S.):

Minimum Education Qualifications: Candidates who have qualified for the award of Bachelor's degree in Engineering/Technology with exceptionally good academic record in an eligible discipline will be considered for direct admission to Ph.D. Programme as a regular full-time scholar subject to fulfillment of one of the following conditions:

i. B.Tech ./ B.E / B.S degree (4 Years) holder of any CFTI/CFI with respective specialization with a minimum CGPA of 7.5 on 10.0 point scale for UR/OBC/EWS category and minimum CGPA of 7.0 CGPA on 10.0 point scale for candidates under SC/ST/PwD category. (**GATE Qualification is not Mandatory**)

ii. Bachelors in Engineering/Technology from any **non-CFTI** with valid GATE score and at least CGPA of 7.0/10 under UR/OBC/EWS category and at least CGPA of 6.5/10 for candidates under SC/ST/PwD category.

- Screening and Selection: Entrance Test and/or Interview. (*based on the number of applications received)
- In cases where the candidates are directly admitted to the PhD programme in Engineering /Sciences with a Bachelor's Degree in Engineering/Technology, the scholar should successfully complete prescribed courses (Coursework) with a minimum of 24 Credits.

Screening and Selection:

a) The Academic Section will conduct the shortlisting and selection process.

b) Eligible candidates possessing the minimum educational qualifications and satisfying additional criteria set by the institute from time to time only will be called for the written test and/or Interview.

c) The syllabus for the written test and/ or Interview is **GATE 2026 syllabus in respective subject (Station Department).**

d) The exam will be conducted either in CBT (Moodle) mode or offline based on number of applications.

e) Based on the academic record and the performance of the candidates in the written test and/or Interview test, the selection committee will finalize the applicants for admission to the Ph.D. programme.

Convener/coordinator of Ph.D. admissions and contact details:

- FIC (PG & R), Ph: 08518-289100 (Ext: 111)

Bank Account Details and Payment QR Code:

Account Name: **IIIT DESIGN AND MANUFACTURING**
Account Number: **37806955974**
IFSC Code: **SBIN0064655**
Branch: IIITDM KURNOOL CAMPUS.



Kindly fill out the Google Form using the link provided:
https://forms.gle/h9R96GznE6wPXSXN6

Important Dates:

Web notification of the PhD Advertisement	06-10-2026
Online application registration process start date	06-10-2026
Last date for the submission of online Application form	18-10-2026
Notification of shortlisted candidates for Interview/Written Test	28-10-2026
Publication of Final Results	29-11-2026
Last date for seat acceptance and fee payment:	05-12-2026
Reporting to the Institute	14-12-2026

Tentative Schedule for Interview/Written Test:

Name of the Program	Examination Date and Reporting Time	Venue
Interdisciplinary Programmes (CIP)	12-13th November 2026, 8:00 AM	Administrative Building 3rd floor

Note: Accommodation will be provided subject to availability.

Institute Website link: https://iiitk.ac.in

PhD Programs under Centre for Interdisciplinary Programs		
S.No.	**Title**	**Problem Statement**
1.	Design and Fabrication of Photodetectors for NIR Applications	Design and Numerical simulation of the photodetectors for near Infrared applications. Futher, the device will be fabricated and verified with the simulation results.
2.	Wave Propagation in bioinspired Structures	Bioinspired architected structures, such as nacre-like configurations, helicoidal Bouligand arrays, and hierarchical honeycomb lattices, offer remarkable mechanical properties including enhanced energy dissipation, impact resistance, and unique wave mitigation capabilities. However, due to their intricate microstructural geometries, anisotropy, and inherent material nonlinearities, deriving closed-form analytical solutions to describe wave propagation within these systems remains a significant challenge. This paper presents a comprehensive study on the application of advanced numerical methods to analyze and simulate elastic and acoustic wave propagation in bioinspired structural systems. Using computational approaches such as the Finite Element Method (FEM), the Wave Finite Element (WFE) framework, and the Spectral Element Method (SEM), we model the transient response, dispersion relationships, and bandgap behaviors of various biomimetic cellular architectures. Bloch-Floquet boundary conditions are enforced on parameterized periodic unit cells to evaluate directional energy flow, group velocities, and the formation of complete or partial phononic bandgaps under varying static and finite deformation states. Furthermore, time-domain simulations are implemented to capture dynamic stress wave interaction, scattering at complex internal interfaces, and the spatial mitigation of high-frequency impacts. The numerical outcomes demonstrate how geometric scaling, multi-scale hierarchies, and material interfaces can be strategically tuned to manipulate acoustic and stress waves. The modeling techniques and findings outlined in this research provide a robust foundation for the design, optimization, and non-destructive evaluation of next-generation, impact-resistant metamaterials and protective engineering
3.	Additively Manufactured 3D Photocatalytic Materials for Sustainable Hydrogen Production	Energy demands increased drastically due to population growth, rapid urbanisation, and industrialisation, leading to the accumulation of waste in the environment. Since 1990, researchers have been working on renewable clean energy resources, and hydrogen is one of the top-priority areas of business around the world. To date, hydrogen production is mainly from fossil fuels, such as steam reforming and the partial oxidation route. Unfortunately, these routes are inherently constrained by their high production costs, low H2 production efficiency, and, more importantly, the million tons of CO2 emissions. To overcome these issues, researchers are exploring alternative ways to produce H2 gas from renewable resources, such as biomass processes and photocatalytic water splitting. The fabrication of a large-area, uniform photocatalytic panel that could cover the UV to visible range of light is a bottleneck process, and most experiments are optimised in controlled laboratory conditions and in pilot-scale production over large-area photocatalytic panels, offering a solar-to-hydrogen fuel generation efficiency of less than 1%. To overcome these limitations, the proposed project uses a 3D printing technology solution that provides precise control over 3D geometries with desired porous structures, improved surface area, and photon management and produces efficient hydrogen gas.
4.	Uniform polishing of multi-phase ceramics by selective surface modification	Multiphase ceramics offers unique advantage of high strength to weight ratio, all due to distinct properties of two phases in the material. That is the reason why their usage in high end optics such as space mirrors are getting increased. However, material removal and uniform polishing of such materials are challenging due to different removal characteristics of two phases. Therefore, it is needed to balance the surface properties of phases so that uniform removal could be achieved. This project will work on intersection of surface science and manufacturing where

		selective surface modification approaches will be leveraged for improving the polishing efficiency.
5.	Design and Development of Autonomous Navigation for Mobile Robots	This research proposal focuses on the development of autonomous path planning algorithms for mobile robots operating in both indoor and outdoor environments. The aim is to design intelligent navigation strategies that enable robots to move efficiently, safely, and autonomously in structured and unstructured settings. The proposed work integrates sensor data, environment mapping, and decision-making techniques such as simultaneous localization and mapping (SLAM) and heuristic-based path planning algorithms. The system will address challenges such as dynamic obstacles, varying terrains, and real-time adaptability. Indoor navigation will emphasize accuracy within confined spaces, while outdoor navigation will consider environmental uncertainties and scalability. The performance of the developed algorithms will be evaluated using simulation tools and real-time experiments. The expected outcome is a robust and efficient path planning framework that enhances navigation accuracy, reduces computational complexity, and supports applications in logistics, surveillance, and smart city systems.
6.	Nanocomposites for advanced electromagnetic interference shielding	Developing conductive polymeric/Natural fiber nanocomposites offers a versatile, future-ready solution for EMI shielding, bridging the gap among performance, functionality, and manufacturability. Making them adaptable and technologically advanced makes them central to next-generation electromagnetic shielding materials. Surface functionalization of fillers enhances compatibility with the polymer/natural fiber matrix, promoting uniform dispersion and improved interfacial polarization, contributing to absorption-dominant shielding.
7.	Learning Articulatory Dynamics from Speech Using Graph Neural Networks	Acoustic-to-articulatory inversion (AAI) aims to estimate the underlying articulatory movements of the speech production system from the observed acoustic speech signal. Conventional approaches generally model the relationship between acoustic features and individual articulatory trajectories using statistical or neural-network-based regression. However, articulators such as the tongue, lips, jaw, and velum are physically and functionally interdependent. Modeling these articulators independently may therefore fail to capture their coordinated movements. This project proposes a graph neural network (GNN)-based framework for AAI, in which articulators are represented as nodes of a graph and their physiological or spatial relationships are represented as edges. Acoustic speech features will be used as input to the network, while the target will be the corresponding articulatory trajectories obtained from an articulographic database.
8.	Wind Turbines: Physics-Informed AI-CFD Framework for Predictive Assessment and Remaining Useful Life Estimation	Wind turbine blades are continuously exposed to rain, dust, sand, and other airborne particles, causing progressive leading-edge erosion. Erosion alters blade surface geometry and roughness, leading to aerodynamic losses and reduced power-generation efficiency. Severe erosion can also increase operational loads, maintenance requirements, and turbine downtime. Early-stage erosion is difficult to detect using conventional inspection and condition-monitoring techniques. CFD can provide detailed insights into flow behaviour, erosion mechanisms, and aerodynamic performance degradation. However, high computational costs limit the application of CFD for real-time health monitoring. Data-driven AI models offer rapid prediction but often lack physical interpretability and generalisation capability. There is therefore a need to integrate experimental measurements, CFD-based physics, and AI-based prediction. The proposed research will utilise the EcoSense wind-turbine training setup for controlled experimental investigations. Different erosion/degradation states will be characterised under varying operating conditions. CFD models will be developed to establish relationships between erosion, aerodynamics, and turbine performance. Physics-informed AI models will integrate experimental and CFD-derived features to assess erosion. The framework will further enable turbine health monitoring and remaining useful life (RUL) estimation. The outcome will be an experimentally validated AIâ€“CFD digital-

		twin framework for predictive maintenance of wind turbines.
9.	Generative AI for Personalised English Language Learning: Design and Development of an Intelligent Computational Framework	Despite rapid advances in Artificial Intelligence, Natural Language Processing, and Generative AI, existing AI-based English language learning tools often lack strong pedagogical grounding, personalized feedback, and explainability. They may identify language errors without adequately explaining the underlying linguistic issues or adapting feedback to individual learners and their learning needs. This creates a gap between the capabilities of AI and established principles of effective English language pedagogy. Therefore, there is a need to develop and evaluate an interdisciplinary framework that integrates English language education principles with NLP and Generative AI to provide accurate, explainable, personalized, and pedagogically meaningful support for English language learning.
10.	AERO-Path: Joint Optimization of Task Offloading, Cooperative Edge Caching, and Adaptive Single- and Multi-UAV Path Planning for Flood Disaster Management	Effective flood monitoring depends on observing affected areas, processing collected data quickly, and making current information available when needed. UAVs can support these activities by collecting data and sharing processing tasks with nearby UAVs, edge servers, and the cloud. Their operation, however, is limited by battery capacity, onboard computing resources, and unreliable communication links. Flood conditions also change over time, requiring UAVs to adjust where they fly, how long they hover, and which tasks they prioritize. These decisions are connected. A UAVâ€™s position affects its coverage and access to computing resources, while the choice of where to process a task influences delay, energy use, and workload. Information stored on UAVs and edge nodes may become outdated as the flood develops or difficult to access as UAVs move. Handling task offloading, flight planning, and caching separately can therefore lead to delayed results, wasted energy, uneven workloads, and decisions based on stale information. The main problem is how to coordinate these activities so that critical regions receive timely attention within the available resources. This research aims to develop an aerial edge computing framework that integrates these decisions. It will assign monitoring tasks to suitable processing locations based on task priority, data size, available computing capacity, communication conditions, and UAV energy. Deep reinforcement learning will guide the trajectories, task allocation, and hovering behavior of single and multiple UAVs, while accounting for connectivity, collision avoidance, and changing flood conditions. A cooperative caching mechanism will manage where flood-related information is stored and when it is updated, taking into account UAV mobility and information freshness. The framework will be evaluated using task latency, energy consumption, task completion rate, cache hit ratio, information freshness, coverage, communication reliability, and workload balance across UAVs.
11.	Hardware accelerators for LLMS for RTL generation	The intersection of Large Language Models (LLMs) and electronic design automation (EDA) presents a transformative paradigm shift in hardware design engineering, characterized by a unique bi-directional relationship. On one axis, LLMs function as high-level creators, translating natural language descriptions and technical specifications into synthesizable Register-Transfer Level (RTL) code. This pipeline bypasses traditional manual coding barriers using structured agentic workflows, hierarchical design space exploration (DSE), and High-Level Synthesis (HLS) design patterns. On the inverse axis, hardware acceleratorsâ€”spanning application-specific GPUs, field-programmable gate arrays (FPGAs), and specialized tensor processing units (TPUs)â€”serve as the foundational computational backbone. These systems provide the high-throughput, low-latency token generation loops required to execute complex multi-agent optimization and iterative code repair cycles. This abstract synthesizes the current state-of-the-art in both domains, highlighting how LLM-driven synthesis reduces RTL engineering cycles, while modern hardware acceleration frameworks resolve the underlying compute bottlenecks. Ultimately, this co-design ecosystem lays the groundwork for fully

		autonomous, closed-loop silicon compilation.
12.	FPGA-Based Hardware Acceleration of Machine Learning Algorithms for Real-Time ECG Signal Analysis	Electrocardiogram (ECG) signals are widely used for detecting cardiac abnormalities, but real-time ECG analysis requires fast signal processing and accurate classification. Conventional machine-learning-based ECG analysis is mainly performed using software platforms, which may introduce latency and computational overhead for continuous and portable healthcare applications. FPGA-based hardware acceleration can provide parallel processing, low-latency computation, and deterministic operation; however, implementing machine-learning algorithms on FPGA while maintaining classification accuracy and minimizing hardware resources remains a challenge. This research aims to develop a resource-efficient FPGA architecture for accelerating machine-learning algorithms for real-time ECG signal analysis and classification. The study will investigate hardware-friendly ML models, ECG preprocessing and feature extraction, fixed-point implementation, and optimized parallel/pipelined architectures to achieve low latency, low power consumption, and efficient FPGA resource utilization.
13.	Multiferroic materials - analytical and numerical analysis	-
14.	AI-Driven Characterization of Machined Components	This project explores the application of artificial intelligence, specifically deep learning and machine vision, to characterize machined components produced through CNC turning. Conventional approaches to evaluating machining outcomes—such as surface roughness measurement, tool wear inspection, and chip morphology analysis—often rely on manual observation or offline instruments, which can be time-consuming and prone to subjectivity. By integrating AI-based image analysis, the study aims to automate and enhance the accuracy of machining characterization.
15.	Inverse Problems in Remote Sensing via Neural-Numerical Fusion	Inverse problems arising in remote sensing and environmental modeling are inherently ill-posed, characterized by incomplete, noisy, and indirect observational data. Traditional numerical approaches for solving such problems, based on ordinary and partial differential equation (ODE/PDE) models, often suffer from instability, high computational cost, and sensitivity to measurement errors. On the other hand, purely data-driven methods using artificial neural networks lack physical interpretability and fail to generalize reliably in data-scarce regimes. This research proposes the development of a hybrid computational framework that integrates numerical methods for ODE/PDEs with advanced neural network architectures to address inverse problems in remote sensing. The proposed approach leverages physics-based constraints through numerical solvers while employing neural networks for efficient parameter estimation, feature extraction, and data assimilation from satellite imagery. Regularization techniques and physics-informed learning strategies will be incorporated to ensure stability, robustness, and consistency with governing physical laws. The framework will be designed to recover unknown physical parameters, boundary conditions, and hidden states in environmental systems from spatiotemporal image data. Applications include soil moisture estimation, atmospheric pollutant reconstruction, and oceanographic parameter identification. The proposed methodology aims to significantly improve accuracy, computational efficiency, and interpretability compared to existing approaches. This interdisciplinary research bridges numerical analysis, machine learning, and remote sensing, contributing to the development of next-generation scientific computing tools for complex real-world systems.