



Academic Building, MNNIT



Administrative Building, MNNIT



New Yamuna Bridge at Allahabad



'Sangam' at Allahabad



CFD-2013



BCFD-2014

Contact Details

Dr. Akshoy Ranjan Paul

Assistant Professor & Programme Convener

Department of Applied Mechanics.

Motilal Nehru National Institute of Technology Allahabad.

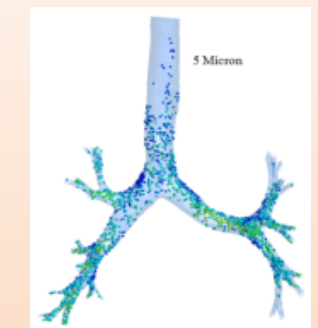
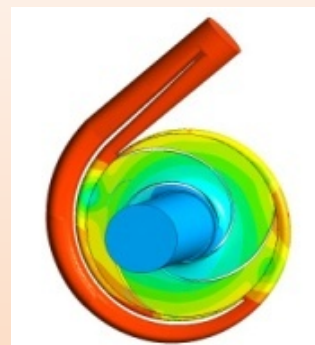
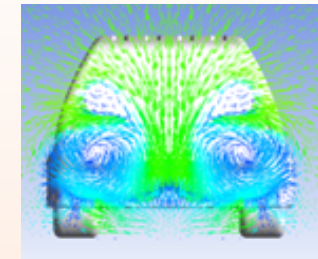
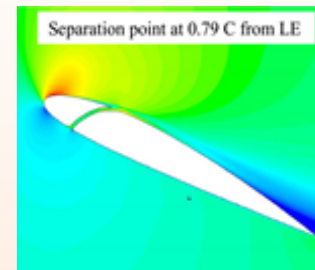
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Short-Term Training Programme On Computational Fluid Dynamics (CFD-2015)

June 22 – 26 (Mon – Fri), 2015



Organized by



Department of Applied Mechanics
Motilal Nehru National Institute of Technology Allahabad
Allahabad- 211004, U.P., India

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.

Scope of the Programme

Department of Applied Mechanics (AMD), MNNIT Allahabad organizes a short-term training programme on 'Computational Fluid Dynamics (CFD)', to develop human resource in the area of CFD. The programme offers basic theories of CFD simulation ranging from physics of the problem, transport equations, computational domain, grid generation, discretization, numerical techniques, validation and analysis of results. The programme also includes hands-on lab.session with best practice guidelines for a variety of problems to boost the understanding of CFD.

Highlights of the Programme

- **Third edition** of a popular course designed for the beginners 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.
- Hands-on Lab. sessions with exposure to CFD software and coding.
- Laboratory facilities available beyond the scheduled time.
- Overview of present state-of-the-art of CFD and future scope of research and applications of CFD.
- Feedback/Tutorials/quizzes at the end of each session/day.
- A proficiency test/presentation by the willing participants at the end of the STTP.

Takeaways/Outcomes

On completion of this programme, the participants will be able

- To use CFD software independently.
- To know the underlying principles of the software options.
- To be able to use the software options effectively.
- To be able to identify the pitfalls and steps to circumvent those.
- To check and validate the results.
- To know the possible applications and research areas.

Venue

Seminar Room & Computational Laboratory, AMD, MNNIT Allahabad.

Who Should Attend this Programme

This programme is ideal for practicing engineers, faculty and students who has basic background in either fluid dynamics or numerical methods and wish to use CFD in future. No prior knowledge of CFD is necessary. However, prior knowledge will be helpful to learn about its efficient use for variety of problems.

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

Registration Fees

Registration fee is **Rs. 4000/-** which includes a folder with writing accessories, course materials and tutorials in a CD, breakfast, tea and working lunch for all five days of course, printed Group Photograph of the participants and the resource persons and a Participation Certificate after completion of the programme.

The registration fee does not include the accommodation and dinner charges. No T.A., D.A. will be paid to the participants for attending the course.

The participants who want to attend the specially designed **Proficiency Test** will have to pay **Rs.500/-** extra along with their registration fee. A separate **proficiency certificate** will be issued to them.

Registration fee can be sent in form of demand draft (D.D.) in favour of "CFD-2015" payable at Allahabad or can directly deposit through NEFT/RTGS to the designated account.

Bank Details

Account Name: CFD-2015.

Account No.: 718400301000169.

Bank: Vijaya Bank, MNNIT Branch, Allahabad-211004, U.P.

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 24 A.C. rooms and a dining hall. Accommodation will be provided *first-come-first-serve basis* and depending on the availability.

A few guest rooms are also available in Boys' and Girls' hostels of the institute.

Click here for details: <http://www.mnnit.ac.in/index.php/facilities/edc>

Resource Persons

- Prof. Anuj Jain
- Dr. Akshoy Ranjan Paul
- Dr. Vivek Kumar Patel

Lab. sessions and Tutorials will be supported by the Research scholars of the department.

Fluids Engineering Research Group

Department of Applied Mechanics has a state-of-the art CFD facilities with one64-core IBM Blade-server, 14 high power workstations (HP Z-series) and 36 desktop computers of latest configurations and Ansys CFD software. The Fluids Engineering research group of the department is actively engaged in the teaching and research in the diversified fields in CFD at M.Tech. and Ph.D. levels and many research publications to their credit.

Two DST sponsored research projects are in progress in the department in the area of flow control and Bio fluid dynamics. Two research scholars are awarded PhD recently and three more in progress currently in the area of CFD.

Current research interest of the group includes some of the frontier areas like aerospace, bio-fluid dynamics, vehicle aerodynamics, flowcontrol, thermo-fluid dynamics, and turbomachines 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 (i) Applied Mechanics, (ii) Material Science & Engineering, (iii) Fluids Engineering, and (iv) Biomedical Engineering. The department also offers Ph.D. programme in these areas. Currently 15 Research scholars are pursuing their Ph.D. The department has distinction of having its all faculty with Ph.D. degree. The committed faculty of the department is recognized for their quality teaching and research. The department has state-of-the-art facilities to carry out theoretical, computational and experimental studies. The department is 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 Allahabad and its Connectivity

Allahabad is well known throughout the country for its purity and cleanliness that the city has maintained for many years. It is a holy and religious place and the meeting point of three most pious rivers namely Ganga, Yamuna and the mythological Saraswati. The city has always been associated with well known political, cultural and academic personalities of the country which has aggrandized the glory of the city. The city better known as "PRAYAG" has many governmental institutions which include MNNIT, High Court of U.P., Allahabad University and famous tourist places like Sangam, Anand Bhawan, Narayani Ashram etc. Wide and clean roads with statues at regular squares form a part of the attraction of the city. And at last, MNNIT is the heart of the city and one of the best institutes which ensures Quality Education.

Allahabad city 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. Daily trains, buses and flights are available from major cities in India. Allahabad is the head quarters of north-central railway and is part of Howrah-Delhi grand chord rail network. It is well connected to all other important cities in India Allahabad has its own domestic airport at Bamrauli which is 15 km away from the heart of the city. Air link is available for New Delhi only. Air-connectivity to other parts of India is available from Lucknow (200 km) and Varanasi (135 km). Good road services are available in Allahabad. 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?**
All the participants who attends the STTP will receive a 'Participation Certificate' signed by the Programme coordinator.
- **Will I get anything more than a participation certificate?**
The participants, who wish to appear for a test on the final day of STTP, which is especially designed to evaluate the proficiency in CFD; they will be provided with a 'Proficiency Certificate' mentioning their marks/grades.
- **What resources will I need for this STTP?**
Your curiosity! The rest will be provided by the organizers.
- **Do I need a scientific background?**
The STTP consists of 5 days. The first day focus on the 'fundamentals', however always with clear links to the various applications of CFD. The next three days focus on the core CFD businesses with hands on training/lab. sessions. We built the STTP in this way because the knowledge of the fundamentals is important to fully understand the core businesses and applications. In terms of university/academic education, both fundamentals and applications are essential components of a course and therefore also the tutorials will focus on these two components. Any student, engineer, who is having basic knowledge of fluid mechanics, thermodynamics, heat transfer and elementary course on computational/numerical methods can participate in the STTP and learn a lot from it.

Organizing Committee

Patron: Prof. P. Chakrabarti, Director, MNNIT Allahabad.

Programme Chair: Prof. Anuj Jain.

Programme Convener: Dr. Akshoy Ranjan Paul.

Members:

Prof. K.K. Shukla
Dr. R.P. Tewari.
Dr. S.J. Pawar.
Dr. Ramesh Pandey.
Dr. Abhishek Kumar.

Dr. Ajaya Bharti.
Dr. Anindya Bhar.
Dr. A.K. Upadhyay.
Dr. V. Murari.
Dr. Vivek K. Patel.

Programme Schedule

Date	08.30 AM to 9 AM	Session-I (9 AM to 11 AM)	11 AM to 11:30 AM	Session-II (11 AM to 1:30 PM)	1:30 PM to 2:30 PM	Session-III (2:30 PM to 4.30 PM)	4:30 to 5 PM	Session-IV (5 PM to 5.30PM)
Day-I (22/06/2015) Monday	Breakfast	Registration and Inaugural ceremony	Tea Break	Overview of CFD: Computational Methods, Transport Equations & Boundary conditions	Lunch Break	Introduction to CFD Software: Geometry, Grid Generation, Solver, Post Processing	Evening Tea	Review of the days learning
Day-II (23/06/2015) Tuesday		Diffusion/Conduction problems.		Convection-diffusion problems.		Lab. Session on Diffusion & Convection-diffusion problems.		
Day-III (24/06/2015) Wednesday		Pressure-Velocity coupling.		Unsteady/Transient problems.		Lab session on pressure-velocity coupling & unsteady problems.		
Day-IV (25/06/2015) Thursday		Turbulence & Its Modeling.		Best Practices and Applications in CFD.		Lab session on Turbulence modeling.		
Day-V (26/06/2015) Friday		CFD Researches in India & Abroad: A Glimpse.		Presentations by the Participants/Proficiency Test.		Feedback, Valedictory Function & Presentation of Certificates		Departure