

One-week short term course

on

MODELING AND SIMULATION IN SOLID AND FLUID MECHANICS-I

(MSFM-2021)

November 15-19, 2021

Organized by

Applied Mechanics Department
Motilal Nehru National Institute of
Technology-Allahabad
Prayagraj-211004
In Association with
ARK Infosolutions Pvt Ltd
Noida-201301



The city of Prayagraj (Allahabad) is among the larger cities of Uttar Pradesh. It is situated at the confluence of three rivers- Ganga, Yamuna and the mythological Saraswati. Besides Sangam, it also has many governmental institutions which include Allahabad University, HRI, IIIT Allahabad, High Court of UP, AGUP, CDA Pension, State Government education board and various tourist places like Anand Bhawan, Khusroo Bagh, Chandra Shekhar Azad Park and Bharadwaj Park.

THE INSTITUTE

Motilal Nehru National Institute of Technology Allahabad, Prayagraj (MNNIT Allahabad) is an Institute with total commitment to quality and excellence in academic pursuits. It was established as one of the seventeen Regional Engineering Colleges of India in the year 1961 as a joint enterprise of Government of India and Government of Uttar Pradesh. On June 26, 2002 MNREC was transformed into National Institute of Technology and Deemed University fully funded by Government of India. With the enactment of National Institutes of Technology Act-2007 the Institute has been granted the status of institution of national importance w.e.f. 15.08.2007.

The Institute offers nine B.Tech., twenty-five MTech. (Including part-time), MCA, MBA, M.Sc. (Mathematics and Scientific Computing) programmes and also registers candidates for the Ph.D. degree. The Institute has been recognized by the Government of India as one of the centers for the Quality Improvement Programme for MTech. and Ph.D. The Institute has been selected as a Lead Institution under World Bank funded Government of India Project on Technical Education Quality Improvement Programme (TEQIP) (2002-2007).

THE DEPARTMENT

The Department of Applied Mechanics was established in 1965. The Department offers courses at undergraduate level on Solid Mechanics, Fluid Mechanics, Hydraulic Machines, Structural Analysis, Material Science, Engineering Mechanics, Mechanics of Deformable Solids, Kinematics of Mechanics, Dynamics of Machines, Theory of plates & shells, Mechanical Vibration and Nano Technology etc.

The department runs four Post Graduate (M.Tech.) programmes in Engineering Mechanics and Design, Material Science & Engineering, Fluids Engineering and Biomedical Engineering. The department also offers Ph.D. programme in these areas.

The department consists of well qualified faculty with PhD/Post-doctorate from top engineering/technical institutions from India and abroad with multidisciplinary background and related to the broad area of mechanics.

THE COURSE

The proposed course is planned to train the students, young scientists and engineers, teachers etc. in the field of solid and fluid mechanics along with fluid-structure interactions (FSI) using ANSYS which will help them save tremendous amount of cost and efforts incurred in real time experimental systems. Considering the current national and global COVID situations, the course is planned to be conducted in the **online mode**. Recording of the sessions shall also be provided in video formats for wider reach and circulation. All the training lectures and laboratory session are planned to be conducted in collaboration with working engineers (ARK Info-solutions Pvt. Ltd.) working in the respective fields of solid & fluid mechanics and FSI.

Four Laboratory sessions (2 hours each) related to various modeling and simulation techniques of solid mechanics and fluid mechanics aspects are also planned to be conducted in sessions using ANSYS in online mode itself which will give exposure to the participants to connect them to the theories and the standards and practices adopted in numerical simulations for Mechanical systems and Fluid Dynamics based applications. Details are provided in the schedule of the Proposed FDP.

WHO SHOULD ATTEND?

Faculties, research scholars, PG scholars, UG Students from Technical Institutions/Engineering Colleges/Polytechnic working in Mechanical Engineering/Chemical Engineering/Civil Engineering etc are eligible. Interested practicing engineers from Government and private industries and staff of MNNIT may also apply. The number of seats is limited to 200 and selection is based on first come first serve basis.

MODE OF PRESENTATION

The course will be conducted in online mode and further details will be communicated to all registered participants in due time.

TOPICS TO BE COVERED

Introduction to FEM, CFD and Numerical Simulations using ANSYS:

Necessity, Current scenario, Future Prospects, About the scope of the course.

Basics of Modeling:

Basics of SCDM, Geometrical Modeling, Geometry Cleanup & Repair Lecture with demonstration over ANSYS Software.

Basics of Meshing:

Introduction to Meshing, Mesh Methods, Global Mesh Controls, Local Mesh Controls with demonstration over ANSYS software.

ANSYS Mechanical:

Introduction to FEM: Introduction of FEM, Static Structural, 1d Analysis, SFD BMD with demonstration over ANSYS Mechanical software.

Static Structural Analysis:1-D,2-D,3-D analysis, Modal Analysis: Plate with a hole, Eigenvalue Buckling: Buckling of Columns with demonstration over ANSYS Mechanical software.

Thermal Analysis, Remote Boundary Conditions, Static Structural: Analysis of shaft and bearing, Parameter Management with demonstration over ANSYS Mechanical software.

ANSYS CFD:

Introduction to CFD: Fluid Flow & Heat Transfer in Mixing Tee, Introduction to FLUENT GUI, Cell Zone & Boundary Conditions: flow around a sphere with demonstration over ANSYS CFD software.

Solver settings, Turbulence Modelling, Flow through porous media with demonstration over ANSYS CFD software including turbulent flow past backward step, CFD Post.

External Aerodynamics, Electronics Cooling with demonstration over ANSYS CFD software Flow through Porous media, Flow Around vehicle and electronics cooling.

ANSYS-FSI:

1-way structural FSI (Fluid-Solid Interaction) (for a flow probe), 1-way Thermal stress Analysis (T-junction).

2-way FSI (for a Hyper elastic Flap with Dynamic Re-meshing), 2-way Thermal FSI (for an Exhaust Manifold).

ADDRESS FOR COMMUNICATION

Coordinator MSFM-2021
Department of Applied Mechanics
Motilal Nehru National Institute of Technology-Allahabad
Prayagraj-211004

Email: csfmg.mnnit@gmail.com

For any further information / assistance you may contact following student coordinator:
Mr. Ashutosh Singh, AMD (9794861095)

IMPORTANT DATES

Online filling of Registration form along with fee details – 14/11/2021, 5PM

REGISTRATION

To register for this course the applicants will have to pay fees in advance in the name of **MSFM-2021** as per the following details:

A/c No.: 77660200001296

Bank Name: Bank of Baroda

Branch: MNNIT Allahabad

IFSC Code: BARB0VJMNRE (Fifth digit is 'ZERO')

Category	Registration Fee (Rs.) including GST
U.G. Students	236/-
P.G. Students	590/-
Ph.D. Students	1180/-
Faculty members	2360/-
Industry/Others	5900/-

REGISTRATION LINK

<https://forms.gle/Qow6Xp6nMvWGYS2r5>

NOTE: Two lecture sessions (1hr 30 minutes each) along with one lab session (2hrs) shall be held daily.

ORGANIZING COMMITTEE

Patron

Prof. Rajeew Tripathi
Director, MNNIT Allahabad

Chairman

Dr. Abhishek Kumar
Head, Applied Mechanics Department

Coordinator/Convener

Dr. Anindya Bhar, AMD
Dr. Ashutosh Kumar Upadhyay, AMD
Dr. Anubhav Rawat, AMD

Student Coordinator:

Er. Ashutosh Singh

RESOURCE PERSONS

Dr. Tushar Sharma, ARK Infosolutions Pvt. Ltd.
Ms. Sangeetha, ARK Infosolutions Pvt. Ltd.)
Mr. Kailash, ARK Infosolutions Pvt. Ltd
Er. Akhileshwar Pandey, GEC Bharatpur, Rajasthan

CERTIFICATES

All the participants shall be awarded **certificate of participation** at the end of the short-term course. A quiz shall also be held at the end of the course and students getting more than 75% score shall be awarded with **certificate of appreciation** containing the score obtained by the participant.