

A Self Sponsored Workshop
On
“Numerical Methods in Mechanical Engineering Applications”
March 17–21, 2021



ORGANIZING TEAM

Patron

Professor (Dr.) Goutam Sutradhar
Director, National Institute of Technology, Manipur

Chairman

Professor (Dr.) Rajesh Kumar Bhushan
Professor, Department of Mechanical Engineering
National Institute of Technology, Manipur

Secretary

Dr. Huiem Neerajan Singh
Head & Assistant Professor, Department of Mechanical Engineering
National Institute of Technology, Manipur

Convener

Dr. Dushyant Singh
Assistant Professor, Department of Mechanical Engineering
National Institute of Technology, Manipur

Coordinator

Mr. Prabhat Kumar
Trainee Teacher, Department of Mechanical Engineering
National Institute of Technology, Manipur

Coordinator

Mr. Ashutosh Kumar Singh
Trainee Teacher, Department of Mechanical Engineering
National Institute of Technology, Manipur



Organized By:

**Department of Mechanical Engineering
National Institute of Technology Manipur
West Imphal, Manipur, India- 795004**

ABOUT NIT, MANIPUR

National Institute of Technology Manipur, a centrally funded institution is set up to impart quality technical education at various levels of higher learning. It is one of the ten new NITs established and developed as “**Institute of National Importance**” by an act of Parliament in 2007. NIT Manipur started its first session with the three branches of Engineering-Electrical & Electronics Engineering, Electronics & Communication Engineering and Computer Science Engineering. The functioning of the institute was started at its temporary campus at Takyelpat, Imphal under the mentorship of NIT Agartala. As one of the National Institutes of Technology (NIT), the Institute has the responsibility of providing high quality education in Engineering, Technology and Sciences to produce competent technical and scientific manpower for the country. The Institute offers B Tech, M Tech, M Sc, and PhD programmes in several disciplines of Engineering, Technology and Sciences.

ABOUT THE COURSE

Numerical simulation is a powerful tool to solve scientific and engineering problems. It plays an important role in many aspects of fundamental research and engineering applications, for example, mechanism of turbulent flow, vibration analysis of beams, optimization of processes, and online control of manufacturing. The soul of numerical simulation is numerical method, which is driven by the above demands and in return pushes science and technology by the successful applications of advanced numerical methods. Numerical methods are used to approximate the solution to a problem whose analytical is not available or the analytical solution can't be generalized. The numerical methods are very useful in various applied science and engineering disciplines.

Topics to be Covered

The short-term course aims to include following themes with particular emphasis to Mechanical Engineering, Civil Engineering, Chemical Engineering, Aerospace Engineering, Oceanography, Meteorology, Marine and Naval Engineering:

1. Introduction to numerical techniques in engineering.
2. Introduction to optimization methods.
3. Overview of MATLAB and its applications in solving systems of linear equations, matrix eigenvalue problems, partial differential equations, etc.
4. Introduction to basic governing equations of fluid flow and heat transfer.

OBJECTIVES OF THE COURSE

1. The main objective of this workshop is to provide a unique platform to facilitate UG, PG, PhD students as well as the academicians and professionals and familiarize the ways of solving complicated mathematical problems with the help of numerical methods.
2. To help you become familiar with MATLAB software and its applications.
3. Ability to provide a thorough understanding of the numerical methods applicable for industrial problems.

Who can attend this workshop through Online?

Students: (UG, PG, PhD)

Faculty of Engineering/Sciences: (Any Branch)

Other Professionals: Engineers & Scientists from Industry and R&D organizations

Registration: Kindly register through this link: <https://forms.gle/USHVXhD9G1Avmr9h6>

Registration fee for attending this workshop.

UG Students: Rs 500/-

PG/PhD Students: Rs. 750/-

Faculty: Rs. 1000/-

Engineers /Other professionals: Rs.2000/- including GST

Details of the Bank Account:

Name: Director NIT Manipur IRG

Acc. No. 60330100000143

Bank and Branch: Bank of Baroda, NIT Manipur Campus

IFSC code: BARBONITMAN

Number of participants are limited to 100. Shortlisted candidates will be informed through email.

For any query, you can contact to the course coordinators

Mr. Prabhat Kumar/ Mr. Ashutosh Kumar Singh (ME)

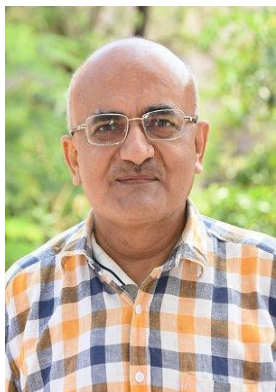
Email: cfdnitm@gmail.com ; Mb: +91 8340453682, 8789109835

IMPORTANT DATES

Last Date of Registration

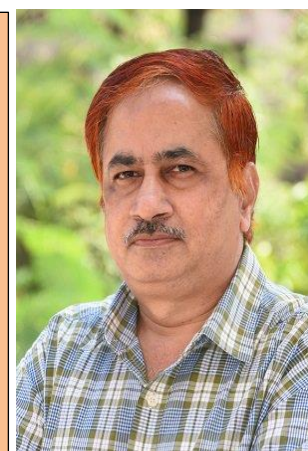
March 15, 2021

Resource Persons Biography



Prof. Uday S. Dixit is currently serving as a professor in the Department of Mechanical Engineering, IIT Guwahati. He graduated B.E. in 1987 from IIT Roorkee and M. Tech. in 1993 and Ph. D. (Mechanical Engineering) in 1998 from IIT Kanpur, India. He has been deeply involved in the research areas of Plasticity, Metal Forming, Laser Based Manufacturing, Finite Element Modeling, Optimization, Mechatronics, Neural Network and Fuzzy Set Application. He has been an author of over 115 Journal and 110 Conference papers. He has published 14 books and 27 book chapters in the field of manufacturing, optimisation and finite element method, etc. He has completed more than 21 sponsored research projects and consultancy projects. He has supervised/supervising more than 20 Doctoral and 48 Masters students. He has organised several national and international conferences as well as short term courses at IIT Guwahati. He is editorial board member and associate editor of many reputed journals.

Prof. Rajiv Tiwari is presently serving as a professor in the Department of Mechanical Engineering, IIT Guwahati. He graduated B.E. in 1988 from Ravishankar University, Raipur and M. Tech. in 1991 and Ph. D. (Mechanical Engineering) in 1997 from IIT Kanpur, India. He has been deeply involved in the research areas of Vibrations, Rotor Dynamics, Estimation of Rotor-Bearing Parameters, Rolling element Bearings Design and Analysis, Identification of Rotor Faults and Active Magnetic Bearings. He has been an author of over 108 Journal and 113 Conference papers. He has completed more than 19 sponsored research projects and consultancy projects. He has supervised/supervising more than 21 Doctoral and 54 Masters students. He has organised several conferences and short term courses at IIT Guwahati. He has published a book on Rotor Systems: Analysis and Identification by CRC Press, Taylor and Francis Group, USA. Recently, he is organizing a renowned 16th International Conference on Vibration Engineering & Technology (VETOMAC-2021) at B.M.S. College of Engineering, Bengaluru, 16-18 Dec. 2021. He is also associate editor of various reputed journals.



Prof. Rajesh Kumar Bhushan is currently working as Professor in Department of Mechanical Engineering, National Institute of Technology Manipur, India. He has published 40 research papers in reputed international journals, 43 research papers in international conferences and national conferences. He has 24 years of experience in teaching, research and administration. He has completed 01 sponsored research project and 02 sponsored research project are under process. He is member of various international technical committee. He is PhD thesis examiner. He is certified energy manager and auditor by bureau of energy efficiency, ministry of power government of India. He is reviewer of 32 reputed international journals. He has guided 03 PhD and 35 M Tech students so far. He has delivered 20 invited lectures at national/ international conference/workshop. His research interests are Design of Bio-enabled structures, High Performance Computational Modelling of Engineered Systems, Multi-disciplinary Design Optimization, Cybersecurity in design and manufacturing, Additive manufacturing of complex and composite materials.

Dr. Dushyant Singh is currently an Assistant Professor in the Department of Mechanical Engineering at National Institute of Technology Manipur (NIT Manipur). He received his PhD from Indian Institute of Technology Delhi (IIT Delhi) and before joining his NIT Manipur, he was a Post-Doctoral Researcher in joint industrial research work with BHEL industry. His current research is collaborative and directly practical engineering applications in industries. He has 35 research articles in reputed International Journals and Conference and published 2 book chapters. He has supervised more than 02 Doctoral and 10 Masters project. He has research interests in the area of CFD, Experimental and Numerical analysis of Fluid Flow and Heat Transfer Enhancement, Multiphase Flows.





Dr. Saurabh Kango is presently working as an Assistant Professor in the Department of Mechanical Engineering at National Institute of Technology Jalandhar. He received his Bachelor's degree from HPU Shimla (IET Baddi) and Master's in Computational Fluid Dynamics & Heat Transfer and PhD degree in the field of Tribology from NIT Hamirpur. He has 18 research articles in reputed International Journals and 19 international conference publications and published 4 book chapters. His current h-index is 07 and Google citations are 327. He has research interests in the area of CFD analysis of different tribological systems by using the concept of micro surface texturing/grooving & non-Newtonian rheologies of lubricants, Tribological study of treated surfaces and fabrication of hydrophobic & superhydrophobic surfaces. He is the reviewer of 8 reputed international journals. He is supervising 02 PhD and guided 3 M Tech students so far. He is a member of various international technical committees. He has taken various administration responsibilities at NIT Jalandhar.

Mr. Prabhat Kumar is recently working as a Trainee Teacher in the Department of Mechanical Engineering, National Institute of Technology Manipur, India. He received his Bachelor's degree in Mechanical Engineering from NIT Jamshedpur and selected by MHRD, NIT-IIT Trainee Teacher Scheme in 2014. Subsequently, he did Master's degree from IIT Guwahati in 2016 and presently pursuing PhD from IIT Guwahati (Thesis submitted). He has 12 reputed journal/conference/book chapter publications. He has research interests in the area of Vibration, Rotor Dynamics, Faults identification and Applications of Active Magnetic Bearings in Rotor System.



Mr. Ashutosh Kumar Singh is currently working as a Trainee Teacher in the Department of Mechanical Engineering, National Institute of Technology Manipur, India. He received his Bachelor's degree in Mechanical Engineering with Gold Medal from GZS PTU Campus Bathinda Punjab and selected by MHRD, NIT-IIT Trainee Teacher Scheme in 2016. Subsequently, he did Master's degree from IIT Guwahati in 2018 and presently pursuing PhD from IIT Guwahati. He has 4 reputed journal/conference/book chapter publications. He has research interests in the area of CFD, Experimental and Numerical study of Film Cooling and Turbulent Flows.

SESSION PLAN

A Self Sponsored Workshop
on

“Numerical Methods in Mechanical Engineering Applications (NMMEA-2021)”

March 17–21, 2021

Organizing by: Department of Mechanical Engineering, NIT Manipur

Date-Day	Forenoon Session (10:30 AM-12PM)		Afternoon Session (2:30 PM-4PM)
17/03/2021 Wednesday	Session 1 Inaugural Session -----	B R E A K	Session 2 Introduction to Numerical Techniques in Mechanical Engineering Prof. Uday S. Dixit IIT Guwahati
	Session 3 Optimization Techniques in Engineering Prof. Rajesh Kumar Bhushan NIT Manipur		Session 4 Introduction to MATLAB (Hands-on-Training) Mr. Prabhat Kumar NIT Manipur
18/03/2021 Thursday	Session 5 Finite Element Analysis in Rotor Systems Prof. Rajiv Tiwari IIT Guwahati		Session 6 Finite Differential Analysis in Journal Bearings Dr. Saurabh Kango NIT Jalandhar
	Session 7 Numerical Fluid Flow and Heat Transfer Dr. Dushyant Singh NIT Manipur		Session 8 Hands-on-Training on MATLAB Mr. Prabhat Kumar NIT Manipur
19/03/2021 Friday	Session 9 Finite Volume Discretization Techniques Mr. Ashutosh Kumar Singh NIT Manipur		Session 10 Hands-on-Training on MATLAB Mr. Prabhat Kumar NIT Manipur <i>/Valedictory</i>
20/03/2021 Saturday			
21/03/2021 Sunday			