



# Advanced Optimization Techniques and Hands- on with MATLAB/SCILAB

6<sup>th</sup> – 17<sup>th</sup> September 2021



Chairman, Advisory Board, EICT Academy &  
Director MNIT Jaipur  
Prof. Udaykumar R. Yaragatti

Honorary Academic Chair, EICT Academy  
Prof. V. Sinha

Chief Investigator, EICT Academy  
Prof. Vineet Sahula, ECE

Co- Chief Investigators, EICT Academy  
Prof. Lava Bhargava, ECE  
Prof. Pilli Emmanuel Shubhakar  
Dr. C. Periasamy, ECE  
Dr. S. J. Nanda, ECE  
Head, ECE (Prof. V. Janyani)  
Head, CSE (Prof. D. Gopalani)

**Preamble (Electronics & ICT Academy)**  
Government of India had announced a National Policy on Skill Development, which has set a target of skilling 500 million people by 2022 in the domain of Electronics & IT. Under the plan scheme of "Digital India Manpower Development". MeitY has set up seven (07) Electronics and ICT Academies as a unit in 03 IITs, 03 NITs and 01 IIIT with an objective of faculty/mentor development/up gradation in the areas related to Electronics & ICT leading ultimately to improved employability of graduates/diploma holders. MNIT Jaipur has set up such an academy for providing specialized training to faculty and industry persons in the states/UTs of Rajasthan, Gujarat, Daman & Diu, Dadra Nagar Haveli.

## (A) Issues-

1. IT Hardware and Electronics Manufacturing industry- availability of properly trained, skilled and qualified manpower
2. Number of quality PhDs generated in IT / Computer Science is very low
3. In E & ICT domain- there is a very high degree of obsolescence of existing technologies and faster emergence of newer technologies

## (B) Approach-

1. A focused faculty training/updation programme for IT, Electronics and related sectors
2. Spreading up and continuous updation regarding Emerging Technology
3. Training and consultancy services for Industry
4. Design, Develop and Deliver specialized modules for specific research areas and Industry
5. Providing advice and support for technical incubation and entrepreneurial activities

An intensive two-week online training programme is being organized for faculty of engineering and technological institutions. It is also open to persons from industry and doctoral students of Indian organizations. The main theme of training program will be oriented around exploring the state of the art methods for advanced optimization techniques with MATLAB/SCILAB.

## Experts/Speakers-

- 1) Prof. Ganapati Panda, Former Dy. Director, IIT Bhubaneswar
- 2) Prof. Bijay Ketan Panigrahi, Dept. of Electrical Engineering, IIT Delhi
- 3) Dr. Swagatam Das, Electronics & Comm. Unit, ISI Kolkata
- 4) Dr. Pyari M. Pradhan, Dept. of Electronics & Comm., IIT Roorkee
- 5) Dr. Sriparna Saha, Dept. of Computer Science and Engineering, IIT Patna
- 6) Dr. Nithin V. George, Dept. of Electrical Engineering, IIT Gandhinagar
- 7) Dr. Jagdish C. Bansal, Dept. of Math., South Asian University, New Delhi
- 8) Dr. Pankaj Kumar Sa, Dept. of Computer Science & Engg., NIT Rourkela
- 9) Dr. Jyoti Prakash Singh, Dept. Of Computer Science & Engg., NIT Patna
- 10) Dr. Trilochan Panigrahi, Dept. of Electronics & Comm., NIT GOA
- 11) Dr. Sitanshu S. Sahu, Dept. of ECE, Birla Institute of Technology, Mesra
- 12) Dr. Prashant K. Jain, Dept. of Mechanical Engg., IIITDM Jabalpur
- 13) Dr. Anil Kumar, Dept. of Electronics & Comm., IIITDM Jabalpur
- 14) Dr. Urvashi P. Shukla, Dept. of Computer Science, Banasthali Vidyapith
- 15) Dr. Rahul Kumar Vijay, Dept. of Computer Science, Banasthali Vidyapith
- 16) Dr. Rachana Gupta, Institute of Advanced Research, Gandhinagar

Experts from MNIT Jaipur

## Programme Modules:

- Module 1: Fundamental of Optimization : , Classical Optimization techniques, Constrained Optimization, MATLAB for Optimization Techniques
- Module 2: Nature Inspired Optimization: Genetic Algorithm (GA) and its variants, Artificial Immune System & Symbiotic Organism Search, Particle Swarm Optimization (PSO), Ant Colony Optimization, Cuckoo Search, Colliding Bodies Optimization & Social Spider Optimization, Artificial Bee Colony, Differential Evolution (DE), Spider Monkey Optimization, Gray Wolf Optimization, Biogeography-based optimization, Whale Optimization, Sin-Cos Optimization, Teaching Learning-based optimization
- Module 3: Multi & Many Objective Optimization : Nondominated Sorted Genetic Algorithm NSGA-II & NSGA-III, Multi Objective Particle Swarm Optimization & Cat Swarm Opt, Multi Objective Application to Clustering, Cognitive Radio, Sensor Networks, Biomedical Signal Processing
- Module 4: Real Life Applications : Wireless Sensor Network, Nonlinear System Identification, Channel Equalization, Data Clustering, Active Noise Control, Bio informatics, Signal Processing, Hyperspectral Image Processing, Video Processing, Social Media Data Processing

## Programme Coordinator:

- Dr. Satyasai. J. Nanda [sjnanda.ece@mnit.ac.in](mailto:sjnanda.ece@mnit.ac.in) 9549654237 (M)  
Dr. Ila Sharma [ila.ece@mnit.ac.in](mailto:ila.ece@mnit.ac.in) 9549650769 (M)

## Registration:

Registration is open to faculty, industry persons, doctoral, postgraduate and graduate students. Participants will be admitted on first-come first-served basis. Register on line at - [http://www.mnit.ac.in/eict/acad\\_training\\_prg.php](http://www.mnit.ac.in/eict/acad_training_prg.php)

## Certification Fee:

- Academic (student/faculty): 500/-, Industry/Others: 1000/-  
(A) Fee once paid will not be refunded back; it would be adjusted in future.  
(B) The fee covers online participation in the programme, tutorial notes and examination, certification charges.  
(C) The organizers should receive the registration amount through online payment gateway provided at the registration portal.  
(D) For modules details, see separate sheet attached.  
→ For any other query, email us at [academy@mnit.ac.in](mailto:academy@mnit.ac.in)

PRINCIPAL  
G. Narayana Murthy Institute of  
Technology & Science (for women)  
(AUTONOMOUS)  
Shankpet, Hyderabad - 500 104



## Tentative Time Table

Date :13th July to 24th July 2020

## Two Week Global Online FDP on Advanced Optimization Techniques and Hands-on with MATLAB/SCILAB

Date	Session I (5PM-6PM)		Session II (6.10PM-7.10PM)	Session III(7.20PM-8.20PM)
13-07-2020 (Monday)	5PM-5.20 PM	5.20PM-6.20PM	Module I : Dr. S. J. Nanda	Lab I : Dr. Prashant K. Jain
	Introduction	Module I : Prof. G. Panda Introduction	Fundamental of Optimization	Introduction to MATLAB for Optimization Techniques
14-07-2020 (Tuesday)	Module II : Prof. G. Panda		Module II : Dr. S. J. Nanda	Lab II : Dr. Ila Sharma
	Multimodal Optimization, Genetic Algorithm (GA) and its variants		Artificial Immune System & Symbiotic Organism Search	MATLAB for Fundamental Optimization
15-07-2020 (Wednes- day)	Module II : Prof. G. Panda		Module II : Dr. S. J. Nanda	Lab III : Dr. S. J. Nanda
	Particle Swarm Optimization (PSO), Ant Colony Optimization		Colliding Bodies Optimization & Social Spider Optimization	MATLAB for Binnary Genetic Algorithm
16-07-2020 (Thursday)	Module II : Dr. J. C. Bansal		Module II : Prof. Rajesh Kumar	Lab IV : Dr. S. J. Nanda
	Artificial Bee Colony		Differential Evolution (DE)	MATLAB for PSO & DE
17-07-2020 (Friday)	Module II : Dr. J. C. Bansal		Module II : Prof. Rajesh Kumar	Lab V : Dr. Urvashi P. Shukla
	Spider Monkey Optimization		Gray Wolf Optimization	MATLAB : Social Spider Opt
18-07-2020 (Saturday)	Module II : Dr. J. C. Bansal		Module II : Prof. Rajesh Kumar	Module II : Dr. Sitanshu S. Sahu
	Gravitational Search & Biogeography- based optimization		Whale Optimization	Bacterial Foraging Optimization
19-07-2020 (Sunday)	Module III : Dr. Sriparna Saha		Module III : Dr. P. M. Pradhan	Lab VI : Dr. Rahul K. Vijay
	Nondominated Sorted Genetic Algorithm NSGA-II & NSGA-III		Multi Objective Particle Swarm Optimization & Cat Swarm Opt	MATLAB for Gray Wolf Optimization
20-07-2020 (Monday)	Module III : Dr. Sriparna Saha		Module III : Dr. P. M. Pradhan	Lab VII : Ms. Rachana Gupta
	Simulated Annealing based Approach for Multi Objective Optimization		Multi Objective Application to Cognitive Radio	Multi-objecive NSGA-II programing with MATLAB
21-07-2020 (Tuesday)	Module IV : Dr. Sriparna Saha		Module IV : Dr. P. M. Pradhan	Lab VIII : Ms. Rachana Gupta
	Many & Multi Objective Optimization for Solving feature Selection Problem		Multi Objective Application to Wireless Sensor Network	Many Objective NSGA-III programing with MATLAB
22-07-2020 (Wednes- day)	Module IV : Dr. N. V. George		Module IV : Dr. S. J. Nanda	Lab IX : Dr. S. J. Nanda
	Application of Multi-agent System for Nonlinear System Identification		Application to Channel Equalization	Application to System Identification & Equalization
23-07-2020 (Thursday)	Module IV : Prof. G. Panda		Module IV : Dr. N. V. George	Lab X : Mr. Dinesh Kotary
	Application to Forecasting / Prediction of Stock Markets		Application for Active Noise Control	Application to Clustering & Classification
24-07-2020 (Friday)	Module IV : Prof. G. Panda		Module IV : Dr. Sitanshu S. Sahu	Module IV : Dr. Sitanshu S. Sahu
	Application to Intelligent Instrumentation		Application to Genomic Signal Processing	Application to Biomedical Signal Processing
Speakers Details :			8.20PM-8.45PM Feedback and Validation	

Speakers Details :

1) Prof. Ganapati Panda, Fellow INAE, Fellow NSAI, Former Dy. Director and Prof. Emeritus, IIT Bhubaneswar

2) Dr. Pyari M. Pradhan, Dept. of Electronics and Communication Engg., IIT Roorkee

3) Dr. Sriparna Saha, Dept. of Computer Science and Engineering, IIT Patna

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5) Dr. Jagdish Chand Bansal, Dept. of Mathematics, South Asian University, New Delhi

6) Dr. Sitanshu Sekhar Sahu, Dept. of Electronics &amp; Communication Engg., Birla Institute of Technology, Mesra

7) Dr Prashant K. Jain, Dept. of Mechanical Engg., IIITDM Jabalpur (Coordinator)

8) Dr. Rahul Kumar Vijay, Dept. of Computer Science, Banasthali Vidyapith

9) Prof. Rajesh Kumar, Dept. of Electrical Engg., MNIT Jaipur

10) Dr. Satyasai J. Nanda, Dept. of Electronics &amp; Communication Engineering, MNIT Jaipur (Coordinator)

11) Dr. Ila Sharma, Dept. of Electronics &amp; Communication Engineering, MNIT Jaipur

12) Dr. Urvashi Prakash Shukla, PhD from Dept. of Electronics &amp; Communication Engineering, MNIT Jaipur

13) Ms. Rachana Gupta, Submitted PhD at Dept. of Electronics &amp; Communication Engineering, MNIT Jaipur

14) Mr. Dinesh Kumar Kotary, PhD from Dept. of Electronics &amp; Communication Engineering, MNIT Jaipur

Shaikpet, Hyderabad - 500 104

PRINCIPAL

Gayatri Prakashan Institute of  
Technology & Science (for woman)  
(AUTONOMOUS)





**G. NARAYANAMMA INSTITUTE OF TECHNOLOGY & SCIENCE (for women)**

**AUTONOMOUS  
Dept of ECE**

Report on  
Two Week Global Online FDP on Advanced Optimization Techniques and Hands-on with  
MATLAB/SCILAB

Date of the Program : Date :13th July to 24th July 2020

Sponsored By : supported by The Ministry of Electronics and Information Technology (MEITY)

Number of Participants: 450

**About the Resource Persons:**

**Speakers Details :**

- 1) Prof. Ganapati Panda, Fellow INAE, Fellow NSAI, Former Dy. Director and Prof. Emeritus, IIT Bhubaneswar
- 2) Dr. Satyasai J. Nanda, Dept. of Electronics & Communication Engineering, MNIT Jaipur (Coordinator)
- 3) Dr. Ila Sharma, Dept. of Electronics & Communication Engineering, MNIT Jaipur
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- 14) Mr. Dinesh Kumar Kotary, PhD from Dept. of Electronics & Communication Engineering, MNIT Jaipur

**About the Program: Topics Covered:**

Unconstrained and Constrained Optimization, Linear Programming, Graphical Method, Symmetric Dual Problems, Simplex Method, Derivative based Optimization, Newton's Method, Least Mean Square Method. Quantum Superposition and Entanglement; Quantum Gates and Circuits; No-cloning theorem & Quantum Teleportation; Bell's inequality and its implications  
Swarm Intelligence (Particle Swarm Optimization, Ant Colony Optimization, Cat Swarm Optimization, Cuckoo-search, Grey Wolf Optimization, Whale Optimization), Bio Inspired Optimization (Artificial Immune System, Bacterial Foraging Optimization), Physical Algorithms (Simulated Annealing, Colliding Bodies Optimization, Gravitational Search Optimization). Linear Optical Approaches; Nonlinear Optical Approaches; Limits of the approaches; Future scope Benchmark mathematical function optimization, Linear and Nonlinear System Identification, Dynamic System Identification, Communication Channel Equalization, Device Modeling, Forecasting/Prediction of time series, Data Classification and Clustering, Hybridization of optimization techniques with Neural Networks and Deep Neural Networks. Multi-modal function Optimization, Evolutionary Computation (Genetic algorithm, Genetic Programming, Differential Evolution, Social Spider Optimization)  
Multi-objective Optimization, Non-dominated Solutions, Non-dominated Sorted Genetic Algorithm (NSGA-II), Multi objective Particle Swarm Optimization, Many-objective Optimization, NSGA-III.

Dr Renuka Devi S M  
Prof. ECE Dept

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(AUTONOMOUS)  
Shaikpet, Hyderabad - 500 104