

## Course Contents

- Unit 1** – General introduction and introduction to computer programming
- Unit 2** – Introduction to PDEs, Classification of PDEs.
- Unit 3** – Introduction to Numerical methods.
- Unit 4** – Optimization techniques, Optimization techniques using software.
- Unit 5** – Analytical solution of hyperbolic PDEs.
- Unit 6** – Numerical solution of hyperbolic PDEs,
- Unit 7** – Analytical solution of Elliptic PDEs.
- Unit 8** – Numerical solution of Elliptic PDEs.
- Unit 9** – Analytical solution of Parabolic PDEs.
- Unit 10** – Numerical solution of Parabolic PDEs.
- Unit 11** – Laplace transforms to solve PDEs.
- Unit 12** – Fourier transforms to solve PDEs.

## Important features

- The need of analytical and numerical methods in experimental research works will also be demonstrated.
- Sample programs will be supplied to the participants.

## About the City

The city of Jabalpur is known and considered as Sanskardhani, a “Cultural Center Place”. It is a place of great historical and cultural importance. This Cultural capital of Madhya Pradesh is situated on the bank of the holy Narmada and Famous for Dhuandhar Falls and Marble Rocks in Bhedaghat, Hanumantal Bada Jain Mandir, Madan Mahal Fort, Rani Durgawati Museum. Simultaneously it is keeping pace with modern advanced knowledge. Jabalpur is an important junction for the Indian Railways. Jabalpur is a large Defence and Military Center. Jabalpur is also known for housing spiritual leaders Maharishi Mahesh Yogi and Bhagwaan Shri Rajneesh (Osho). This vibrant city with multiple dimensions of knowledge and liberation has a magnetic attraction for people all over the world. The Jageshwar Nath Shiv Temple at Bandakpur, near Damoh, Kundalpur Jain Teerth Kshetra, near Damoha, Vishnu-Varaha Temple, Majholi, Pench National Park, Kanha Tiger Reserve, Bandhavgarh National Park are attractions near Jabalpur city.

## Route to Jabalpur

The city of Jabalpur is well connected by road, rail and air with all the important places of India. Regular flights are provided by Air India & Spice Jet. Daily services are available to Bhopal, Delhi, Hyderabad and Mumbai. Jabalpur has direct connection to Mumbai, New Delhi, Bhopal, Kolkata, Nagpur, Patna etc. The IIITDM campus is only 10 km from Jabalpur railway station and 5.5 km from the Dumna airport.

## About the PDPM IIITDM

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 in India’s mission of inclusive and sustainable growth. The Institute offers undergraduate, post graduate and PhD programmes in Computer Science and Engineering, Electronics and Communication Engineering, Mechanical Engineering, Design and PhD programmes in Mathematics and Physics. Under IIIT act, the Institute has been declared an Institute of National Importance in January 2015. The Institute campus is being developed on 250 acres of land close to Dumna Airport, Jabalpur.

## Teaching Faculty

Faculty members from the Discipline of Mechanical Engineering of IIITDM Jabalpur will be teaching the course contents. Subject experts from other premier institutions will be invited for delivering the special lectures with tutorial sessions.

## Course Material

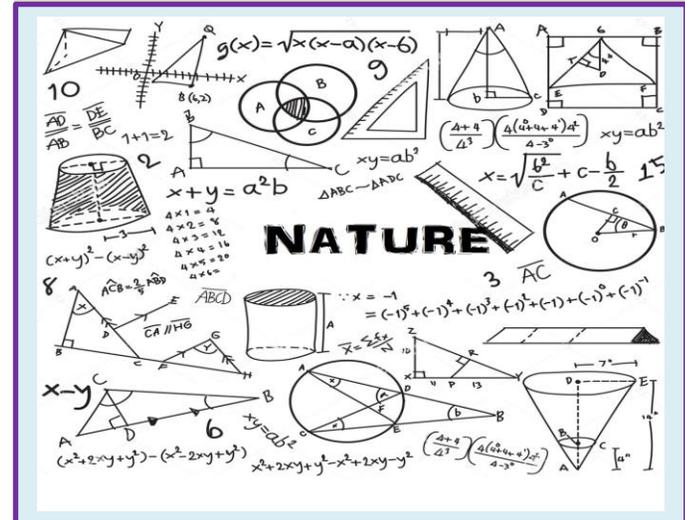
Hard / Soft copies of the lecture notes/presentations will be made available to participants at the end of lecture/presentation. Moreover, sample programs in Matlab will be provided.



**QIP Short Term  
Course On**



**NUMERICAL AND ANALYTICAL  
TECHNIQUES TO UNDERTAKE RESEARCH  
IN ENGINEERING  
(NATURE 2017)  
Sept. 01-05, 2017**



ICTE sponsored Short Term Course

**NATURE  
2017**

Organised by:

Department of Mechanical Engineering,  
PDPM IIITDM Jabalpur

## Contact Us

Dr. Sujoy Mukherjee, Dr. Sunil Agrawal, Dr. Goutam Dutta, (Course Coordinators)

NATURE 2017

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**QIP Short Term Course on  
Numerical and Analytical Techniques to  
Undertake Research in Engineering  
(NATURE 2017)**

**Sept. 01-05, 2017**

**Introduction and objectives of the  
course:**

The objective of the course work is to provide the theoretical fundamentals coupled with practical knowledge of analytical and numerical methods to solve various engineering problems of real life applications. Appropriate and carefully selected problems of practical relevance in mechanical (structural and thermal), civil, chemical and other engineering domains will be solved.

The course contents are focused to solve the problems of the ODEs & PDEs. The convergence and stability analysis of the methods will also be addressed. The theoretical lectures will be followed by lab session where computer programs mainly in Matlab will be discussed.

The first aim would be to develop the decision-making capability among the participants whether to use the analytical or numerical method and write their own customized algorithms and numerically solve the linear/nonlinear, steady/transient governing equations. The hands-on training session will be conducted using MATLAB mainly and also using CPP, FORTRAN along with EXCEL sheet iterative calculations.

**Tentative List of Resource Persons:**

- Prof. R.P. Vedula, Professor  
IIT B (Tentative)
- Dr. Sujoy Mukherjee, Assistant professor  
IIITDM Jabalpur (Course Coordinator)
- Dr. Sunil Agrawal, Associate professor  
IIITDM Jabalpur (Course Coordinator)
- Dr. Goutam Dutta, Associate professor  
IIITDM Jabalpur (Course Coordinator)

**Who Can Attend?**

All existing faculty members, research scholars, participants from govt. and private departments and industries working in the field of engineering and applied mathematics are eligible.

**Category 1:** The selected faculty members (30) from AICTE approved and govt. institutions have to pay Rs. 1000 (refundable) as registration fees. They will be eligible for to and fro railway fare via shortest route in III AC and free lodging and boarding in the Institute guest house/hostels during course period. Candidates attending the course in full only will be eligible for TA. For all other participants, no TA will be paid by IIITDM Jabalpur. The security money will be returned back to the faculty members account only if he/she completes the course.

**Category 2:** Participants from Governments Departments and Industries are also eligible, provided they meet their T.A. and D.A. and pay a course fee @ Rs. 3000/-.

**Category 3:** Research scholars can also participate provided they meet their T.A. and D.A. and pay a course fee @ Rs. 1000/-.

**Category 4:** Participants (above selected 30) can also participate provided they meet their T.A. and D.A. and pay a course fee @ Rs. 2000/-.  
The fee includes a kit containing the study material, tea and snacks.

**How to Apply and Register?**

By Email – Scanned copy of the filled in application form duly endorsed by the forwarding authority to be mailed at [iiitdmj.nature@gmail.com](mailto:iiitdmj.nature@gmail.com). Application format is given in this brochure.

**Mode of Payments**

The registration fees are to be paid online in Allahabad Bank, Branch Mehgawan, Jabalpur (IFSC Code ALLA0212433) Account No. 50388395415 in favor of QIP PDPM IIITDM Jabalpur through any nationalized bank and payable at Jabalpur, add remark “**QIP IIITDMJ NATURE 2017**” for the transaction. After payment is made, participants need to send an email to [iiitdmj.nature@gmail.com](mailto:iiitdmj.nature@gmail.com).

The selected candidates will be informed through email within a week.

**Website: [www.iiitdmj.ac.in](http://www.iiitdmj.ac.in)**

**Application for Registration**

**Numerical and Analytical Techniques to  
Undertake Research in Engineering  
(NATURE 2017)  
Sept. 01-05, 2017**

1. Name .....
2. a) Age..... b) Sex: M/F.....
3. Designation & pay scale.....
4. Organisation .....
5. Address for correspondence  
.....  
.....
- E-mail:.....
- Phone/Mobile.....
6. Highest Academic  
Qualification.....
7. Specialisation .....
8. Experience (in years)  
a) Teaching: .....
- b) Industrial. ....
9. Amount of T.A. required as per entitlement  
mentioned in the brochure (only for AICTE approved  
college teachers): .....

Please register me for the course on Numerical and Analytical Techniques to Undertake Research in Engineers (NATURE 2017) to be held at IIITDM Jabalpur.

Date.....

Place ..... Signature of the Applicant

**FORWARDING LETTER**

Prof./Dr./Mr./Ms./Mrs./..... is an employee of our institute and his/her application is hereby approved. The applicant is permitted to attend the short-term course “Numerical and Analytical Techniques to Undertake Research in Engineers (NATURE 2017)” at IIITDM Jabalpur during date of NATURE, if selected.

Date: ..... Signature of forwarding Authority

Designation:

Official Seal:

Date:

Signature of the Applicant