



Saranathan College of Engineering  
Trichy-12



Department of Mechanical Engineering

AICTE Sponsored one week Short Term Training Programme (STTP)

on

**Rudiments and Practices of Computational Fluid Dynamics in  
Thermo Fluid Analysis**

**Phase I - 10/05/2021 to 15/05/2021**

The Department of Mechanical Engineering of Saranathan College of Engineering, Trichy organized a one week Short Term Training Programme (STTP) titled “**Rudiments and Practices of Computational Fluid Dynamics in Thermo Fluid Analysis**” in two phases. **Phase I** of the STTP was conducted from 10<sup>th</sup> May 2021 to 15<sup>th</sup> May 2021. This program was sponsored by AICTE, New Delhi. The programme began with the keynote address by Dr. S.Vengadesan, Professor, Department of Applied Mechanics, IIT Madras, Chennai, who emphasized the importance of adopting CFD in thermo fluid research and industrial practices. The training program was well structured with twenty-four technical sessions in which lectures were delivered by experts from eminent institutes like IITs, CEG (Anna University) etc. and practising CFD engineers and scientists from PSUs like BHEL (Trichy), IGCAR, Kalpakkam and other corporate units. A broad range of topics were covered during the sessions – topics ranging from fundamental concepts of Computational Fluid Dynamics to live demonstrations on applying CFD software tools in solving real time thermo fluid problems. The CFD team from FOSSEE, IIT Bombay gave a live demonstration on the capabilities of Open FOAM as free CFD software. The training program concluded with a valedictory address by Dr. S.M.Giriraj Kumar, HOD/ICE & Head (T&P), SCE, who gave a brief overview of the National Education Policy (NEP) and highlighted the salient features of the policy. The programme was well attended by academicians and researchers from all over Tamil Nadu and other neighbouring states and 59 participants received certificates.



**SARANATHAN COLLEGE OF ENGINEERING**  
 (Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)  
 (Accredited by NAAC with A+ Grade)  
**DEPARTMENT OF MECHANICAL ENGINEERING**  
 (Accredited by NBA)



**AICTE Sponsored One Week Short Term Training Programme on  
 Rudiments and Practices of Computational Fluid Dynamics in Thermo Fluid Analysis 03/05/2021  
SCHEDULE OF TRAINING PROGRAMME-Phase I (10/05/21 to 15/05/21)**

Day/ Session	SESSION-I (9.45 AM -11.15 AM)	SESSION-II (11.30 AM – 1.00 PM)		SESSION-III (2.00 PM – 03.30 PM)	SESSION-IV (3.45 PM – 5.15 PM)
10.05.21 MON	<b>Prof. Dr. S. Vengadesan,</b> Professor, Dept. of Applied Mechanics, IIT- Madras, Chennai  <i>Inaugural Address and CFD- Basics and Governing Equations-Part I</i>	<b>Prof. Dr. S. Vengadesan,</b> Professor, Dept. of Applied Mechanics, IIT- Madras, Chennai  <i>CFD- Basics and Governing Equations-Part II</i>		<b>Dr. K. Arul Prakash,</b> Professor , Dept.of Applied Mechanics, IIT- Madras, Chennai  <i>Proposed topic: Finite Volume method –Part I</i>	<b>Dr. K. Arul Prakash,</b> Professor , Dept. of Applied Mechanics, IIT- Madras, Chennai  <i>Proposed topic: Finite Volume method –Part II</i>
11.05.21 TUE	<b>Dr.R.Sivakumar</b> Professor & Dean, School of Mechanical Engineering, VIT-Chennai Campus  <i>Proposed topic: Applications of CFD – An Overview</i>	<b>Dr.P.R.Naren,</b> Associate Professor, Dept. of Chemical Engineering, SCBT, SASTRA, Tanjore  <i>Proposed topic: Building and Simulating CFD Models</i>	L U N C H	<b>Dr. Kulasekharan Narasingamurthi,</b> Specialist-Computational Fluid Dynamics, Simulation Metier-GEEDS, Valeo India Private Limited, Chennai  <i>Proposed topics: 1. Design and Development of Compact Heat Exchangers 2. Gas Turbine Cooling System</i>	
12.05.21 WED	<b>Dr.Prasad Patnaik BSV,</b> Professor, Dept of Applied Mechanics, IIT- Madras, Chennai  <i>Proposed Topic: Turbulent flows and Modelling</i>	<b>Dr.K.Venkatasubbiah,</b> Associate Professor, Department of Mechanical and Aerospace Engineering, IIT Hyderabad  <i>Proposed topic: Computational Fluid Dynamics (CFD) and Heat transfer</i>	B R E A K	<b>Dr.M.Ganesan,</b> Associate Professor, Dept of Mech. Engineering, Saranathan College of Engineering, Trichy  <i>Proposed Topic: Case Study on CFD Simulation</i>	<b>Dr. G. Jayaprakash,</b> Professor & Head, Dept of Mech. Engineering, Saranathan College of Engineering, Trichy  <i>Proposed topic: CFD- Application Problems using ANSYS CFX</i>

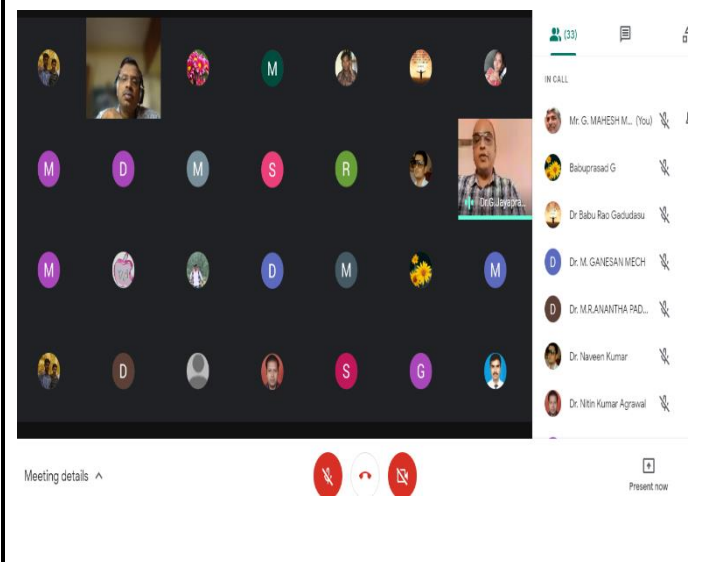
Day/ Session	SESSION-I (9.45 A.M -11.15P.M)	SESSION-II (11.30 A.M – 1.00P.M)		SESSION-III (2.00 PM – 03.30 PM)	SESSION-IV (3.45 PM – 5.15 PM)
13.05.21 THU	<p><b>Dr. Pallab Sinha Mahapatra,</b> Assistant Professor, Department of Mechanical Engineering, IIT- Madras, Chennai</p> <p><i>Proposed topic: Multiphase Flow heat transfer</i></p>			<p><b>Dr.P.Harish,</b> Asst.Professor, Dept. of Mechanical Engineering IIT Jammu,J&amp;K</p> <p><i>Proposed topic: CFD Modeling of Boiling heat Transfer</i></p>	<p><b>Dr. N. Baskar,</b> Professor, Dept of Mech. Engineering, Saranathan College of Engineering, Trichy</p> <p><i>Proposed topic: Optimization of Finite Element Equations in Heat Transfer Problems</i></p>
14.05.21 FRI	<p><b>Prof. Janani Srree</b> FOSSEE IIT Bombay</p> <p><i>Proposed topic: CFD- OpenFOAM</i></p>	<p><b>Mr. Ashley Melvin and Mr. Divyesh Variya</b> CFD Members, FOSSEE IIT Bombay</p> <p><i>Proposed topic: Software Demo on CFD problems in Open FOAM</i></p>	L U N C H  B R E A K	<p><b>Prof. Dr. G. Kumaresan,</b> Associate Professor, Institute of Energy Studies,CEG, Anna University, Chennai</p> <p><i>Proposed topic: CFD Analysis of Thermal System Components</i></p>	<p><b>Dr. A. Mercy Vasan,</b> Associate Professor, Dept of Mech. Engineering, Saranathan College of Engineering, Trichy</p> <p><i>Proposed topic: Challenges in applying CFD techniques to solve real time problems in CFB boilers</i></p>
15.05.21 SAT	<p><b>Dr R.Elankovan, DGM( Commercial/Fossil Boilers)</b> B.H.E.L, Trichy</p> <p><i>Proposed topic :Grid Generation and Case studies on applications of CFD</i></p>			<p><b>Dr. N. L. Parthasarathi,</b> Scientific Officer, Metal Forming and Tribology Section, IGCAR , Kalpakkam</p> <p><i>Proposed topic: Nano materials and coatings in industrial applications: A tribology perspective</i></p>	<p><b>Dr.S.M.Giriraj Kumar,</b> Professor&amp; Head, Dept of ICE &amp; Head(T&amp;P), Saranathan College of Engineering, Trichy</p> <p><i>Talk on National Education Poilcy(NEP) and Valediction</i></p>

**Certification test on 15.5.2021 at 3.45PM**

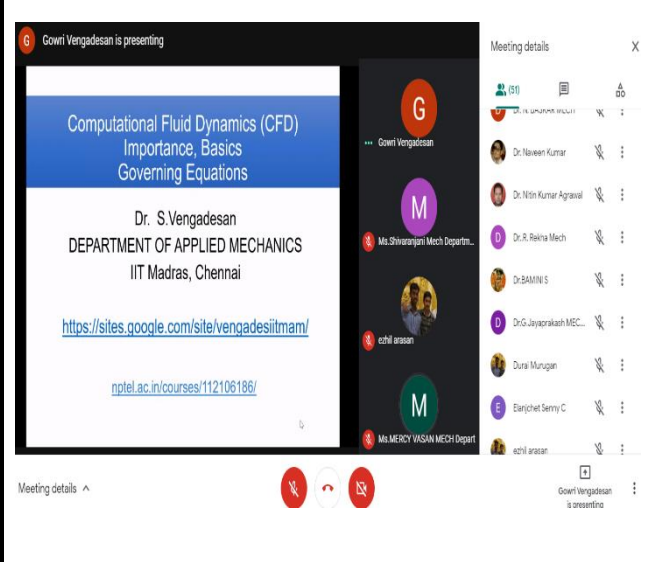
**Coordinator**

**DAY 1: 10/05/2021**

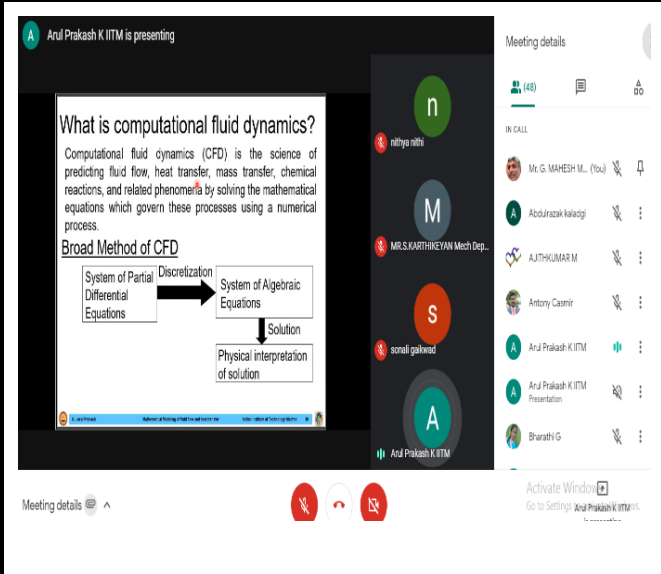
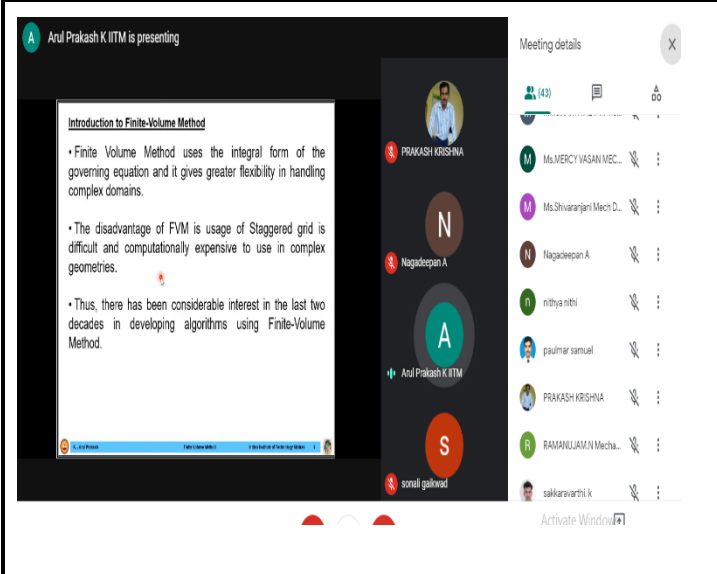
**SESSION 1:**  
**Inauguration & CFD- Basics and Governing Equations-Part I**  
**Prof. Dr. S. Vengadesan,**  
**Professor,**  
**Dept. of Applied Mechanics,**  
**IIT- Madras, Chennai.**



**SESSION 2:**  
**CFD- Basics and Governing Equations-Part II**  
**Prof. Dr. S. Vengadesan,**  
**Professor,**  
**Dept. of Applied Mechanics,**  
**IIT- Madras, Chennai.**



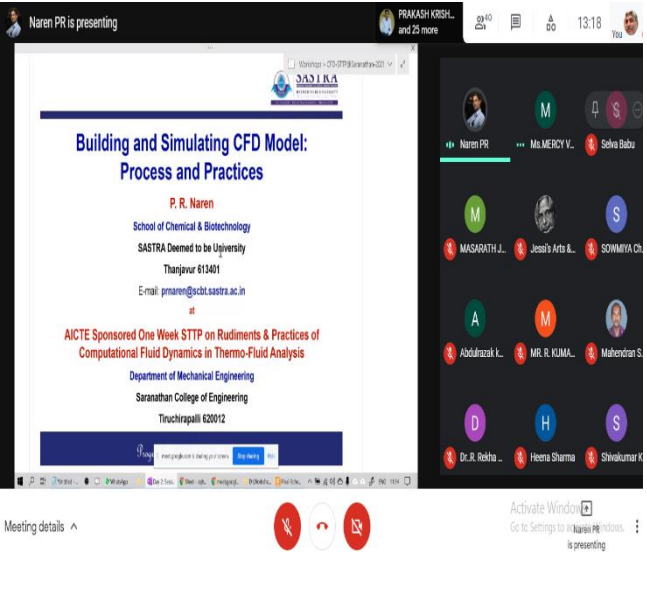
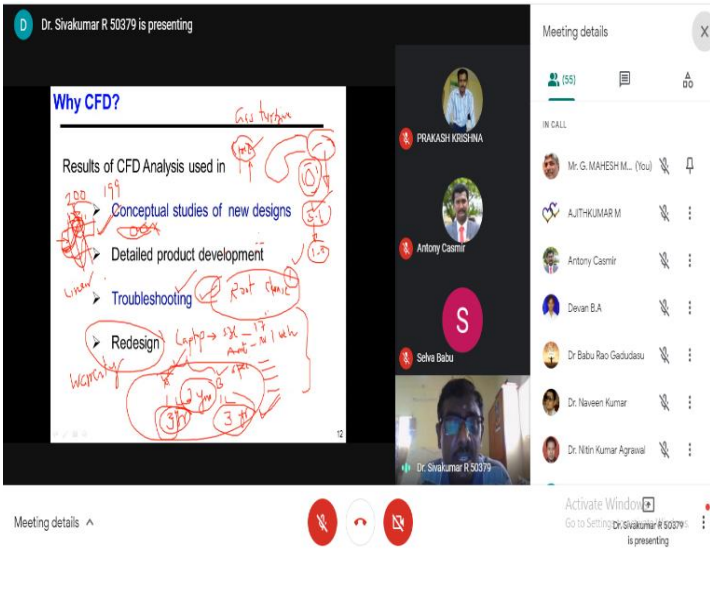
**SESSION 3 & 4:**  
**Finite Volume method**  
**Dr. K. Arul Prakash,**  
**Professor,**  
**Dept.of Applied Mechanics,**  
**IIT- Madras, Chennai**



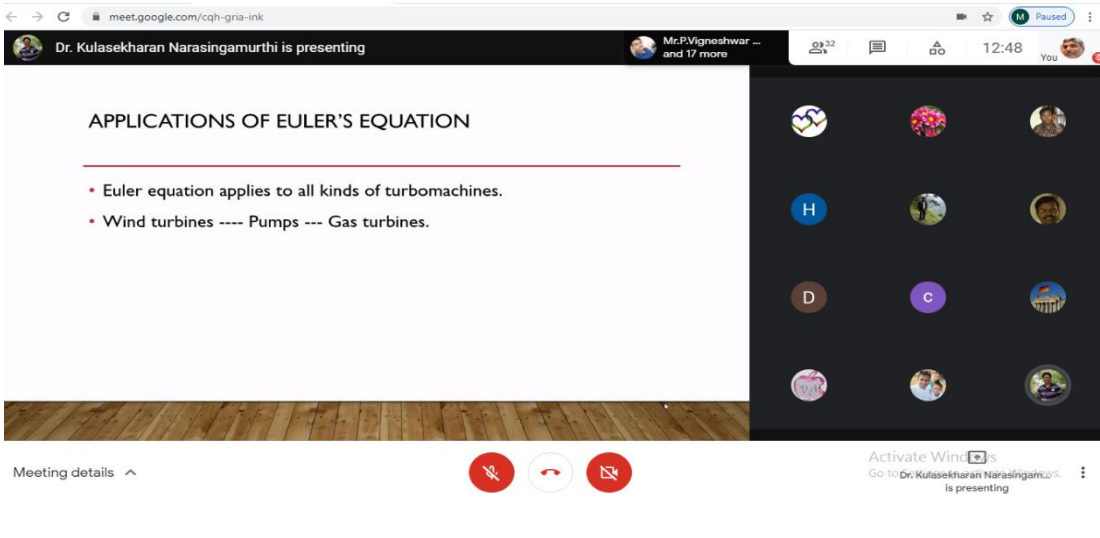
**DAY 2: 11/05/2021**

**SESSION 1:**  
**Applications of CFD – An Overview**  
**Dr.R.Sivakumar**  
Professor & Dean,  
School of Mechanical  
Engineering,  
VIT-Chennai Campus

**SESSION 2:**  
**Building and Simulating CFD Models**  
**Dr.P.R.Naren,**  
Associate Professor,  
Dept. of Chemical  
Engineering,  
SCBT, SASTRA, Tanjore



**SESSION 3 & 4:**  
**1. Design and Development of Compact Heat Exchangers**  
**2. Gas Turbine Cooling System**  
**Dr. Kulasekharan Narasingamurthi,**  
Specialist-Computational Fluid Dynamics, Simulation  
Metier-GEEDES, Valeo India Private Limited, Chennai.



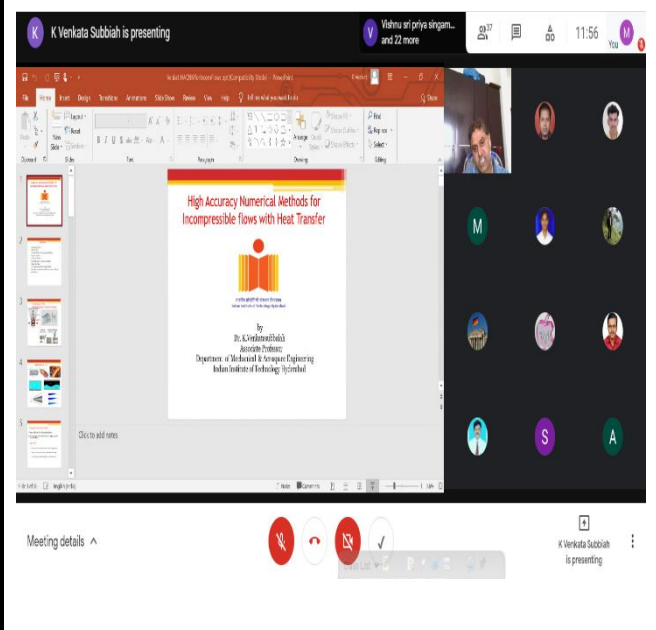
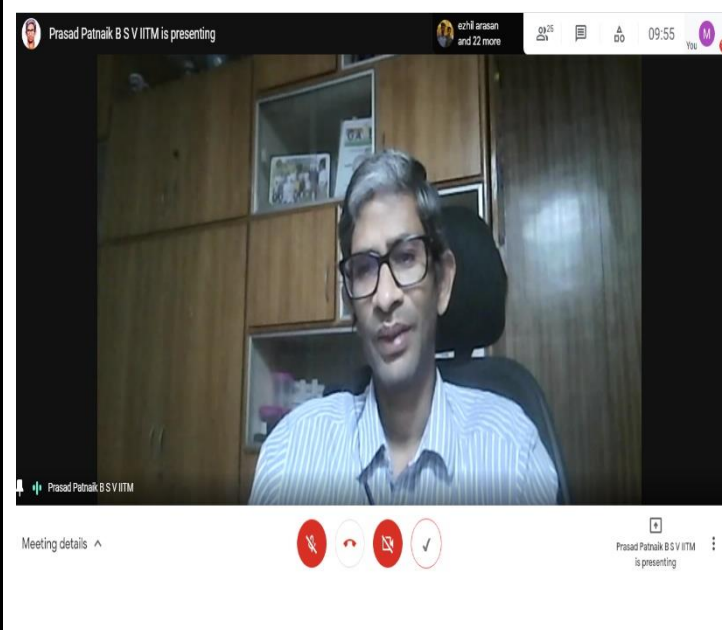
**DAY 3: 12/05/2021**

**SESSION 1:**

**Proposed Topic: Turbulent flows and Modelling**  
**Dr. Prasad Patnaik BSV,**  
**Professor,**  
**Dept of Applied Mechanics,**  
**IIT- Madras, Chennai**

**SESSION 2:**

**Computational Fluid Dynamics (CFD) and Heat transfer**  
**Dr. K. Venkatasubbiah,**  
**Associate Professor,**  
**Department of Mechanical and Aerospace Engineering,**  
**IIT Hyderabad**

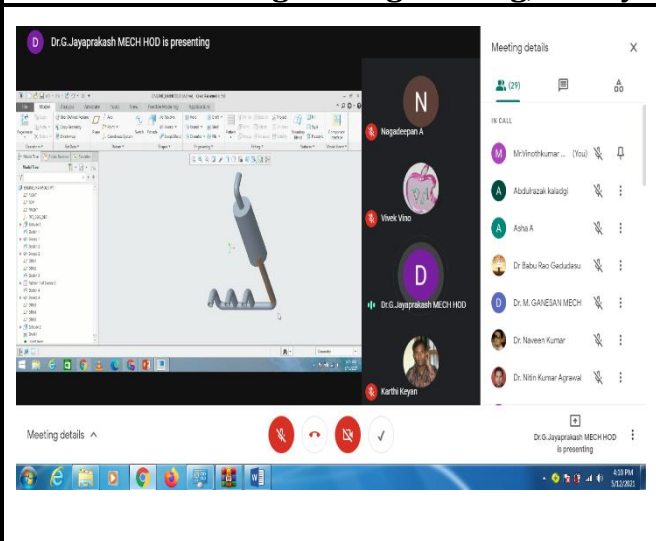
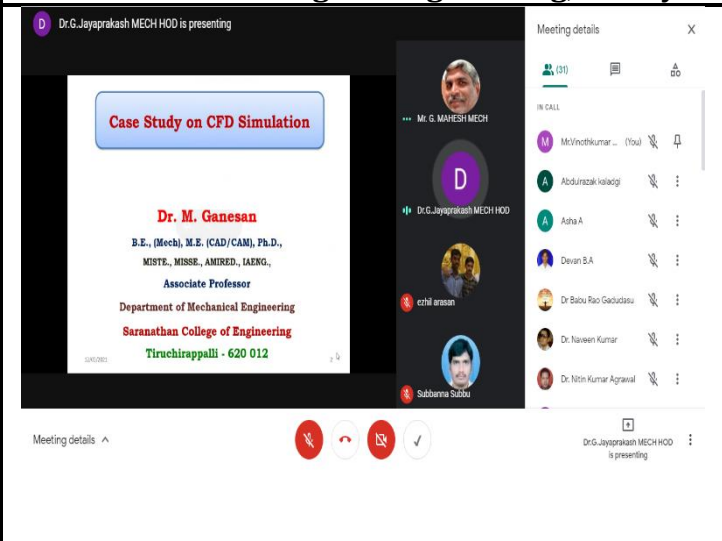


**SESSION 3:**

**Case Study on CFD Simulation**  
**Dr. M. Ganesan,**  
**Associate Professor,**  
**Dept of Mech. Engineering,**  
**Saranathan College of Engineering, Trichy**

**SESSION 4:**

**CFD Application Problems using ANSYS CFX**  
**Dr. G. Jayaprakash,**  
**Professor & Head,**  
**Dept of Mech. Engineering,**  
**Saranathan College of Engineering, Trichy**

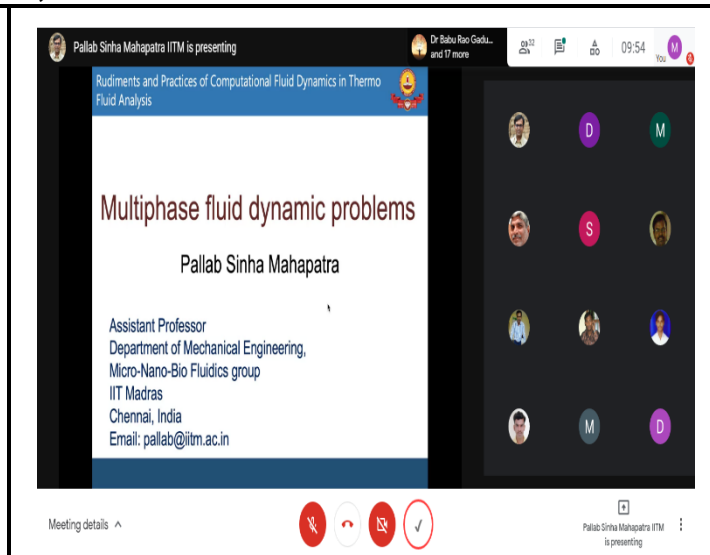
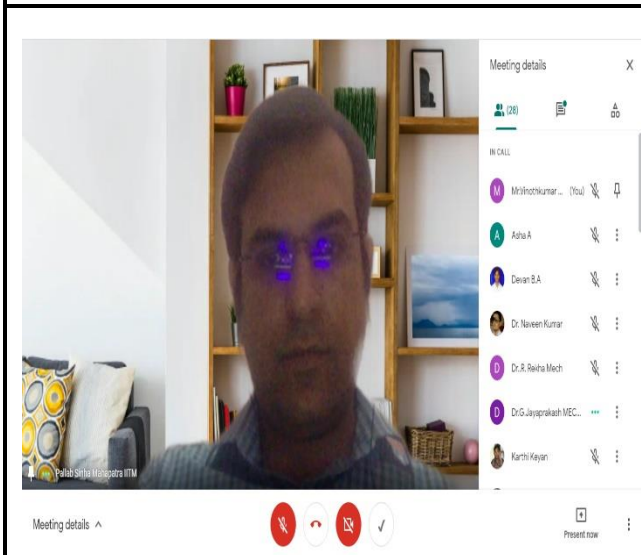


**DAY 4: 13/05/2021**

**SESSION 1&2:**

**Multiphase Flow heat transfer**

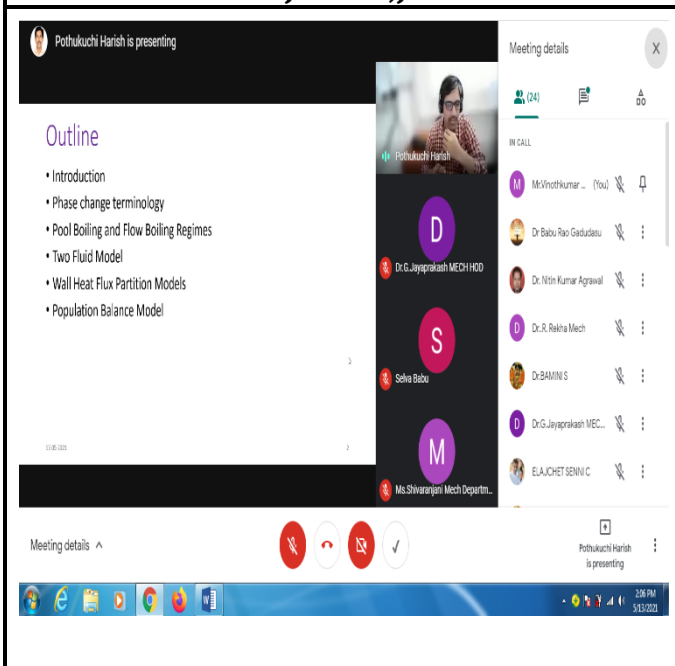
**Dr. Pallab Sinha Mahapatra,**  
Assistant Professor,  
Department of Mechanical Engineering,  
IIT- Madras, Chennai



**SESSION 3:**

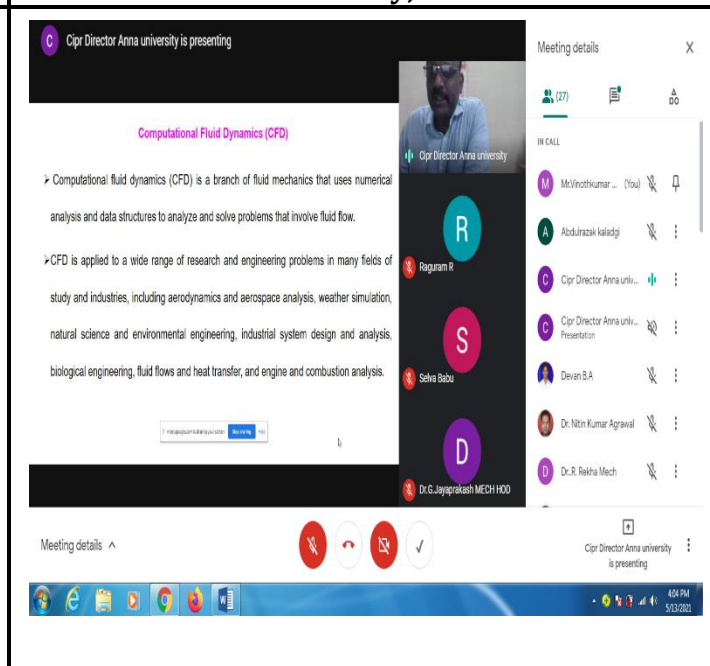
**CFD Modeling of Boiling Heat Transfer**

**Dr.P.Harish,**  
Asst.Professor,  
Dept. of Mechanical Engineering  
IIT Jammu,J&K



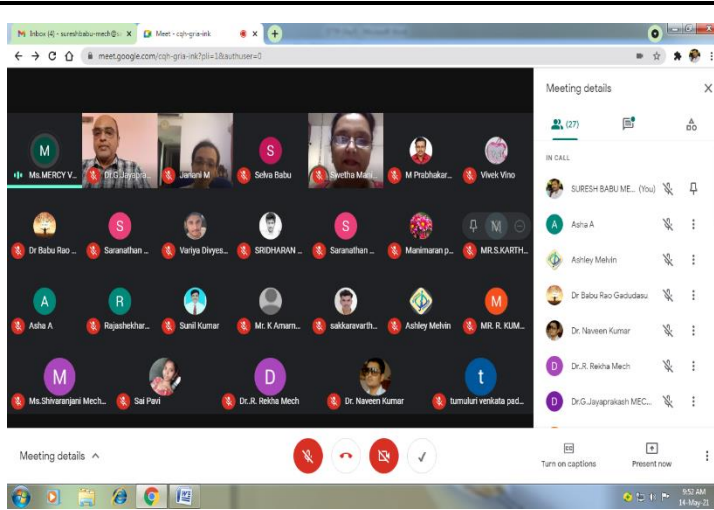
**SESSION 4:**

**Research Patenting**  
**Dr. M. Kantha Babu,**  
Director, CIPR, and Professor,  
Dept. of Manufacturing Engineering, CEG,  
Anna University, Chennai.

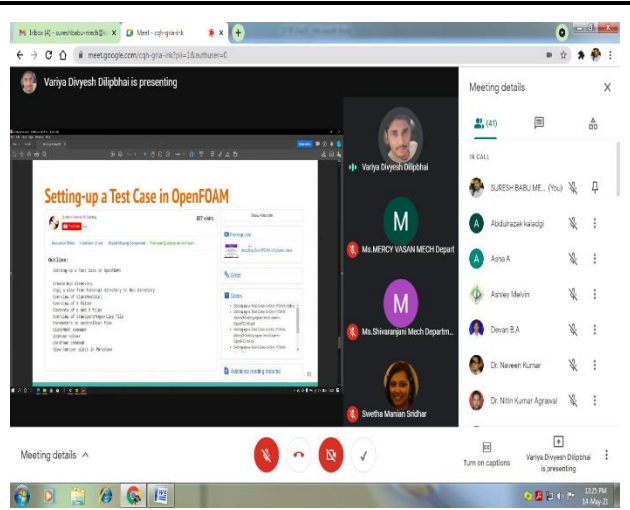


**DAY 5: 14/05/2021**

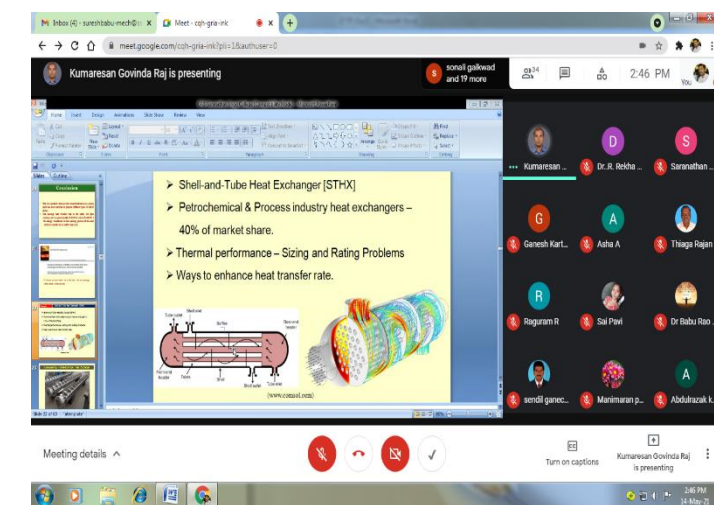
**SESSION 1:  
CFD – Open FOAM  
Prof Janani Srree,  
FOSSEE,  
IIT Bombay**



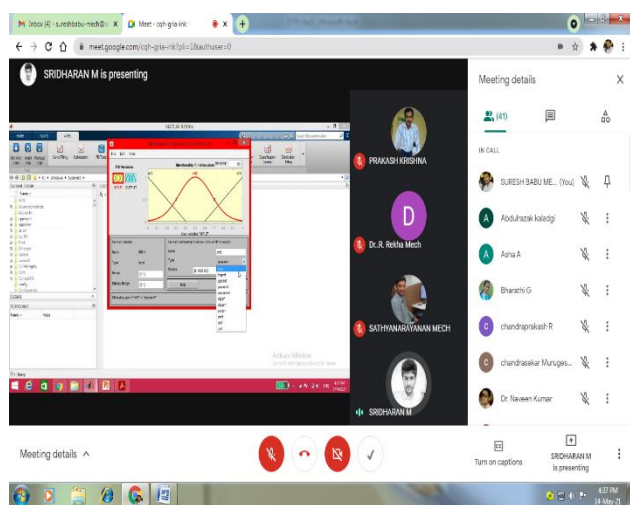
**SESSION 2:  
Software Demo on CFD problems in open  
FOAM  
Mr. Ashley Melvin and Mr. Divyesh Variya,  
CFD Members,  
FOSSEE,  
IIT Bombay.**



**SESSION 3:  
CFD Analysis of Thermal System Components.  
Prof. Dr. G.Kumaresan,  
Associate Professor,  
Institute of Energy Studies,  
CEG,  
Anna University,  
Chennai**



**SESSION 4:  
Applications of Fuzzy Logic Expert  
Systems in the Field of Thermo-Fluidics.  
Dr. M.Sridharan,  
Associate Professor,  
Dept of Mech. Engineering,  
K.Ramakrishnan College of Engineering,  
Trichy**



**DAY 6: 15/05/2021**

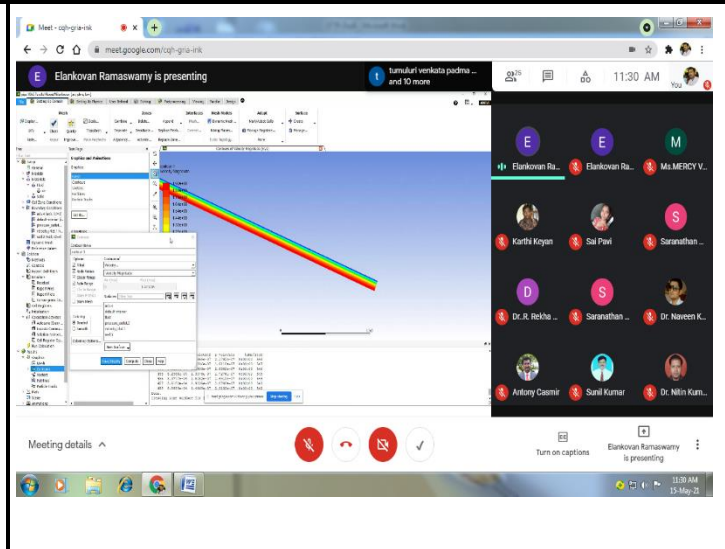
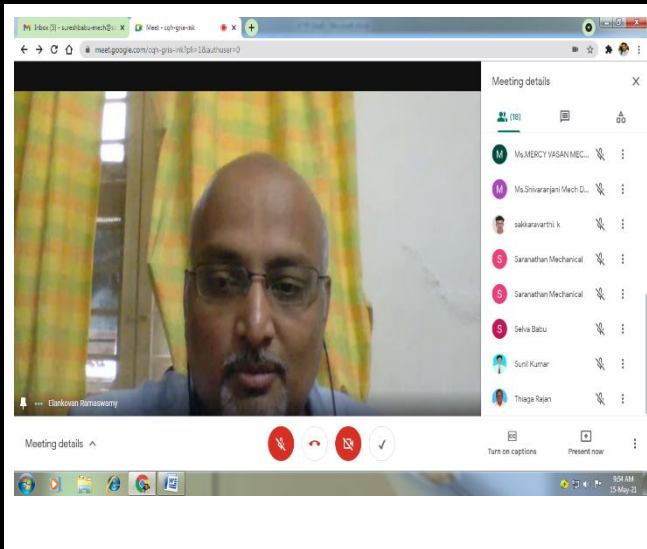
**SESSION 1& 2:**

**Grid Generation and Case studies on applications of CFD**

**Dr.R.Elangovan,**

**DGM (Commercial/Fossil Boilers),**

**B.H.E.L., Trichy**



**SESSION 3:**

**Nano materials and coatings in industrial applications : A tribology perspective**

**Dr. N.L.Parthasarathi,**

**Scientific Officer,**

**Metal Forming and Tribology Section,**

**IGCAR,Kalpakkam.**

**SESSION 4:**

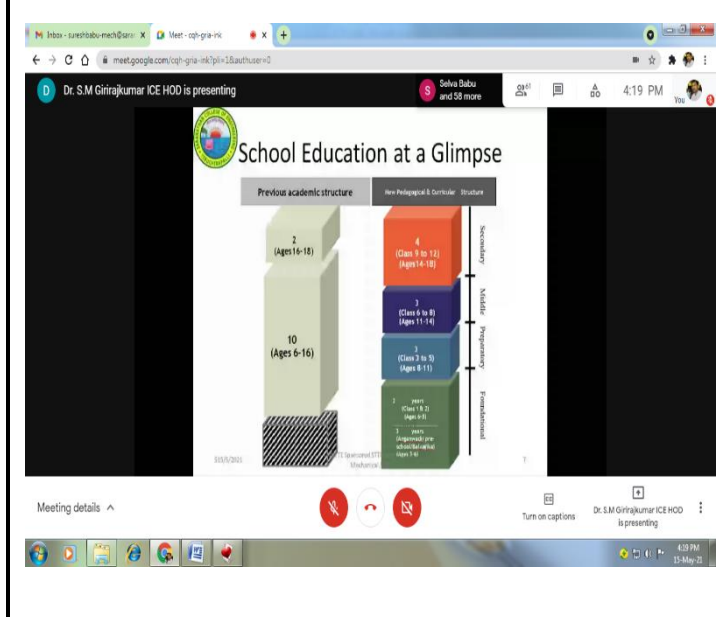
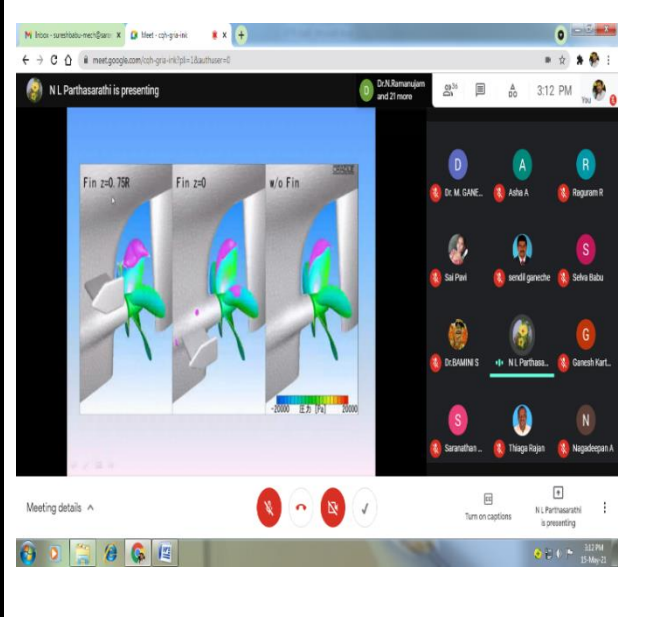
**Talk on National Education Policy (NEP).**

**Dr. S.M.Giriraj Kumar,,**

**Professor & Head,**

**Dept of ICE & Head (T & P),**

**Saranathan College of Engineering, Trichy**



## ABOUT THE COLLEGE

Saranathan College of Engineering was founded in the year 1998 by "VidyaSevaRatnam", "Guru Seva Mani" Auditor Sri. K. Santhanam. The institution was so named in respectful memory of his Guru Prof. Saranathan, the then Principal of National College, Tiruchirappalli. Saranathan College of Engineering is a self-financing college approved by AICTE and affiliated to Anna University, Chennai for the UG courses it offers( Civil, CSE, EEE, ECE, IT, ICE and Mechanical Engineering). All the six (6) eligible UG branches are accredited by NBA, New Delhi. An enviable 'A+' rating by "NAAC" stands testimony to the commitment of the college to impart quality education.

## ABOUT THE DEPARTMENT

The Department of Mechanical Engineering was started in the year 2005. The department offers an undergraduate programme B.E. in Mechanical Engineering and a postgraduate programme M.E. in Thermal Engineering. The department is accredited by NBA, New Delhi, since June 2018. The department is also a recognized research centre under Anna University, Chennai. The department has all of the following: state-of-the-art laboratories, CAD centre with advanced software, a department library, experienced and expert faculty members having doctoral degrees, outstanding research publications in peer reviewed International/National journals. The department's mission is to generate employable mechanical engineering graduates with knowledge, skills and ethics and provide them with the professional and soft skills necessary to lead a successful career and equip them with the confidence necessary to contribute positively to the society by performing in their respective chosen fields of endeavour.

## PROGRAMME EVALUATION COMMITTEE (PEC)

### PATRON:

**Shri. S. Ravindran**  
Secretary

### CHAIRPERSON:

**Dr. D. Valavan**  
Principal

### CO-CHAIRPERSON:

**Dr. G. Jayaprakash**  
Professor & Head, Mechanical Engineering.

### COORDINATOR:

**Dr. N. Baskar**  
Professor, Mechanical Engineering

### PEC MEMBER

**Dr. C. Krishnakumar**  
Professor & Head, Department of Electrical and Electronics Engineering.

### CO-COORDINATORS:

**Dr. A. Mercy Vasan**  
Associate Professor, Mechanical Engineering  
**Dr. R. Rekha**  
Associate Professor, Mechanical Engineering

### CONVENERS:

**Dr. M. R. Anantha Padmanaban**  
Associate Professor, Mechanical Engineering  
**Dr. M. Ganesan**  
Associate Professor, Mechanical Engineering

### ORGANIZERS:

**Dr. G. Mahesh**  
Associate Professor, Mechanical Engineering  
**Mr. R. Suresh Babu**  
Assistant Professor, Mechanical Engineering  
**Mr. S. Sathyanarayanan**  
Assistant Professor, Mechanical Engineering

# AICTE



**Sponsored**

*One-week Short Term Training Program  
on*

***Rudiments and practices of  
Computational Fluid Dynamics  
in Thermo-fluid Analysis***

***Phase I - 10.05.2021-15.05.2021***

***Phase II – 24.05.2021-29.05.2021***



**Organized by**

***Department of Mechanical Engineering  
Accredited by NBA, New Delhi***

**SARANATHAN COLLEGE OF  
ENGINEERING**

***(Approved by AICTE, New Delhi and  
Affiliated to Anna University, Chennai)  
(Accredited by NAAC with A+ Grade)***

[www.saranathan.ac.in](http://www.saranathan.ac.in)

## OBJECTIVES AND CONTEXT

- To provide a comprehensive training to engineers and researchers on application of CFD techniques over a broad range of applications like turbomachinery and multi-phase flows
- To familiarize the basic concepts, methods and mathematical equations controlling practical thermal and fluid flow phenomena
- To correlate theoretical and practical engineering usages of CFD through hands-on –training on various software packages
- To highlight the contemporary research trends in CFD and promote progressive research in product design and development

## RELEVANCE

The short-term training programme is essential in the current scenario to facilitate researchers and engineers to adopt CFD as a standard practice in industry and research. With simulation techniques becoming a vital part of the design process in providing within the time constraints efficient solutions to thermal and fluid system, CFD has started playing a crucial role in product development cycle. The major obstacle, to the evolving of CFD from the stage of being a mere research tool to the stage of being used for real time applications in industries, is the lack of fundamental knowledge and high level of expertise in coding and software usage. This program aims to bridge that gap.

## RESOURCE PERSONS

Experts from IITs, NITs, Anna University, DRDO, IGCAR, Industry, etc.

## EXPECTED OUTCOMES

This program will enable the faculty, practising engineers and researchers

- ✓ To solve fundamental equations relating to fluid flow and heat transfer problems
- ✓ To acquire software computing skills in CFD and interpret results to make design decisions
- ✓ To forecast implications of design changes and optimize a design, based on CFD results, with an aim to create quality product development and to carry out virtual experimentation on complicated prototypes

## TOPICS OF INTEREST

- Fundamental knowledge in theory and concepts of Computational Fluid Dynamics
- Hands on training on modern CFD software tools for solving Thermo-fluid problems
- Industrial visits to understand the significance of CFD applications in solving real time industrial flow problems

## EXPECTED SKILLS AND SUGGESTED FURTHER ACTIONS

- Fundamental knowledge in theory and concepts of Computational Fluid Dynamics
- Industrial visits to understand the significance of CFD applications in solving real time industrial flow problems

## COURSE DURATION

Each STTP is for a duration of 6 days and will be held online through Google meet. For an effective utilization of the program and to become eligible for the e-certificate attendance on all the days is important. Based on their convenience participants can choose to attend any one of the phases of STTP listed.

## REGISTRATION

Registration is based on first come first served basis. Google Meet link will be provided by E-Mail, to the selected participants only.

**NO REGISTRATION FEE.**

Registration Link :

<https://forms.gle/NFq498upV8vgsxVTA>



## CONDUCT OF TEST AND ISSUANCE OF CERTIFICATE

All the participants have to appear for a test at end of the program. E-Certificates will be issued only to those participants who have attended the program on all the days and have qualified in the evaluation test.

## IMPORTANT DATES

Last date of Receipt Application: 04-05-2021  
(Google form)

Intimation to Selected Participants: 05-05-2021  
(Mail)

## ADDRESS FOR CORRESPONDENCE

**Dr.G.Mahesh (+91 8610337854)**

Associate Professor,  
Department of Mechanical Engineering  
Saranathan College of Engineering, Panjappur, Tiruchirappalli,  
Tamil Nadu 620012.

email:saranathanmechdept@gmail.com