About Electronics & ICT Academy at PDPM IIITDM Jabalpur

The Ministry of Electronics and Information Technology (MeitY), Government of India has instituted Electronics and ICT Academies in the year 2015. In the second phase, the academy at PDPM IIITDM Jabalpur aims at scalable training programmes in niche areas of Electronics and ICT for the development of the required knowledge base, skills and tools to unleash the talent of the Indian population. In addition to the faculty development programmes (FDPs) on fundamental and advanced topics in electronics, information and communication technologies, the Academy conducts customized training programmes for students, corporate sectors and research promotion workshops in emerging areas. The Academy is identified by the MeitY as the central hub of activities on training, internships, research, and consultancy programmes.

About PDPM IIITDM Jabalpur

PDPM IIITDM Jabalpur was established in 2005 with a focus on education and research in IT-enabled Design and Manufacturing. Since its inception, PDPM IIITDM Jabalpur has been playing a vital role in producing quality human resources for contribution to India's mission of inclusive and sustainable growth. The Institute offers undergraduate, postgraduate and PhD programmes in Computer Science and Engineering, Electronics and Communication Engineering, Mechanical Engineering, Design and PhD programmes in Mathematics, Physics and Literature. Further, the Institute offers an undergraduate programme in Smart Manufacturing. Under IIIT act, the Institute has been declared as an Institute of National Importance. The Institute campus is developed on 250 acres of land close to Dumna Airport, Jabalpur. The Institute is 10 kms from the main railway station and 5.5 kms from Dumna Airport, Jabalpur.

Faculty Development Programme Recent Advanced Mathematical Methods for Engineering and Physical Sciences

The programme aims to provide knowledge of basic to advanced mathematical techniques, along with algorithm and programming experience, for addressing engineering and physical problems encountered by research scholars. During this one-week course, we will focus on various mathematical techniques, including the finite difference method, finite element method, spectral method, wavelets, and multiple transforms such as the Laplace transform, Fourier transform, Discrete Fourier transform, Z-transform, etc., all presented on a single platform. In addition to the mathematical concepts, the importance and utility of these techniques will be highlighted, and participants will gain hands-on programming experience with various applications. The basics of research methodology, writing research papers in LateX, and effective writing methods will be discussed.

Who can attend: The Programme is open to faculty from all colleges, universities, and technical and professional institutes. Students, fresh graduates, researchers, and industry personnel working in allied disciplines can also attend.

Important Dates:

Last Date of Online Registration: 06-03-2025

Coordinator: Dr. Lokendra K. Balyan,

Faculty of Mathematics, Discipline of Natural Sciences, PDPM IIITDM Jabalpur-Madhya Pradesh

Contact us:

academy@iiitdmj.ac.in, eict@iiitdmj.ac.in

Mr. Durgesh Kushwaha : 7898670354

Faculty Development Programme Recent Advanced Mathematical Methods for Engineering and Physical Sciences

March 20-25, 2025 (Hybrid mode)

Electronics and ICT Academy, Phase II

An Initiative of
Ministry of Electronics and Information Technology,
Government of India

PDPM Indian Institute of Information Technology, Design and Manufacturing, Jabalpur
Dumna Airport Road, Jabalpur 482005

Faculty Development Programme

Recent Advanced Mathematical Methods for Engineering and Physical Sciences

March 20-25, 2025 (Hybrid mode)

RESOURCE PERSONS

- Prof. Mani Mehra, IIT Delhi
- Prof. Sanjeev Kumar, IIT Roorkee
- Dr. Vivek K. Aggarwal, DTU, Delhi
- Prof. V K Gupta, IIITDM Jabalpur
- Dr. Anil Kumar, IIITDM Jabalpur
- Dr. L K Balyan, IIITDM Jabalpur
- Dr. Deepmala, IIITDM Jabalpur

COURSE COORDINATORS

Dr. Lokendra K. Balyan,
Assistant Professor,
Discipline of Natural Sciences
PDPM IIITDM Jabalpur
Email: balyan@iiitdmj.ac.in
Phone: +91-761-2794346
Mobile: +91-9425411328

Course Contents

- Wavelet Transform
- Fourier Transform, Discrete Fourier Transform
- Multi Multi-resolution analysis for wavelet Galerkin and collocation methods
- Introduction to multi-rate system and Application
- Spectral Decomposition, Singular Value Decomposition,
- Low-Rank Approximation, Manifold Learning
- Principal Component Analysis, Linear Discriminant Analysis
- Finite Difference Methods
- Implementation of FDM for elliptic problems with error analysis
- Numerical optimization for the transport problem
- Introduction of Finite Element Method
- Basic concepts of FEM - type of element, convergence, boundary conditions
- Weighted residual method, Variation principal and application of FEM
- Introduction of higher order Spectral Methods, advantages and limitations
- Fourier Galerkin Spectral Method for periodic and non-periodic problems for Initial Value Problems
- Interpolation-based Fourier Collocation Spectral Method for linear and nonlinear problems with stability analysis
- Introduction to Python to errors in computations methods

Hands-On Sessions

- Basics operations of Python,
- Implementation of FDM on pythons IVPs
- DFT and wavelet implementation for signal processing
- Python implementation of SVD, PCA, LDA
- Lab on application of FEM
- Spectral approximations for time dependent problems
- Paper writing in LateX including figure and table and pictures

Registration Details

- Registration link – Please fill out registration using the following link: https://forms.gle/TLKmk2Z1XT8wzxhF8
- Registration fee: 1000 INR/ (For Offline)/ 500 INR/- (For Online)
- Last Date for Registration: March 06, 2025

Online Payment Details

- **Internet banking**

Beneficiary Name	PDPM IIITDM Jabalpur
Bank Name	INDIAN BANK
A/C No.	50018692852
IFSC Code	IDIB000M694

- **UPI ID: iiitdmj@indianbk**