

Information Brochure
TEQIP-III Sponsored National Workshop on
Advances in Applications of
Computational Fluid Dynamics (ACFD-2019)

Date: 6–11 March 2019

Department of Applied Mechanics
Motilal Nehru National Institute of Technology Allahabad
Prayagraj- 211004, Uttar Pradesh

Introduction: Computational Fluid Dynamics (CFD) is a tool being extensively used in research as well as in the industry for solving complex fluid flow and heat transfer problems. Simultaneous development of high performance computing (HPC) technology, numerical algorithms, physical and chemical models of flow physics, etc. are responsible for the big impact of CFD in solving both basic and applied scientific and engineering problems. In recent past, CFD has developed into a rich and diverse subject and has emerged as a major component of applied and basic fluid dynamic research along with theoretical and experimental studies. The use of CFD based simulation ranges from the analysis of the movement of microorganisms to the weather prediction. The leading manufactures, like automotive, aerospace, naval sectors frequently use this technique for the building of prototype and product development. The importance of CFD is continuously growing with time with the increasing capabilities of CFD and its applications. Recently, open source simulations software attracted so much attention because it is free of cost and flexible. However, using Open source CFD requires additional skill sets. The purpose of present workshop is to introduce the participants with CFD fundamentals, open source CFD and its advantages and limitation along with its use for solving a variety of problems.

Scope of the Workshop: Department of Applied Mechanics (AMD), MNNIT Allahabad organizes an International Workshop on 'Advances in Applications of CFD' to develop human resource in the area of CFD. The workshop offers basic understanding of CFD simulation ranging from physics of the problem, transport equations, computational domain, grid generation, discretization, numerical techniques, validation and analysis of results to application of commercial/open source CFD to a variety of problems.

Highlights of the Workshop:

- Third edition of a popular course designed for the users of CFD.
- Delivered in most interactive and participative manner using the best pedagogical practices. Good for young teachers to improve their teaching skills, also.
- Methodical treatment connecting the Fluid Dynamics, its Mathematics and Computational software.
- Exposure to CFD software.
- Overview of present state-of-the-art of CFD and future scope of research and applications of CFD.
- Review at the end of each day.

Takeaways/Outcomes: On completion of this workshop, the participants will be able

- To know the underlying principles of the CFD software options.
- To be able to use the CFD software.
- To be able to acquire additional skills required to use open source CFD.
- To know the possible applications and research areas.

Tentative Programme Coverage:

Heat Transfer Modeling, Multiphase Flow Modeling, CFD on Turbomachines, Turbulence and its Modeling, Overview of Opensource CFD.

Venue: Seminar Room, Department of Applied Mechanics, MNNIT Allahabad.

Who should Attend this Workshop:

This workshop is ideal for practicing engineers, faculty and research students who have basic background in either fluid dynamics or numerical methods and wish to use CFD to solve real life/research problems. The workshop is designed to make the participants learn from basics of CFD to the use of opensource CFD to a variety of real life problems.

Note: The number of participants is limited to forty and will be selected on 'first come first served' basis.

Registration Fees: For students and unemployed graduate engineers Rs. 1000/-, for persons from academia and research organization Rs. 2000/- and practicing engineers Rs. 3000/-. Registration fee includes study material in a CD, refreshment for all five days of course. The registration fee does not include the accommodation and lunch/dinner charges. No T.A., D.A. will be paid to the participants for attending the workshop.

Registration fee can be deposited to the current account of "ACFD-2019" through NEFT/RTGS to the designated account.

Bank Details:

Account Name: ACFD-2019.

Account No.: 718400301000344..

Bank: Vijaya Bank, MNNIT Branch, Prayagraj (Allahabad)- 211004, Uttar Pradesh

IFSC Code: VIJB0007184.

Boarding and Lodging: The institute offers accommodation and dining facilities on payment basis at the Executive Development Centre (EDC), which is located in the MNNIT staff colony. It houses 20 A.C. and 04 Non-A.C.rooms and a dining hall. Accommodation will be provided first-come-first-served basis and depending on the availability. A few guest rooms are also available in Boys' and Girls' hostels of the institute.

Please email to the course convener at arpaul2k@gmail.com for tariff details.

Resource Persons: From IITs, NITs and reputed Indian & Foreign Universities.

Fluids Engineering Research Group: Department of Applied Mechanics has a state-of-the art CFD facilities with one 64-core IBM Blade-server, 26 high power workstations (HP Z-series) and 36 desktop computers of latest configurations and Ansys software. The Fluids Engineering

research group of the department is actively engaged in the teaching and research in the diverse field of CFD at M.Tech. and Ph.D. levels and has many research publications to their credit. Four externally funded research projects are in progress in the department in the area of flow control and Bio fluid dynamics. Two research scholars are awarded PhD while six more are currently in progress in the area of CFD and Energy. Current research interest of the group includes some of the frontier areas like aerospace, bio-fluid dynamics, vehicle aerodynamics, flow control, thermo-fluid dynamics, turbomachines and green energy with active participation of students and professionals across academia and industries.

About Department of Applied Mechanics: The Department of Applied Mechanics was established in 1964. It was initially named as "Department of Applied Mechanics, Hydraulic and Hydraulic Machines", which was renamed "Applied Mechanics Department" in 2003. The Department offers courses at undergraduate level on Solid Mechanics, Fluid Mechanics, Structural Analysis, Material Science, Engineering Mechanics, Mechanics of Deformable Solids, Kinematics of Mechanics, Dynamics of Machines, Computational Methods etc.

The department runs four Post Graduate (M.Tech.) programmes in (i) Engineering Mechanics & Design, (ii) Material Science & Engineering, (iii) Fluids Engineering, and (iv) Biomedical Engineering. The department also offers Ph.D. programme in these areas. Currently 25 Research scholars are pursuing their Ph.D. in the department. The department has state-of-the-art facilities to carry out theoretical, computational and experimental studies. The department is the recipient of DST FIST grant of Rs. 130 Lakhs. The department has MOUs with reputed universities abroad and industries in India. In 2014, the department celebrated its golden jubilee.

About MNNIT Allahabad: Motilal Nehru National Institute of Technology Allahabad (MNNIT) is an institute with total commitment to quality and excellence in academic pursuits. It was established as one of the seventeen Regional Engineering Colleges (RECs) of India in the year 1961 as a joint enterprise of Government of India and Government of Uttar Pradesh, and was an associated college of University of Allahabad. With over 50 years of experience and achievements in the field of technical education, having traversed a long way, 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 "*Institute of National Importance*" w.e.f. 15.08.2007 by the Act of Parliament. The Institute now offers 9 B.Tech., 20 M.Tech. Degree Programmes (including part-time), MCA, MBA, M.Sc. (Mathematics and Scientific Computing) and Master of Social work (M.S.W.) programmes and also registers candidates for the Ph.D. degree. The Institute has been recognized by the Government of India as one of the centres for the Quality Improvement Programme (QIP) for M.Tech. and Ph.D. The institute offers congenial atmosphere for learning.

About City of Prayagraj (Allahabad) and its Connectivity: Prayagraj (Allahabad) is a mythological city which found its references in Purans, the Ramayan and the Mahabharata. This holy city is situated at the confluence of three most pious rivers namely Ganga, Yamuna and the mythical Saraswati. The city hosts the *Maha Kumbh Mela*, the largest religious gathering in the world, every twelve years. From the days of civilization, Prayagraj has been seat of learning, wisdom and writing. It has attracted many saints, philosophers and historian since the ancient times. The city has always been associated with well known political, cultural and academic personalities of the country which have aggrandized the glory of the city. It is the politically vibrant and spiritually conscious city of India. Allahabad is also known as the "city of prime ministers" because seven out of 15 prime ministers of India since independence have connections to Allahabad. The city has many important institutions which include MNNIT, IIIT, HRI,

GBPSSI, Allahabad University, High Court of U.P., and famous tourist places like Triveni Sangam, Akbar Fort, Ashoka Pillar, Akshaya Vat, Khushroo Bagh, All Saints Cathedral, Anand Bhawan, Chandra Shekhar Azad Park, Museum, Jawahar Planetarium, New Yamuna Bridge etc. Wide and clean roads with statues at regular squares form a part of the attraction of the city.

Prayagraj is situated in the northern part of India in the Awadh region of the state of Uttar Pradesh. It is well connected with flights, rail and road transport to other parts of India. Allahabad has its own domestic airport at Bamrauli which is 15 km away from the heart of the city. Direct air link is available for New Delhi and Mumbai. Air-connectivity to other parts of India is available from Lucknow (200 km) and Varanasi (135 km). Allahabad is the head quarter of north-central railway and is part of Howrah-Delhi grand chord rail network. UPSRTC buses offer service to most of the cities in Uttar Pradesh. From Allahabad bus services are available to as far as Delhi (650 km) and Kolkata (800 km).

Frequently Asked Questions (FAQ):

- **Will I earn a certificate for this course?**
100% attendance is compulsory to earn a certificate. All the participants who attend the workshop in full will receive a 'Participation Certificate' signed by the Workshop Conveners.
- **What resources will I need for this workshop?**
Your curiosity! The rest will be provided by the organizers. However, you carry a laptop with you, it will be wonderful!
- **Do I need a scientific background?**
Any student or engineer who is having basic knowledge of fluid mechanics, heat transfer, computational/numerical methods and computer programming can participate in the workshop and learn a lot from it.

Organizing Committee:

Patron: Prof. Rajeev Tripathi, Director, MNNIT Allahabad.

Workshop Chair: Prof. S.J. Pawar, Head, Department of Applied Mechanics.

Workshop Conveners: Prof. Anuj Jain & Dr. Akshoy Ranjan Paul.

Contact Details:

Dr. Akshoy Ranjan Paul
Workshop Convener (ACFD-2019)
Associate Professor
Department of Applied Mechanics
MNNIT Allahabad.
Prayagraj- 211004, Uttar Pradesh.
Mob.: 0-9336060762.
e-mail: arpaul2k@gmail.com

**TEQIP-III Sponsored National Workshop on
Advances in Applications of
Computational Fluid Dynamics (ACFD-2019)**

Date: 6–11 March 2019

Department of Applied Mechanics, MNNIT Allahabad

REGISTRATION FORM

Name: _____

Date of Birth (in dd/mm/yy format): _____

Designation: _____

Department: _____

Organization: _____

Highest Degree with Specialization/Branch: _____

Address for Correspondence: _____

Phone: _____ Mobile: _____ E-mail: _____

Accommodation Required: YES/NO

(For room tariffs, please contact Course Convener at arpaul2k@gmail.com)

Type of Accommodation Required: _____

Date & Time of Arrival: _____. Date & Time of Departure: _____

Registration Fee Details:

Amount: Rs. 1000(for Students) / Rs. 2000(from Academia and R&D) / Rs. 3000(from Industry)

UTR No. (in case of NEFT/RTGS): _____

Date of Transaction: _____

Bank Details: _____

Signature of Applicant with Date: _____

*The completed registration form should reach to the programme coordinators **on or before 1 March 2019** along with necessary registration fee. No application will be considered without the registration fee.

Refund Policy: If the applicant withdraws himself/herself from the workshop by **2 March 2019**, full refund will be admissible. Beyond this deadline, no refund is possible.