



DEPARTMENT OF MECHANICAL ENGINEERING

One Week offline Student Workshop on

“Computational Fluid Dynamics and its Applications”

from 18th March 2024 to 23rd March 2024 ; Timings 9.30AM to 4.30PM.

A one week offline student workshop on “Computational Fluid Dynamics and its Applications” with hands ons sessions was organized from 18-03-2024 to 23-03-2024 Monday to Saturday from 9.30am to 4.30pm, The total 37 number of student participants attended the workshop. The students were given an individual project to carry out on their own to assess their understanding of doing CFD simulations.

Details of Resource Persons:

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Name of the Resource Person	Designation and Institute
Mr.Muddada Srinivasa Rao	Research Scholar(PMRF), Department of Mechanical Engineering Indian Institute of Technology, Kharagpur

Inauguration Function: The inauguration function of the one week offline student workshop on “Computational Fluid Dynamics and its Applications” started on 18-03-2024 at 9.30AM, with the welcome address by the Convener, Dr.M.B.S.S.Reddy, Professor & HoD, Department of Mechanical Engineering then address by the Principal Dr.K.Appa Rao and resource person, Mr.Muddada Srinivasa Rao, Research Scholar (PMRF), Department of Mechanical Engineering, Indian Institute of Technology, Kharagpur. The inaugural function concluded at 9.50AM. The

**Lakireddy Bali Reddy College of Engineering- MED _ One Week Offline CFD Workshop:
18-03-2024 to 23-03-2024**

session on day-1 at 10AM on the introductory session on the overview of the CFD and its applications for simulation of thermal systems for optimizing the process parameters. There were total 23 sessions conducted including theory and hands on sessions and the details are as given below. Students carried out individual project on the fifth and sixth days of workshop.

Table 1: Details of Resource Persons and topic delivered

Dates	Name of the Resource Person	Topics Covered during CFD workshop
	Mr.Muddada Srinivasa Rao Research Scholar, Department of Mechanical Engineering, Indian Institute of Technology, Kharagpur.	
18.3.2024	Topics covered: DAY-1	
	(i) Introduction to fluid mechanics and its applications	- 10am-11.30am
	(ii) Thermal, heat transfer towards fluid mechanics	- 11.45am - 1pm
	(iii) Introduction to Computational Fluid Dynamics (CFD)	- 2.00pm - 3.15pm
	(iv) Applications of CFD	- 3.30pm-4.30pm
19.3.2024	Topics covered: DAY-2	
	(i) Governing equations involved in CFD	- 9.30am-11.00am
	(ii) The user interface in Ansys Fluent	- 11.20am - 1pm
	(iii) Geometry creation and meshing	- 2.00pm - 3.15pm
	(iv) Problem setup in Ansys Fluent	- 3.30pm-4.30pm
20.3.2024	Topics covered: DAY-3	
	(i) Post-processing and analysis in Ansys Fluent	- 9.30am-11.00am
	(ii) Simple problem solving (hands-on)	- 11.20am - 1pm
	(iii) Post-processing (hands-on)	- 2.00pm - 3.15pm
	(iv) Doubt clearing session	- 3.30pm-4.30pm
21.3.2024	Topics covered: DAY-4	
	(i) Fluid interaction problem (hands-on)	- 9.30am-11.00am
	(ii) Post-processing (hands-on)	- 11.20am - 1pm
	(iii) Generating customized results in CFD	- 2.00pm - 3.15pm
	(iv) Doubt clearing session	- 3.30pm-4.30pm
22.3.2024	Topics covered: DAY-5	
	(i) Fluid and heat transfer interaction problem (hands-on)	- 9.30am-11.00am
	(ii) Post-processing (hands-on)	- 11:20am - 1pm
	(iii) Generating customized results in CFD	- 2.00pm - 3.15pm
	(iv) Doubt clearing session	- 3.30pm-4.30pm
23.3.2024	Topics covered: DAY-6	
	(i) Individual projects by the students	- 9.30am-11.00am
	(ii) Individual projects by the students	- 11.20am - 1pm
	(iii) Overview, question and answer session	- 3.30pm-4.30pm



**LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(Autonomous)**

(Affiliated to JNTUK, Kakinada & Approved by AICTE New Delhi,
NAAC & NBA Accredited, & Certified by ISO 9001:2015)
L.B. Reddy Nagar, Mylavaram-521 230, Andhra Pradesh, INDIA.



One Week Hands on Workshop on
**“COMPUTATIONAL FLUID DYNAMICS AND
ITS APPLICATIONS”**

In Association with

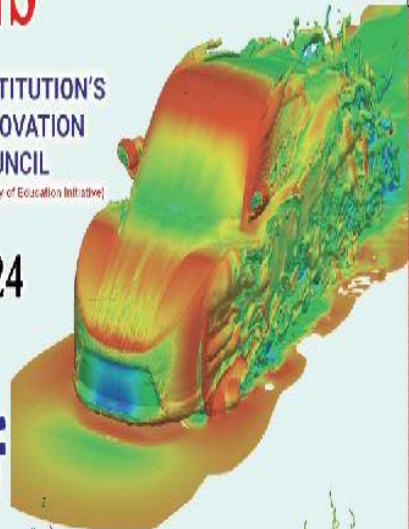
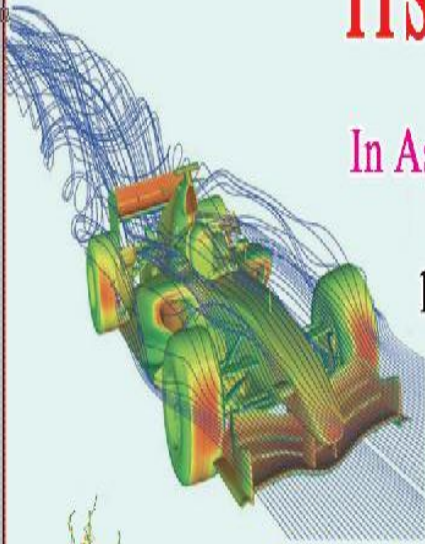


18th March-23rd March, 2024

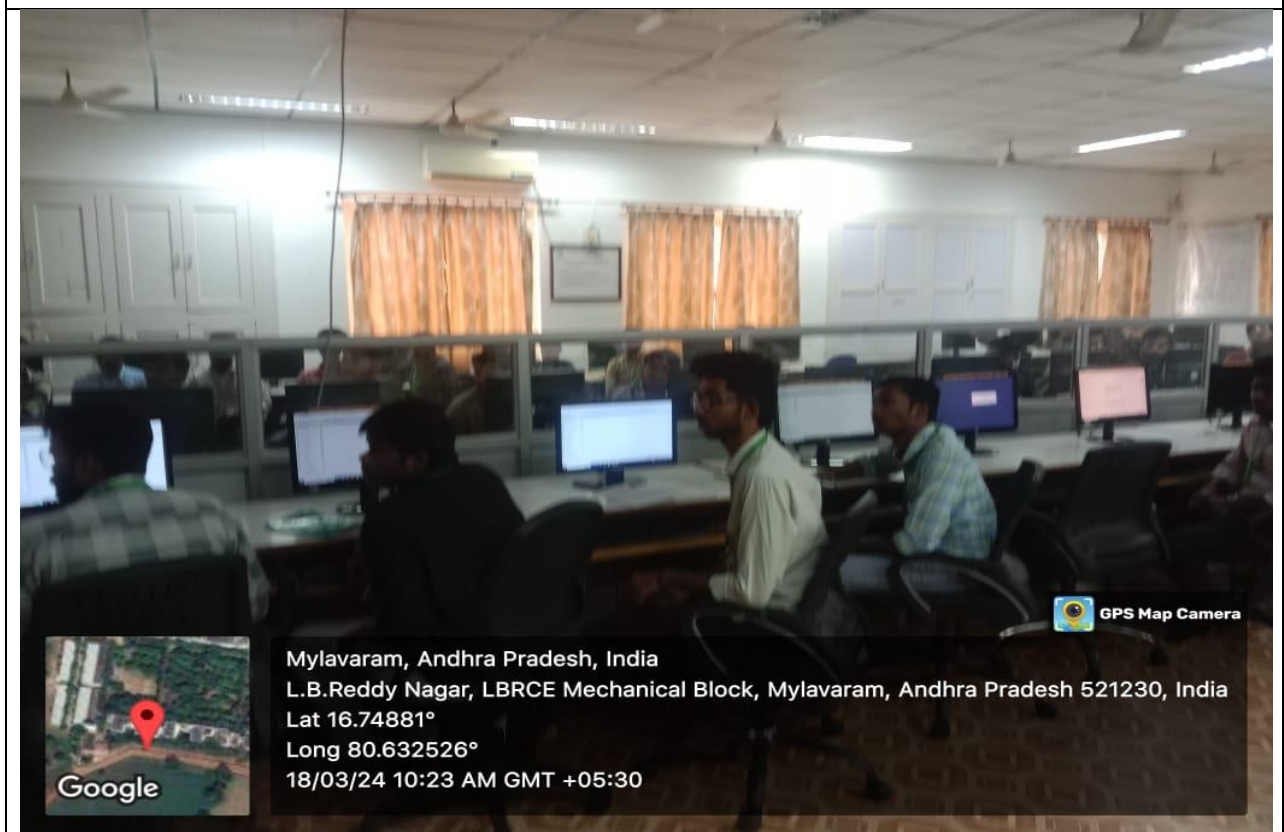
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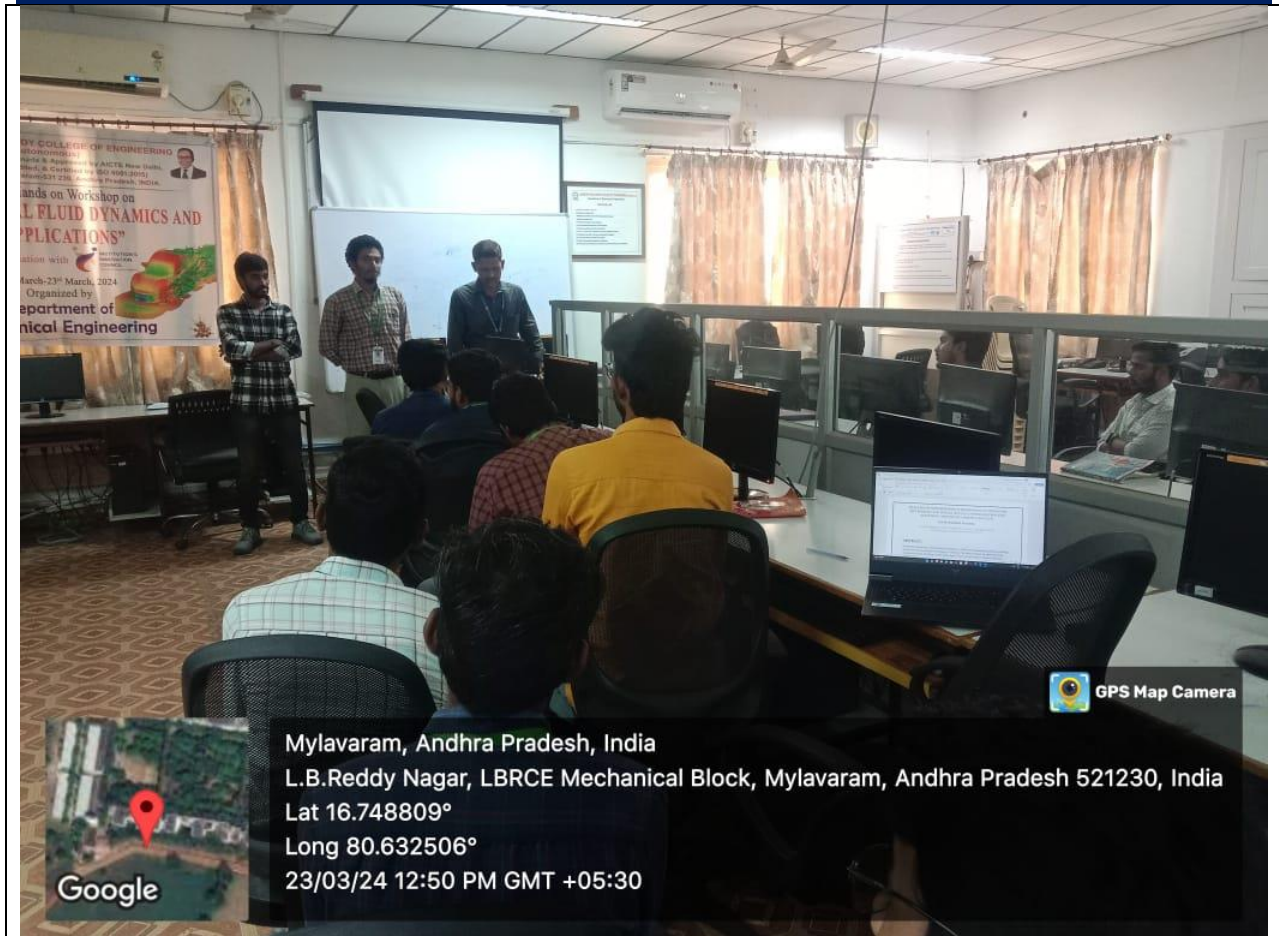
Mechanical Engineering



**Lakireddy Bali Reddy College of Engineering- MED_ One Week Offline CFD Workshop:
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Computational Fluid Dynamics and its Applications workshop

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Students taking photograph with Resource person Mr.Muddada Srinivasa Rao



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Program Objective: To impart the knowledge of CFD applications with hands on sessions for solving fluid flow and heat transfer problems using the Ansys Fluent software.

Program Outcomes: The student participants were able to

1. Understand the fundamentals of CFD governing equations and procedural steps
2. Model an element and run simulations in CFD for fluid flow and heat transfer
2. 1-D models related to thermal systems solved individually
3. Apply CFD tool for solving and analysing the results
4. Take up individual project, solve the problem and make the report.

CO-ORDINATORS

1.Dr.A.Nageswara Rao **2.Dr.P.Vijaya Kumar**
Sr.Asst.Professor Professor

CONVENER

Dr.M.B.S.S.Reddy
Professor and Head

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Accredited by NAAC & NBA (CSE, IT, ECE, EEE & ME) under Tier - I

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**One week offline Student Workshop on
Computational Fluid Dynamics and its Applications
18th March 2024 – 23rd March 2024
Programme Schedule**

**Importance of Computational Fluid Dynamics (CFD) and its applications
M. Srinivasarao Ph.D. (PMRF) Scholar in Mechanical Engg. Dept. at IIT Kharagpur**

Day – 1 (18/03/2024)	
Introduction to fluid mechanics and its applications	10:00 AM to 11:30 AM
Thermal, heat transfer towards fluid mechanics	11:45 PM to 1:00 PM
Introduction to Computational Fluid Dynamics (CFD)	2:00 PM to 3:15 PM
Applications of CFD	3:30 PM to 4:30 PM
Day – 2 (19/03/2024)	
Governing equations involved in CFD	9:30 AM to 11:00 AM
The user interface in Ansys Fluent	11:20 AM to 1:00 PM
Geometry creation and meshing	2:00 PM to 3:15 PM
Problem setup in Ansys Fluent	3:30 PM to 4:30 PM
Day – 3 (20/03/2024)	
Post-processing and analysis in Ansys Fluent	9:30 AM to 11:00 AM
Simple problem solving (hands-on)	11:20 AM to 1:00 PM
Post-processing (hands-on)	2:00 PM to 3:15 PM
Doubt clearing session	3:30 PM to 4:30 PM
Day – 4 (21/03/2024)	
Fluid interaction problem (hands-on)	9:30 AM to 11:00 AM
Post-processing (hands-on)	11:20 AM to 1:00 PM
Generating customized results in CFD	2:00 PM to 3:15 PM
Doubt clearing session	3:30 PM to 4:30 PM
Day – 5 (22/03/2024)	
Fluid and heat transfer interaction problem (hands-on)	9:30 AM to 11:00 AM
Post-processing (hands-on)	11:20 AM to 1:00 PM
Generating customized results in CFD	2:00 PM to 3:15 PM
Doubt clearing session	3:30 PM to 4:30 PM
Day – 6 (23/03/2024)	
Individual projects by the students	9:30 AM to 11:00 AM
Individual projects by the students	11:20 AM to 1:00 PM
Overview, question and answer session	2:00 PM to 4:30 PM



MUDDADA SRINIVASARAO

Pursuing PhD in Mechanical Engineering
Roll No. 20ME92R08
Mechanical Engineering
Indian Institute of Technology Kharagpur
Mobile: 8187880487 DOB: 01/08/1996



Career Objective: I aspire to build my career in research as I wish to contribute to the progress of the nation.

ACADEMIC QUALIFICATIONS

Degree	University/Board	Year of passing	Percentage
Ph.D	IIT Kharagpur	-	9.0 (CGPA)
M. Tech	NIT Meghalaya	2020	9.73 (CGPA)
B. Tech	J. N. T. U Kakirada	2017	74.8
Intermediate/+2	B. L. E. A. P	2013	84.8
Class X	B. S. E. A. P	2011	70

SCHOLASTIC ACHIEVEMENTS

- Attended the "World Hydrogen Energy Summit held at New Delhi" [2023]
- Selected for "2nd Asia-Pacific Combustion Institute Summer School - Fundamental Combustion Problems in Fires" in Chile [2022]
- Selected for the prestigious PMRF Scholarship [2021]
- Ranked 1st in M. Tech Mechanical Engineering and also got an academic silver medal [2020]
- Ranked 1st in B. Tech Mechanical Engineering [2017]
- Cleared All India GATE exam in 2018 and secured a scholarship for graduate studies [2018]

MAJOR PROJECTS AND SEMINAR

- Prediction of Flame Characteristics: Validation and Application to the Industrial Pool fire (Post-Graduation Thesis)
- Computational analysis of natural gas combustor (Post Graduation Seminar)
- Design and analysis of engine exhaust system (B. Tech Thesis)

PUBLICATIONS

- | Journals | Status |
|---|--------------|
| 1. Srinivasarao, M., Jun, D., Lee, B. J., & Reddy, V. M. (2024). Numerical analysis of the enrichment of CH ₄ /H ₂ in ammonia combustion in a hot co-flow environment. <i>International Journal of Hydrogen Energy</i> , 55, 1071-1089. | |
| 2. Effect of thermos-diffusion on the non-premixed flame in the MILD regime using a modified reacting solver | Accepted |
| 3. A modified reacting solver for non-premixed jet flames in the MILD regime with various Lewis numbers | Under review |
| 4. An investigation of borderline (MILD, HiTAC, and No-combustion regimes) interaction in combustion regime diagrams and the impact of preheating, dilution, and blending on MILD combustion | Under review |
| 5. Meticulous Study of Pure Ammonia Flames with Ultra-High Thermal Intensity Under Fuel and Air Staging under Extreme Lean-to-Rich Conditions | Under review |

Conferences

1. Analysis of the borderline of no-ignition and MILD combustion regimes of methane, propane, and syngas fuels based on ignition delay time, ASPACC-2023, Kaohsiung Exhibition Center, Kaohsiung, Taiwan.
2. Effect of thermo-diffusion on non-premixed flame in MILD regime using a modified reacting solver. NAPC-2022, IIT Bombay, National Conference 4.
3. Prediction of pool fire flame characteristics using numerical simulation. FMFP-2020, IIT Guwahati, International Conference

WORK EXPERIENCE

- Worked as an Engineer in the Turbine O&M Department capacity of 4 x 600 MW steam power plant. [Oct'2020-Jun'2021]
- Undergone industrial training and mini project in Vizag Steel Plant, Visakhapatnam [Apr'16-June'16]
- Worked as a technical advisor in Heat Exchanger Design for INDUS Food Products Ltd. [Feb'2023-Aug'2023]

SKILLSET

Software and Coding Skills

Software's: Ansys Fluent, Star CCM+, Solid Works, TECPLOT, ParaView
Coding Skills: Open FOAM, MATLAB, C-Programming

DECLARATION

I hereby declare that the above-furnished particulars are true to the best of my knowledge and belief.

Place: Kharagpur, West Bengal, India- 721 302

Date: 07/11/2023

M. Srinivasarao

Signature

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Email: lbcmym@lbrce.ac.in, principal@lbrce.ac.in | Website: www.lbrce.ac.in

Date: 23/03/2024

Name of the Prime Ministers Research Fellow	Muddada Srinivasarao
PMRF ID	2401750
Granting Institute Name	IIT Kharagpur
Department	Mechanical Engineering
Roll Number in the Granting Institute	20ME92R08
Name of the institute in which TA work is done	Lakireddy Bali Reddy College of Engineering, Mylavaram, Andhra Pradesh, India-521230
Name of the course /subject for which the PMRF is a TA for	Computational Fluid Dynamics (CFD)
Nature of work (Tutorial/Demonstration/Workshop etc)	Workshop
Mode of teaching (Online/Offline)	Offline
No. of Hours completed	39
Start date of TA work	18-03-2024
End date of TA work	23-03-2024
Endorsement from PhD Guide/Co-Guide	
Signature and Seal of the Principal/HoD of the institute in which TA work is carried out.	<p>9.2 ✓ PRINCIPAL 23/3/24 Lakireddy Balireddy College of Engg MYLAVARAM - 521 230.</p>



HoD

(Dr.M.B.S.Sreekara Reddy)