RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
NANDYAL-518501, A.P.

Department of Mechanical Engineering

5 Day Value Added Course on "Applications of CFD"

Program Brochure

Rajeev Gandhi Memorial College of Engineering & Technology

(Autonomous)

Approved by AICTE, New Delhi,
Accredited by NAAC with 'A+' Grade, NBA, New Delhi
Affiliated to JNTUA Anantapuramu, Nandyal-518501 Kurnool (Dist.)-A.P., INDIA

5-Day value added course on

Applications of CFD

Date: 22th FEB – 26th FEB, 2021

Organized By

Department of Mechanical Engineering

Course coordinator
Dr. Upendra Rajak

Convenor
Dr. K. Thirupti Reddy

Principal
Dr. T. Jaya Chandra Prasad

THIRUPATHI REDDY
B.E(Mech), M.Tech.,Ph.D,MISTE,ASME
Professor & Head of M.E and SFIMENS
Department of Mechanical Engineering
R.G.M. College of Engg. & Tech., (Autonomous)
NANDYAL 518 501, Kurnool (Dist.), A.P.

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
NANDYAL-518501, A.P.

Department of Mechanical Engineering

5 Day Value Added Course on "*Applications of CFD*"

Program Course Outcomes (COs)

CO-1: To explain the basics of CDF, and fundamentals.

CO-2: To analyze various governing equations of CFD.

CO-3: To analysis on the two dimensional geometry.

CO-4: To discuss different components of machine element and automobiles.

CO-5: To demonstrate different configurations of Mesh and its sizing of Mesh.

CO-6: To introduce the fundamentals of analysis of fluent simulation and post process.

Dr K. THIRUPATHI REDDY
B.E.(Mech.), M.Tech., Ph.D. (IIST), ASME
Professor & Head of M.E and SEIMENS
Department of Mechanical Engineering
R.G.M. College of Engg. & Tech., (Autonomous)
NANDYAL - 518 501, Kurnool (Dist), A.P

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
NANDYAL-518501, A.P.

Department of Mechanical Engineering

5-Day Value Added Course on "*Applications of CFD*"

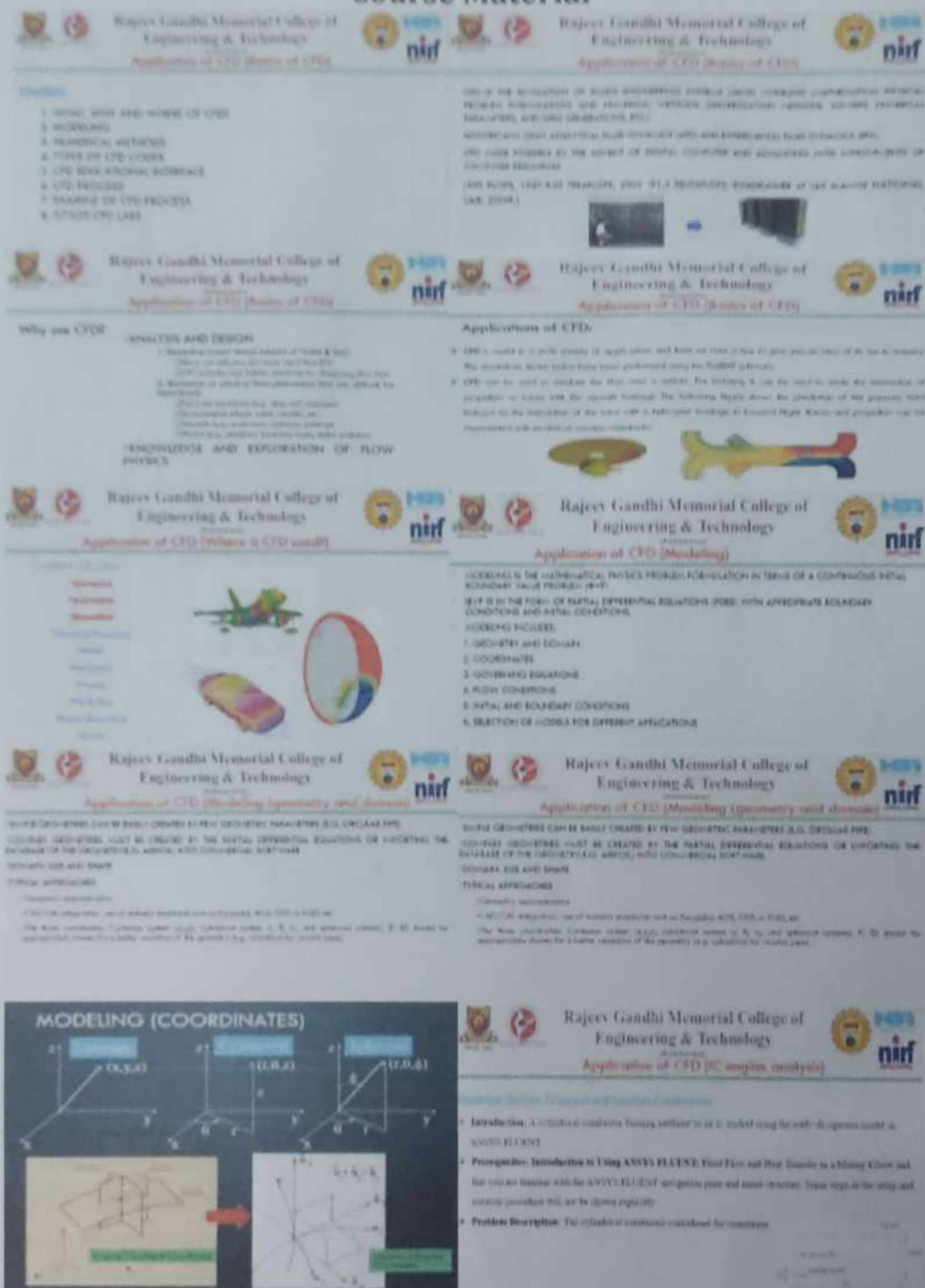
Course Contents

Date	Session	Topic	Resource Person
Monday 22/02/2021	Session-1 (09.00AM – 10.30AM)	Basics of CFD	Dr. Upendra Rajak
	Session-2 (11.00AM – 01.00PM)		
	Session-3 (02.00PM – 03.30PM)	Governing equation	Dr. Upendra Rajak
	Session-4 (04.00PM – 05.00PM)		
Tuesday 23/02/2021	Session-1 (09.00AM – 10.30AM)	Modelling and mesh	Mr. N. Upendra
	Session-2 (11.00AM – 01.00PM)		
	Session-3 (02.00PM – 03.30PM)	Refine mesh and types	Mr. N. Upendra
	Session-4 (04.00PM – 05.00PM)		
Wednesday 24/02/2021	Session-1 (09.00AM – 10.30AM)	IC engine analysis	Dr. Upendra Rajak
	Session-2 (11.00AM – 01.00PM)		
	Session-3 (02.00PM – 03.30PM)	Components of IC engine	Dr. Upendra Rajak
	Session-4 (04.00PM – 05.00PM)		
Thursday 25/02/2021	Session-1 (09.00AM – 10.30AM)	Induction material and properties	Dr. Manoj Panchal
	Session-2 (11.00AM – 01.00PM)		
	Session-3 (02.00PM – 03.30PM)	Statics analysis	Mr. N. Upendra
	Session-4 (04.00PM – 05.00PM)		
Friday 26/02/2021	Session-1 (09.00AM – 10.30AM)	Models and constant analysis	Dr. Manoj Panchal
	Session-2 (11.00AM – 01.00PM)		
	Session-3 (02.00PM – 03.30PM)	Post process analysis	Dr. Upendra Rajak
	Session-4 (04.00PM – 05.00PM)		

Dr K. THIRUPATHI REDDY
B.Ed., M.Tech., Ph.D., MISTE, ASME
Professor & Head of M.E and SEM Engg
Department of Mechanical Engineering
R.G.M. College of Engg. & Tech., (Autonomous)
NANDYAL 518 501, Kurnool (Dist), A.P.

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
NANDYAL-518501, A.P.

Department of Mechanical Engineering
5-Day Value Added Course on "*Applications of CFD*"
Course Material



7

Dr K. THIRUPATHI REDDY
Professor & Head of Mechanical Engineering
R.G.M College of Engg. & Tech., (Autonomous)
NANDYAL - 518 501, Kurnool (Dist), A.P.

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
NANDYAL-518501, A.P.

Department of Mechanical Engineering

5-Day Value Added Course on "*Applications of CFD*"

Course Questionnaire / Hands on session

Name of the Student: _____ **Regd. No.:** _____

Duration: 20 Min **Marks: 20**

1. CFD is the method to calculate heat transfer and fluid flow [ ]
   A). Numerically
   B). Experimentally
   C). Instantaneously
   D). None of above

2. At diastolic pressure, blood flow is [ ]
   A). Turbulent
   B). Mixed
   C). Laminar
   D). Irregular

3. Reynolds number and velocity are [ ]
   A). Directly proportional to each other
   B). Inversely proportional to each other
   C). Equal to each other
   D). None of above

4. In steady flow of a fluid, the acceleration of any fluid particle is [ ]
   A). Constant
   B). Zero
   C). Variable
   D). Non zero

5. I Discretization technique is. [ ]
   A). Finite volume
   B). Finite difference
   C). Finite element
   D). All of these

6. Which of these is related to the flux terms? [ ]

   A) Element connectivity
   B) Node connectivity
   C) Face connectivity
   D) Vertex connectivity

7. In the boundary faces, the normal vector points [ ]

   A) To the owner element
   B) Outside the domain
   C) In the direction of the flux
   B) In the direction opposite to the flux

15

Dr K. THIRUPATHI REDDY
B.E.(Mech.), M.Tech., Ph.D., MISTE
Professor & Head of M.E and SEM I/c
Department of Mechanical Engineering
K.G.M College of Engg. & Tech., (Autonomous)
NANDYAL 518 501, Kurnool (Dist), A.P.

8. Which of these points is shared by the maximum number of elements? [ ]

A) Grid point
B) Cell centre
C) Face centre
D) Vertex

9. Vertex connectivity is important while [ ]
A) Solving the discretized equation
B) Discretizing
C) Post-processing
D) Pre-processing

10. The variation of the size of a cell from an optimal cell size is its [ ]
A) Centroid
B) Structure
C) Orthogonality
D) Skewness

11. The aspect ratio of each element should be [ ]
A) Less than one
B) Equal to one
C) Around one
D) Greater than one

12. In a two-dimensional flow, the algebraic equation of an element relates the element with [ ]
A) Its face centres
B) Its vertices
C) Its faces
D) Its neighbours

13. Which is a pre-processing software? [ ]
A) ANSYS ICEM CFD
B) ANSYS Mechanical
C) ANSYS CFX
D) EnSight

14. Full form of FOAM in OpenFOAM? [ ]
A) Field Optimization and Manipulation
B) Flow Optimization and Manipulation
C) Field Operation and Manipulation
D) Flow Operation and Manipulation

15. When was the first commercial CFD package released? [ ]

a) 1991
b) 1983
c) 1985

Dr K. THIRUPATHI RE
B.E.(Hons), M.Tech., Ph.D.
Professor & Head of M.E and S
Department of Mechanical Engg
R.G.M. College of Engg. & Tech., (Aut
NANDYAL 518 501, Kurnool (Dist.),

d) 1981

16. Which of the following properties will need a plot like this? [ ]

A) Pressure
B) Temperature
C) Velocity
D) Lift

17. Which one is an open source CFD solver tool? [ ]

A) OpenFOAM
B) ANSYS Fluent
C) TGrid
D) Para view

18. The following plot represents flow velocity. Which of these points has the highest acceleration? [ ]

A) 1
B) 2
C) 3
D) 4

19. Is adaptive meshing possible in current CFD packages? If yes, which software offers it? [ ]

A) No
B) Yes, ANSYS Fluent 12.0
C) Yes, PHOENICS
D) Yes, ANSYS 8.0

20. Which of these plots are irrelevant to CFD post-processing? [ ]

A) Contour plots
B) Vector plots
C) xy plots
D) Bar plots

Dr K. THIRUPATHI REDDY
M.E., M.Tech., Ph.D., MISTE
Professor & Head of M.E and SEIA
Department of Mechanical Engineering
R.G.M. College of Engg. & Tech., (Autonomous)
NANDYAL 518 501, Kurnool (Dist.), A.P.

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
NANDYAL-518501, A.P.

Department of Mechanical Engineering

5-Day Value Added Course on "*Applications of CFD*"

Course Questionnaire / Hands on session

Name of the Student: ANIL KUMAR.N Regd. No.: 17091A0306

Duration: 20 Min Marks: 20

1. CFD is the method to calculate heat transfer and fluid flow [A] ✓
   A). Numerically
   B). Experimentally
   C). Instantaneously
   D). None of above

2. At diastolic pressure, blood flow is [B] ✗
   A). Turbulent
   B). Mixed
   C). Laminar
   D). Irregular

3. Reynolds number and velocity are [A] ✓
   A). Directly proportional to each other
   B). Inversely proportional to each other
   C). Equal to each other
   D). None of above

4. In steady flow of a fluid, the acceleration of any fluid particle is [B] ✓
   A). Constant
   B). Zero
   C). Variable
   D). Non zero

5. I Discretization technique is. [D] ✓
   A). Finite volume
   B). Finite difference
   C). Finite element
   D). All of these

6. Which of these is related to the flux terms? [B] ✗

   A) Element connectivity
   B) Node connectivity
   C) Face connectivity
   D) Vertex connectivity

7. In the boundary faces, the normal vector points [B] ✓

   A) To the owner element
   B) Outside the domain
   C) In the direction of the flux
   B) In the direction opposite to the flux

18

Dr K. THIRUPATHI REDDY
Professor & Head of M.E. Mech. Engg. Specialization
Department of Mechanical Engg.
R.G.M College of Engg. & Technology
NANDYAL 518 501, Kurnool (Dist.), A.P.

8. Which of these points is shared by the maximum number of elements? [D]

A) Grid point
B) Cell centre
C) Face centre
D) Vertex

9. Vertex connectivity is important while [C]

A) Solving the discretized equation
B) Discretizing
C) Post-processing
D) Pre-processing

10. The variation of the size of a cell from an optimal cell size is its [D]

A) Centroid
B) Structure
C) Orthogonality
D) Skewness

11. The aspect ratio of each element should be [C]

A) Less than one
B) Equal to one
C) Around one
D) Greater than one

12. In a two-dimensional flow, the algebraic equation of an element relates the element with [A]

A) Its face centres
B) Its vertices
C) Its faces
D) Its neighbours

13. Which is a pre-processing software? [A]

A) ANSYS ICEM CFD
B) ANSYS Mechanical
C) ANSYS CFX
D) EnSight

14. Full form of FOAM in OpenFOAM? [D]

A) Field Optimization and Manipulation
B) Flow Optimization and Manipulation
C) Field Operation and Manipulation
D) Flow Operation and Manipulation

15. When was the first commercial CFD package released? [D]

a) 1991
b) 1983
c) 1985

Dr K. THIRUPATHI REDDY
Professor & Head of M.E Prin.SF
Department of Mechanical Engg.
R.G.M College of Engg. & Tech., (Autonomous)
NANDYAL - 518 501, Kurnool (Dist.), A.P.

d) 1981

16. Which of the following properties will need a plot like this? [C]

A) Pressure
B) Temperature
C) Velocity
D) Lift

17. Which one is an open source CFD solver tool? [A]

A) OpenFOAM
B) ANSYS Fluent
C) TGrid
D) Para view

18. The following plot represents flow velocity. Which of these points has the highest acceleration? [B]

A) 1
B) 2
C) 3
D) 4

19. Is adaptive meshing possible in current CFD packages? If yes, which software offers it? [B]

A) No
B) Yes, ANSYS Fluent 12.0
C) Yes, PHOENICS
D) Yes, ANSYS 8.0

20. Which of these plots are irrelevant to CFD post-processing? [C]

A) Contour plots
B) Vector plots
C) xy plots
D) Bar plots

15/20

Dr K. THIRUPATHI REDDY
Professor & Head of M.E and Sr.M.E.
Department of Mechanical Engg.
R.G.M College of Engg. & Tech., (Autonomous)
NANDYAL 518 501, Kurnool (Dist), A.P.

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
NANDYAL-518501, A.P.

Department of Mechanical Engineering

5-Day Value Added Course on "*Applications of CFD*"

Course Questionnaire / Hands on session

Name of the Student: Imran.C **Regd. No.:** 17091A0327

Duration: 20 Min **Marks: 20**

1. CFD is the method to calculate heat transfer and fluid flow [A] ✓
   A). Numerically
   B). Experimentally
   C). Instantaneously
   D). None of above

2. At diastolic pressure, blood flow is [C] ✓
   A). Turbulent
   B). Mixed
   C). Laminar
   D). Irregular

3. Reynolds number and velocity are [A] ✓
   A). Directly proportional to each other
   B). Inversely proportional to each other
   C). Equal to each other
   D). None of above

4. In steady flow of a fluid, the acceleration of any fluid particle is [B] ✓
   A). Constant
   B). Zero
   C). Variable
   D). Non zero

5. I Discretization technique is. [D] ✓
   A). Finite volume
   B). Finite difference
   C). Finite element
   D). All of these

6. Which of these is related to the flux terms? [A] ✗

   A) Element connectivity
   B) Node connectivity
   C) Face connectivity
   D) Vertex connectivity

7. In the boundary faces, the normal vector points [B] ✓

   A) To the owner element
   B) Outside the domain
   C) In the direction of the flux
   B) In the direction opposite to the flux

21

Dr K. THIRUPATHI REDDY
Professor & Head of M.E and Scientist
Department of Mechanical Engg.
R.G.M College of Engg. & Tech.
NANDYAL 518 501, Kurnool (Dist), A.P.

8. Which of these points is shared by the maximum number of elements? [D]

A) Grid point
B) Cell centre
C) Face centre
D) Vertex

9. Vertex connectivity is important while [A]
A) Solving the discretized equation
B) Discretizing
C) Post-processing
D) Pre-processing

10. The variation of the size of a cell from an optimal cell size is its [D]
A) Centroid
B) Structure
C) Orthogonality
D) Skewness

11. The aspect ratio of each element should be [C]
A) Less than one
B) Equal to one
C) Around one
D) Greater than one

12. In a two-dimensional flow, the algebraic equation of an element relates the element with [D]
A) Its face centres
B) Its vertices
C) Its faces
D) Its neighbours

13. Which is a pre-processing software? [A]
A) ANSYS ICEM CFD
B) ANSYS Mechanical
C) ANSYS CFX
D) EnSight

14. Full form of FOAM in OpenFOAM? [C]
A) Field Optimization and Manipulation
B) Flow Optimization and Manipulation
C) Field Operation and Manipulation
D) Flow Operation and Manipulation

15. When was the first commercial CFD package released? [D]

a) 1991
b) 1983
c) 1985

22

Dr K. THIRUPATHI REDDY
Professor & Head of M.E
Department of Mechanical Engg.
R.G.M College of Engg. & Tech.
NANDYAL 518 501, Kurnool (Dist.)

d) 1981

16. Which of the following properties will need a plot like this? [C]

A) Pressure
B) Temperature
C) Velocity
D) Lift

17. Which one is an open source CFD solver tool? [A]

A) OpenFOAM
B) ANSYS Fluent
C) TGrid
D) Para view

18. The following plot represents flow velocity. Which of these points has the highest acceleration? [A]

A) 1
B) 2
C) 3
D) 4

19. Is adaptive meshing possible in current CFD packages? If yes, which software offers it? [B]

A) No
B) Yes, ANSYS Fluent 12.0
C) Yes, PHOENICS
D) Yes, ANSYS 8.0

20. Which of these plots are irrelevant to CFD post-processing? [D]

A) Contour plots
B) Vector plots
C) xy plots
D) Bar plots

17/20

Dr K. THIRUPATHI REDDY
Professor & Head
Department of Mechanical Engineering
R.G.M College of Engineering & Technology
NANDYAL 518 501

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
NANDYAL-518501, A.P.

Department of Mechanical Engineering

5-Day Value Added Course on "Applications of CFD"

Outcome of the Value-Added Course

Marks Secured

S.No.	Name of the Participant	Regd. No.	Marks Obtained
1.	ABDUL SALAM.S	17091A0301	15
2.	ACHUTA VENU MADHAV.S	17091A0302	17
3.	AFROZ HUSSAIN.G	17091A0303	18
4.	AKSHAY KUMAR REDDY.S	17091A0304	15
5.	ANIL KUMAR.B	17091A0305	12
6.	ANIL KUMAR.N	17091A0306	16
7.	ARUN.Y	17091A0308	18
8.	ASHOK.U	17091A0309	19
9.	BHARGAV.K	17091A0311	17
10.	BHASKAR.K	17091A0312	16
11.	CHINNA POLAIAH.C	17091A0313	17
12.	DASTAGIRI.S	17091A0314	14
13.	DHARANI.Y	17091A0315	13
14.	DINAKAR.K	17091A0316	18
15.	DINESH REDDY.B	17091A0317	16
16.	FAREED GULFAM.S	17091A0318	16
17.	GOWTHAM REDDY.P	17091A0319	14
18.	GURUSWAMY.N	17091A0320	15
19.	HARIKRISHNA.R	17091A0321	11
20.	HARSHA VARDHAN REDDY.D	17091A0322	17
21.	HARSHAVARDHAN REDDY.R	17091A0323	18
22.	HEMANTH KUMAR REDDY.T	17091A0324	19
23.	HEMANTH KUMAR.G	17091A0325	16
24.	IFTAYKHAR HUSSAIN.N	17091A0326	15
25.	IMRAN.S	17091A0327	14
26.	JAGADEESH YADAV.C	17091A0328	15
27.	JAYADERSH.P	17091A0329	16
28.	KESHAVA TEJA.G	17091A0331	19
29.	KRANTHI KUMAR.D	17091A0332	17
30.	KRISHNA PRASAD.M	17091A0333	16
31.	MADHU.M	17091A0334	15
32.	MAHENDRA KUMAR.G	17091A0335	18
33.	MAHENDRA.M	17091A0336	19
34.	MAHESH.S	17091A0337	15
35.	MAHESHBABU.D	17091A0338	17
36.	MALLIKARJUNA.C	17091A0340	12
37.	MANI KANTA.J	17091A0341	14
38.	MANIDEEP KUMAR REDDY.S	17091A0342	13
39.	MANSOOR.S	17091A0345	15
40.	MANUSAIKIRAN REDDY.K	17091A0346	16
41.	NARENDRA.L	17091A0348	17

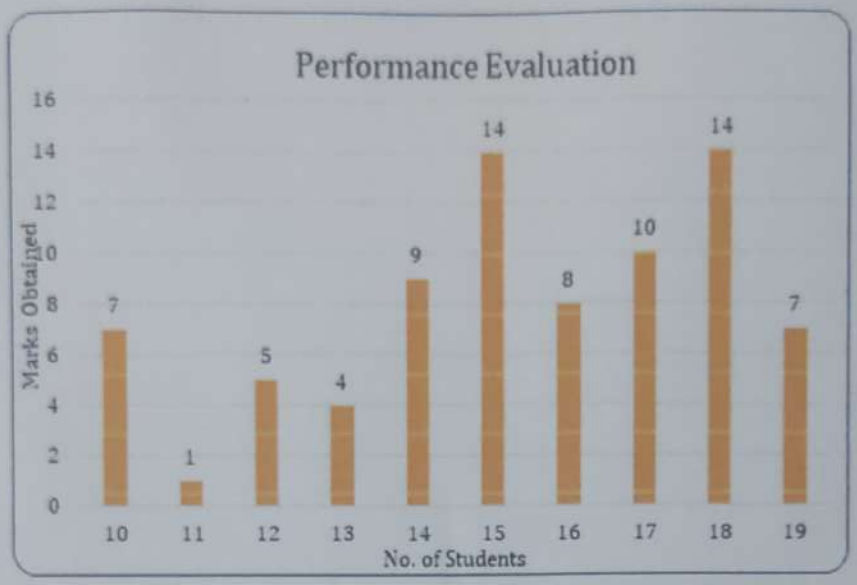
Dr K. THIRUPATHI R...
Professor & Head of M.E and ...
Department of Mechanical ...
N.G.M College of Engg. & Tech., ...
NANDYAL 518 501, Kurnool ...

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
NANDYAL-518501, A.P.

S.No.	Name of the Participant	Regd. No.	Marks Obtained
42.	NAVEEN KUMAR.N	17091A0349	13
43.	NAVEEN KUMAR.T	17091A0350	17
44.	NISHAR.V	17091A0352	16
45.	OAM SAI.P	17091A0353	18
46.	PAVAN KUMAR NAIDU.G	17091A0354	16
47.	PAVANKUMAR REDDY.K	17091A0355	10
48.	PRASANNA KUMAR.Z	17091A0356	19
49.	PRASANTH KUMAR REDDY.P	17091A0357	17
50.	PRASHANTH.J	17091A0358	18
51.	PRAVEEN KUMAR REDDY.C	17091A0359	16
52.	PRAVEEN KUMAR REDDY.J	17091A0360	15
53.	PRAVEEN KUMAR REDDY.NB	17091A0361	17
54.	PREMKUMAR REDDY.B	17091A0362	14
55.	RAJASEKHAR.B	17091A0363	16
56.	RAJU.N	17091A0364	18
57.	RAMACHANDRA.KP	17091A0365	16
58.	RAMESH.P	17091A0367	15
59.	RAVI KALYAN.K	17091A0368	14
60.	RAVINDRA REDDY.N	17091A0369	15
61.	ABHISHEK .R	18095A0301	12
62.	ABRAR AHAA-MED.S	18095A0302	17
63.	ARESH.D	18095A0303	18
64.	ASHOK RAJA.N	18095A0304	19
65.	DEVENDRANATH.G	18095A0305	15
66.	DILEEP KUMAR REDDY.K	18095A0306	15
67.	FAYAZ.A	18095A0307	17
68.	GURUPAVAN.C	18095A0308	15
69.	HARIKRISHNA.K	18095A0309	16
70.	HARISH.U	18095A0310	18
71.	JAGANMOHANACHARI.V	18095A0311	17
72.	JYOSHTNA.A	18095A0312	15
73.	KALYANKUMAR.G	18095A0313	15
74.	KALYAN.M	18095A0314	19
75.	MALLESWARA REDDY.PCR	18095A0315	17
76.	MERINA.N	18095A0316	16
77.	MOHAMMAD SAMEER.S	18095A0317	18
78.	MOAMMAD SOHAIL.S	18095A0318	11
79.	MOULALI.K	18095A0319	13
80.	MUNEERDESAI	18095A0320	14

Dr K. THIRUPATHI RED...
B.E(Mech.), M.Tech., Ph.D, MIS...
Professor & Head of M.E and S...
Department of Mechanical Engg...
R.G.M. College of Engg. & Tech., (Aut...
NANDYAL 518 501, Kurnool (Dist)...

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
NANDYAL-518501, A.P.



Dr K. THIRUPATHI REDDY
B.E(Mech), M.Tech., Ph.D(NIT), MSc
Professor & Head of M.E and SF(NCNS
Department of Mechanical Engineering
R.G.M College of Engg. & Tech., (Autonomous)
NANDYAL 518 501, Kurnool (Dist), A.P.

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
NANDYAL-518501, A.P.

Department of Mechanical Engineering

5-Day Value Added Course on "*Applications of CFD*"

Outcome of the Value-Added Course

After completion of this course students will be able to:

1. Analyze the basics of CDF and applications.
2. Analyze the use of different governing equations in fluent.
3. Generate the geometry in workbench 2D and 3D using coordinate systems.
4. Analyze the mesh and use boundary condition in fluent.
5. Explain the use of different boundary phenomena, control mesh size and refine mesh.
6. Interpret working of different configurations of fluent and performance analysis and post analysis in different cases.

Dr K.THIRUPATHI REDDY
B.E(Mech), M.Tech, Ph.D, MISTE, ASME
Professor & Head of M.E and SEIMENS
Department of Mechanical Engineering
R.G.M College of Engg. & Tech., (Autonomous)
NANDYAL 518 501, Kurnool (Dist), A.P.

Rajeev Gandhi Memorial College of Engineering & Technology

(AUTONOMOUS)

Approved by AICTE, New Delhi,

Accredited by NAAC with 'A+' Grade, NBA, New Delhi

Affiliated to JNTU Anantapur, Nandyal-518501, Kurnool (Dist.)-A.P.

Department of Mechanical Engineering

This is to certify that **Mr. ABDUL SALAM.S (17091A0301)** of **IV-B.Tech, II-sem** has participated in 5-Day Value Added Course on **"Applications of CFD"** organized by the Department of Mechanical Engineering, Rajeev Gandhi Memorial College of Engineering & Technology, Nandyal during **22nd – 26th February, 2021**.

Dr. Upendra Rajak	**Dr. K. Thirupathi Reddy**	**Dr. T. Jaya Chandra Prasad**
Course Co-Ordinator	**Head of the Dept.**	**Principal**

Rajeev Gandhi Memorial College of Engineering & Technology

(AUTONOMOUS)

Approved by AICTE, New Delhi,

Accredited by NAAC with 'A+' Grade, NBA, New Delhi

Affiliated to JNTU Anantapur, Nandyal-518501, Kurnool (Dist.)-A.P.

Department of Mechanical Engineering

This is to certify that **Mr. FAYAZ.A S (18095A0307)** of **IV-B.Tech, II-sem** has participated in 5-Day Value Added Course on **"Applications of CFD"** organized by the Department of Mechanical Engineering, Rajeev Gandhi Memorial College of Engineering & Technology, Nandyal during **22nd – 26th February, 2021.**

Dr. Upendra Rajak	**Dr. K. Thirupathi Reddy**	**Dr. T. Jaya Chandra Prasad**
Course Co-Ordinator	**Head of the Dept.**	**Principal**

RAJEEV GANDHI MEMORIAL COLLEGE OF ENGINEERING & TECHNOLOGY
(AUTONOMOUS)
NANDYAL-518501, A.P.

Department of Mechanical Engineering
5-Day Value Added Course on *"Applications of CFD"*
Value Added Course—Report

Introduction:

The "Applications of CFD" workshop was held at RGMCET in Nandyal from February 22nd to February 26th, 2021. Experts, students, and business people got together at the event to talk about and share the latest developments in the area of Computational Fluid Dynamics. The goal of the meeting was to look at new CFD tools, obstacles, and possibilities. This report is a summary of the most important ideas and conclusions from the workshops.

Overview of CFD Market:

The first part of the training was an outline of how CFD is used right now. The guests talked about how CFD is growing and being used more and more. CFD is a piece of software that lets users study the flow, turbulence, and pressure distribution of liquids and gases, as well as how they move through and interact with structures. It can also be used to predict fluid flow, the movement of mass, chemical processes, and other similar things. CFD simulates the flow of fluids (gases and liquids) with the help of fast computers, numerical methods, and solutions. Simulation is the computer copy of what will happen in the real world. This helps find mistakes in the plan before the product is made. CFD is used in many different fields, like the car, military and defence, electrical and electronics, and energy businesses, to name a few. CFDs are used in the aerospace and defence industries to make fuel systems, engine core sections, aircraft and cabin airflow, weapons, subs, and to test aerodynamics.

Advances in CDF Technology:

The report combines extensive quantitative analysis with exhaustive qualitative analysis, and it ranges from a macro overview of the total market size, industry chain, and market dynamics to micro details of segment markets by type, application, and region. As a result, it provides a holistic view of, as well as a deep insight into the Computational Fluid Dynamics (CFD) market covering all of its essential aspects. In addition, the report combines extensive quantitative analysis with exhaustive qualitative analysis. For the competitive landscape, the report also introduces industry players from the perspective of market share, concentration ratio, etc., and describes the leading companies in detail, so that readers can gain a better understanding of their competitors and the competitive situation. In addition, mergers and acquisitions, emerging market trends, the impact of COVID-19, and regional conflicts will be taken into account.

Computational Fluid Dynamics (CFD) Market Applications covered in this report are:

- **AI CFD**
- **Machine Learning CFD**
- **Trading Algorithms CFD**
- **Aerospace & Defense Industry**
- **Automotive Industry**
- **Electrical and Electronics Industry**

Dr K. THIRUPATHI REDDY
B.E(Mech), M.Tech.,Ph.D,MISTE,ASME
Professor & Head of M.E and SEIMENS
Department of Mechanical Engineering
R.G.M College of Engg. & Tech., (Autonomous)
NANDYAL 518 501, Kurnool (Dist), A.P

- Others.

Autonomous HVAC CFD:

The workshop also emphasised the integration of autonomous and networked CFD features. CFD experts discussed the potential for autonomous driving technologies to increase safety, boost efficiency, and reduce energy consumption. Thermal comfort and indoor air quality are two interdependent metrics that register highly in occupant complaints for the HVAC engineer, and for which the most recent advancements in sensor technology were investigated. Thermal comfort is highly dependent on architecture, enclosures, and interior designs, which influence solar/radiant loading, radiant asymmetry, humidity, draughts, and stratification. The mechanical system types chosen to compensate for their shortcomings have an impact on air velocity, relative humidity, and operating temperature. Enclosure performance contributes to moisture issues, interior coatings for volatile organic compound (VOC) emissions, particulate generation, and occupants as sources of carbon monoxide, microorganisms, and aromas. Poor indoor air quality is associated with numerous adverse health effects, including respiratory maladies, cardiovascular disease, and cancer.

Environmental Impact:

When used appropriately, CFD has the potential to significantly cut down on both the length of time required to bring a product to market as well as the environmental effect that product has. Because of these factors, CFD is an essential component in the process of designing and developing sustainable goods.

Industry Collaboration and Policy Support:

The session came to a close with a panel discussion on the significance of the continuing expansion of CFD requiring support from both industry cooperation and policy. The panellists emphasised the necessity for cooperation between automobile manufacturers and technological businesses, including financing for research and development, incentives, and laws.

Conclusion:

Recent Advances in CFD was the topic of a workshop that offered insightful perspectives into the quickly changing world of CFD. Throughout the conversations, topics like recent developments in energy, battery technology, materials technology, and the significance of charging infrastructure and materials were brought up and discussed. At the occasion, a strong emphasis was placed on the need of ongoing research, cooperation amongst industries, and legislative backing in order to realise the full potential of CFD's future.

Course Co-Ordinator HOD Dr K. THIRUPATHI REDDY IQAC Co-Ordinator Principal.

Professor & Head of M.E and
Department of Mechanical
R.G.M College of Engg. & Tech., (Autonomous)
NANDYAL 518 501, Kurnool (Dist), A.P