

INSTITUTE ACTIVITIES

Inauguration of Second Batch of B Tech Program for TATA Motors Passenger Vehicles Limited employees

Nirma University has partnered with Tata Motors for academic programme of BTech in Manufacturing Technology for the employees of Tata Motors Passenger Vehicles Limited working at the Sanand Plant in Gujarat. The programme aims at enhancing employees' technical skills and impart knowledge requisite for the automotive manufacturing industry. The first batch of BTech in Manufacturing Technology has completed 3 years and is currently undergoing their final semester of the BTech degree.

The inaugural function was organized on July 19, 2022 at A-Block in the presence of higher officials from the Tata Motors Passenger Vehicles Limited (TMPV), Sanand Plant and Nirma University. The inaugural function was attended by following officials of TMPV and 35 candidates who have enrolled in the degree programme.



- Electrical Engineering Department has started new PG programme in **Electrical Vehicular Technology**.
- Electrical Engineering Department has offered a training programme titled “**Auto Electrical and Electronics**” to non-electrical Engineers of Tata Motors Ltd., Delhi unit.

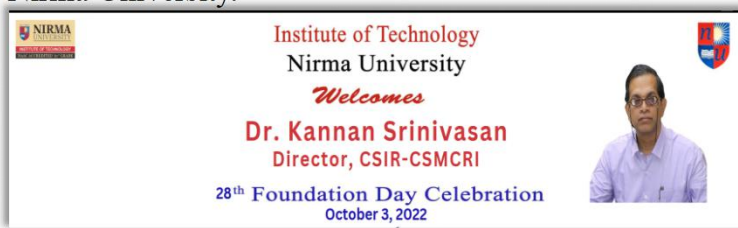
B Tech First Year Orientation Programme

B. Tech First Year Orientation Programme 2022-2023 was held during September 17-30, 2022 for students admitted to B.Tech programmes.



Foundation Day Celebration

The 28th Foundation Day Celebration of the Institute of Technology, Nirma University was held on Monday, October 03, 2022 in the august presence of the Chief Guest Dr Kannan Srinivasan, Director, CSIR-CSMCRI, Bhavnagar, and Dr Anup K Singh, Director General, Nirma University.



STTP 2022

Short term training programme (STTP) were organized at various departments of Institute of Technology, Nirma University in July 2022 to address various aspects of ongoing developments in the subject field. The main objective of the two weeks training program was to address research and development activities and current practices. The experts from the IITS, NIT and Research organization like SAC-ISRO and IPR also from Industry delivered an expert talk. Various industrial visits were organized during short term training programme to enhance latest industrial practice knowledge.



Department	Title	Coordinator
Chemical Engineering Department	Distillation Systems: Design, Simulations and Energy Savings	Dr. M. H. Joshipura
Mechanical Engineering Department	Advances in Material Processing with focus on Emerging Technologies	Dr N D Ghetiya
Civil Engineering Department	Digital Technologies in Construction	Dr. Urmil DaveDr. Parul Patel
Electrical Engineering Department	Electric Vehicle Technology - Status, Challenges, and Road Ahead	Dr. C R Mehta
Electronics & Communications Engg.	Cyber Physical Systems	Dr. D. K. Kothari Prof. Rutul Patel
Compute Science and Engineering	Human Computer Interaction: Learning today's technologies for building tomorrow's interfaces	Dr Saurin ParikhProf. Daiwat Vyas



- Department of Civil Engineering, School of Engineering, Institute of Technology, Nirma University offered a Value-Added course (offline) titled “**Improving Safety, Ethics and Professional Practice in Engineering via Youth Training**” from August 05 to August 09, 2022. The course was conducted on the auspices of ‘ACADEMICS WITHOUT BORDERS’ (<https://www.awb-usf.org/>). The course instructor / A W B Volunteer was Dr Rishi Gupta (<https://www.uvic.ca/ecs/civil/people/home/guptar.php>) Professor, Department of Civil Engineering, University of Victoria, British Columbia, Canada.

- Electronics and Instrumentation Engineering Department conducted national level workshop titled ‘Programmable Logic Controller’ from 4 – 8 July, 2022. Workshop Coordinators were Dr. D M Adyaru & Prof. Alpesh Patel.
- Electronics and Instrumentation Engineering Department conducted following programmes for ATC Mitsubishi Electric India Pvt Ltd.

Micro PLC: MELSEC iQ-F” on	June 28-29, 2022
“Modular PLC: MELSEC iQ-R”	June 30 and July 1, 2022
GOT 2000	July 2, 2022,
VFD (Variable Frequency drive) A800	October 3, 2022
LVS- Low voltage switchgear	August 6, 2022
SCADA MC works 64	November 10, 2022

Electronics & Communication Engineering Department has organized following programme.

Title of program	Organized By	Name of the Faculty Coordinator	Month	Year
Hackathon	Jointly by Nirma University and e-Infochips	Dr Manish Patel	Sep	2022
“FinFET, Nano-Sheet cell design , Now & Road Ahead	online platform Team by Ni Logic Pune Mr Vinay Sharma	Dr Usha Mehta	Sep	2022
BTech Semester III, V and VIII Orientation Program 2022	Electronics and Communication Engineering Dept, IT-NU	Dr Vaishali Dhare	Aug	2022
PG Orientation - 2022	EC Department and Institute of Technology, Nirma University	Dr Manish Patel	Aug	2022
Image Processing Project Exhibition	EC Department and Institute of Technology, Nirma University	Dr Ruchi Gajjar	Nov	2022

AN INDUSTRY MEET

- An industry meet was arranged on November 15, 2022 by Centre of Excellence in Data Science (CoE-DS), CSE Department by inviting industry representatives to provide the offerings of the CoE-DS and discussion on possible collaborations were carried out in terms of various projects, consultancy, workshops. Dr Sangwon Yoon from SUNY Binghamton University and the CoE team from CSE Department addressed the industry personnel.



- Dr. Rahul Rai, Dean's Distinguished Professor in Department of Automotive Engineering, the Clemson University International Center for Automotive Research and Associate Director of the Artificial Intelligence Research Institute in Science and Engineering at Clemson University USA delivered an expert talk for the students of BTech (ME) Sem V on the topic of "Geometric Reasoning and Machine Learning in Digital Manufacturing and Design Applications." and the students of BTech (CSE) Sem V on the topic of "Hybrid Physics Guided Machine Learning Algorithms" on August 23, 2022.
- Dr Sang Won Yoon, Professor, Systems Science, and Industrial Engineering, SUNY, Binghamton University, New York, USA conducted expert lectures on topics Machine Learning and Big Data Analytics for the students of the CSE Department from November 14 to 15,2022.



- Dr Yu (Chelsea) Jin, Assistant Professor, Binghamton University delivered an online talk titled - "Large-Scale Discrete Event Simulation Modeling and Machine Emulator for Pharmacy Automation Systems" on November 11,2022.
- Dr Zimo Wang, Associate Professor, Binghamton University delivered a talk titled - "An explainable machine learning (EML) approach for microstructure characterizations toward improving sustainable material manufacturing" on December 9,2022.
- Dr Hongbo Su, Dr. Ramesh S. V. Teegavarapu and Dr Sudhagar Nagarajan, Department of Civil, Environmental and Geomatics Engineering, Florida Atlantic University, USA delivered 10 hour lectures from November 21 to December 01, 2022

Mr. Ravi Bokade Project Manager & Head of Mobile Department, Yudiz Solutions Limited, Ahmedabad Mr. Sandeep Joshi- Team Leader Yudiz Solutions Limited, Ahmedabad Mr. Abhishek Bekhai - Jr. IOS Developer Yudiz Solutions Limited, Ahmedabad Mr Parth Pandya - Sr. IOS Developer Yudiz Solutions Limited, Ahmedabad conducted a workshop on various topics like:

- Introduction to X code
- Swift Language,
- Storyboard,
- UI components
- App Lifecycle
- UI Table View
- UI Collection
- View Core data for local storage Fetching Website Data into Memory,
- API call using URL Session Core data for local storage Fetching Website Data into Memory,
- API call using URL Session Usage of Firebase datastore in iOS Notification,
- Protocol Delegation on 01/10/2022.

Dr. Ramesh S. V. Teegavarapu (Dr. T.) Professor and Graduate Program Director and Leader of Hydrosystems Research Laboratory (HRL), Department of Civil, Environmental and Geomatics Engineering, Florida Atlantic University, USA delivered an expert talk on 'Fundamental of Geographical Information System (GIS) and Applications' on November 24 & 25 & 28, 2022.

Dr. Shukla is the Founding Editor-in-Chief, the International Journal of Geosynthetics and Ground Engineering, Founding Research Group Leader (Geotechnical and Geoenvironmental Engineering), the School of Engineering, Edith Cowan University, Perth, Australia delivered an Expert Lecture Series in Foundation Engineering on November 07, 14, 21, 28, 2022 and December 05, 2022.

Dr. Hongbo Su (Dr. Su.) Associate Professor Department of Civil, Environmental and Geomatics Engineering, Florida Atlantic University, USA delivered an expert talk on 'Fundamental of Remote Sensing' on November 21-23, 2022.

- **Expert Lectures National:** [Click Here](#)

Swarm and Evolutionary Algorithms: Introduction and Applications



Prof (Dr) Ankit Thakkar
Professor, Department of Computer Science and Engineering

Swarm and Evolutionary (SWEVO) algorithms are nature-inspired algorithms based on the natural evolution of biological organisms, social group behaviour and foraging strategies. Swarms can be described as a group of individuals in large quantities possessing the same behavioural characteristics. Swarm Intelligence (SI) algorithms are inspired by the natural behaviour of living organisms such as ants, fish, and birds, to name a few. Swarm members communicate with each other as well as the environment to complete the given task for the underlying application. Each member of the swarm has low intelligence, but they solve complex problems when they work together. Members of the swarm can communicate directly or indirectly. Information about the food source can be communicated by bees by performing waggle dance is an example of direct communication while pheromone trails used by ants are an example of indirect communication. SI algorithms are self-organized and decentralized algorithms that select the best solution among the available solutions. Ant Colony Optimization (ACO) is one such SI-based algorithm wherein ants search for food from their nests. Initially ants travel randomly in search of food from their nests. Once a food source is found, ants carry a portion of food from the food source to their nests and deposit a chemical substance called pheromone on the path that helps other ants to find a food source. The path which is more frequently visited has more deposition of pheromone that guides other ants to follow the path. Pheromone evaporates over a period of time and hence, the length of each path is also accounted for to decide which path should be followed by ants.

Digital Ants is a real-life application of ACO-based approach that is used to protect the network from malicious activity. In this application, different types of ants collect varied information from different machines that helps to collectively decide threat level in different machines. Whenever any malicious activity is found on a particular machine, ants deposit pheromones on that machine. This attracts more ants toward the machine. Since different ants collect different types of information, more information about the machine is collected that helps to identify the cause of malicious activity.

Evolutionary algorithms are population-based algorithms consisting of an environment where individuals are formed by a process inspired by biological evolution. In this algorithm, the entire population is replaced with the next generation using selection, crossover, and mutation operators. Each individual is a part of the solution space and the fittest ones will survive and be selected for the reproduction process through crossover and mutation operators. Crossover is a useful operator for performing exploration while mutation is used for the exploitation process during the biological evolution process. Crossover rate, mutation rate, and population size are the control parameters for evolutionary algorithms. Self-organization and adaptation are the two main features of evolutionary algorithms.

SWEVO algorithms are used to solve optimization problems. It is also used for feature selection and parameter optimization for machine learning and deep learning algorithms. Moreover, SWEVO algorithms are useful for clustering as well as resampling process. In literature, SWEVO algorithms are applied to various application domains such as computer networks, business, robotics, medicine, computer vision, to name a few.

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