GMR Institute of Technology
An Autonomous Institute Affiliated to JNTU-GV

GMRIT Training Tomorrow's Engineers Today

1.3.2(B) Brochure and Course content or syllabus along with course outcome of Value-added courses offered

Department of Mechanical Engineering
Index

S.No.	Name of the value-added courses offered	Page No.
1	CFD Simulations with ANSYS FLUENT for Engineering Applications	1
2	CC & EC Activities II (AR 21 Curriculum)	13

About GMR Institute of Technology

Welcome to GMR Institute of Technology (GMRIT). Established in the year 1997 by GMR Varalakshmi Foundation – the corporate social responsibility arm of GMR Group – GMRIT offers aspiring engineers high quality technical education. The Institute encourages collaborative learning between industry and academia as a means of reinforcing its curriculum with practical and real world experiences. It is this emphasis on a well-rounded education that makes GMRIT a preferred institute among engineering colleges in India.

ANSYS:

Ansys Fluent is a leading computational fluid dynamics (CFD) software used for simulating fluid flow, heat transfer, and chemical reactions in complex systems. Renowned for its accuracy and versatility, it supports a wide range of industries, enabling engineers to optimize designs, improve efficiency, and solve intricate fluid-related challenges.

Topics to be covered:

- Introduction to CFD
- CFD Workflow and Best Practice
- Mesh Generation and Quality
- Geometry Preparation for CFD Simulations
- Turbulence Models in ANSYS FLUENT
- Heat Transfer Modelling

Target Audience

Students of 3rd and 4th year B.Tech. Mechanical Engineering.

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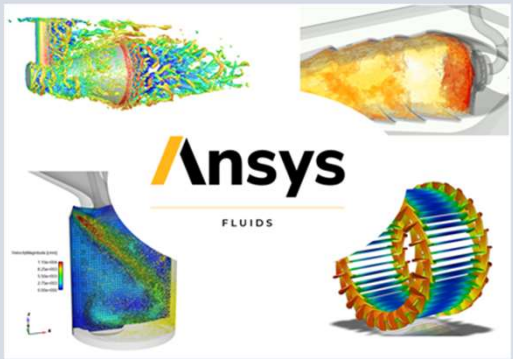
Value added Programme on CFD Simulations with ANSYS FLUENT for Engineering Application

02nd Sept. 2024 to
15th Nov. 2024

Organized by Department of Mechanical Engineering

Co-ordinator

Dr. Pankaj Kumar



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DEPARTMENT OF MECHANICAL ENGINEERING

CIRCULAR

Dt.29.08.2024

We are pleased to announce a 30-hour value add-on course on "CFD Simulations with ANSYS FLUENT for Engineering Application" for 3nd and 4th year Mechanical Engineering students. The course will commence on 4th September 2024.

Interested students are invited to register for the course by providing their names on or before 4 Sept. The registration link will be circulated in the respective class WhatsApp group (https://forms.gle/t8sShxsMMfXjsLG59)

Course Details:

Title: CFD Simulations with ANSYS FLUENT for Engineering Application
Duration: 30 Hours
Start Date:
Venue: CAD Lab
Participants are required to bring their own laptops.
The course will be conducted twice a week, with each session lasting 2 hours.
Days of the week will be decided based on the availability of participants.

Benefits of the Course:

Gain a foundational understanding of ANSYS Software.
Acquire hands-on experience through practical exercises and projects.
Enhance your problem-solving skills in engineering applications.
Develop skills relevant to both academic and industry requirements.

29/8/24
HOD-MECH

3rd Year A Section – Pavi

3rd Year B Section – D

3rd Year C Section – P

4th Year A Section – G

4th Year C Section – R

HANDS-ON TRAINING ON CFD SIMULATIONS WITH ANSYS FLUENT FOR ENGINEERING APPLICATIONS

ANSYS Basics:

Introduction to Computational Fluid Dynamics (CFD). Overview of CFD and its applications in engineering, basic principles of fluid dynamics, ANSYS FLUENT software Installation and user interface walkthrough, steps in a typical CFD workflow, practices for CFD simulations, techniques for generating high-quality meshes

Geometry Preparation for CFD Simulations:

Preparing and importing geometry in ANSYS FLUENT, common issues and solutions in geometry preparation, types of boundary conditions in CFD, setting initial conditions for simulations

Governing Equations of Fluid Flow:

In ANSYS Fluent, fluid flow problems are governed by the Navier-Stokes equations, which consist of the continuity equation for mass conservation, the momentum equation for Newton's second law, and the energy equation for heat transfer. These equations are solved numerically to simulate fluid behaviour in complex geometries and conditions.

Turbulence Models in ANSYS FLUENT:

In ANSYS Fluent, turbulence models like k-ε, k-ω, and Reynolds Stress Model (RSM) are used to simulate turbulent flows. These models help predict the effects of turbulence on fluid behaviour, enhancing the accuracy of simulations in complex, real-world scenarios.

Steady vs. Transient Simulations:

Steady simulations in ANSYS Fluent assume constant flow conditions over time, while transient simulations capture time-dependent changes in flow behaviour, allowing for the analysis of unsteady phenomena like pulsating flows or oscillating forces.

Heat Transfer Modelling:

Heat transfer modelling in ANSYS Fluent encompasses conduction, convection, and radiation. It allows for detailed simulation of thermal interactions within fluids and between fluids and solid surfaces. This modelling helps engineers understand temperature distributions, heat transfer rates, and thermal performance, enabling the optimization of designs for efficient thermal management in applications such as electronics cooling, HVAC, and industrial processes.

Course Schedule

Total Hours: 30

Value -Added Course Starts from: 02-09-2024

Sl. No.	Date	Topics to be covered
1.	02-09-24	Introduction to Computational Fluid Dynamics (CFD)
2.	07-09-24	Overview of ANSYS FLUENT Software
3.	09-09-24	CFD Workflow and Best Practices
4.	16-09-24	Mesh Generation and Quality
5.	23-09-24	Geometry Preparation for CFD Simulations
6.	30-09-24	Boundary Conditions and Initial Conditions
7.	01-10-24	Governing Equations of Fluid Flow
8.	07-10-24	Turbulence Models in ANSYS FLUENT
9.	12-10-24	Steady vs. Transient Simulations
10.	14-10-24	Heat Transfer Modelling
11.	21-10-24	Multiphase Flow Simulations
12.	28-10-24	Combustion Modelling
13.	04-11-24	Aeroacoustics and Noise Prediction
14.	07-11-24	CFD for Aerodynamics
15.	15-11-24	CFD in HVAC Systems

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Students register for value-added course on CFD Simulations with ANSYS

JNTU Number	Name of Students
23345A0335	N Nagaprasad
23345a0345	Kotilingala sai Surya
22345a0301	M.Yuvaraj
22345A0331	Kanithi bhaskara rao
22345A0322	Sivaraj Mavuri
21341A03B8	Routhu Siva
21341A0369	Lopinti Ajay kumar
21341A03B2	Pydi Anandarao
21341A0384	Munukola Vamsi Krishna
23345A0338	A. Bhargav
22345A0338	Peerukatla Pavan
21341a03d9	V.Meghana
23345a0333	Sai Sivani Neelapu
21341A0378	MODALAVALASA RATNA TEJA
22345a0330	Varri Gopisanth
22341A03D3	S.sai
22345A0315	PATHIVADA DURGAPRASAD
21341A03E1	VIVEKANANDA
21341A03A3	P.Gowthami
22345A0337	Varanasi Sai
23345A0339	Gurujapu lakshmi narayana
22341A0343	Ippili Harish
20341A0379	K.Vivek
22345A0304	B.VAMSI
21341A0303	A.Manikanta
22345a0310	D venkatesh
21341A03C3	Satya Sai Sanka
21341a03e2	Vysyaraju prudhvi Raj
22341a0355	K.Harshavardhan
22341A03F8	Yanda Jairam
22341A0330	Ganagalla Appalaraju
22341A0350	Kancharla Madhava
21341A03B9	Routhu Sivakumar
22345A0327	voonna.jagadeesh kumar
22345A0334	YELURI DEVI
21341A0356	KETIREDDY GOWTHAM KUMAR
21341A0370	MACHARLA VENKATA SURYA TEJA
21341A03b0	Potnuru varun
21341a0352	Karaka Abhishek
21341A0365	Leelakumari Koyyana
21341a03b4	R.JITHENDRA

Coordinator Signature

HoD-MECH

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GMR INSTITUTE OF TECHNOLOGY

Department of Mechanical Engineering

Value Added Course

JNTU Number	Name of Students	02-09-24	07-09-24	09-09-24	16-09-24	23-09-24	30-09-24	01-10-24	07-10-24	12-10-24	14-10-24	21-10-24	28-10-24	04-10-24	07-11-24	15-11-24
23345A0335	N Nagaprasad	1	2	3	A	4	5	6	7	8	A	9	10	11	12	13
23345a0345	Kotilingala sai Surya	1	2	3	4	5	A	6	7	8	9	10	11	12	13	14
22345a0301	M.Yuvaraj	1	2	3	4	5	6	A	7	8	9	10	11	12	13	14
22345A0331	Kanithi bhaskara rao	1	2	3	4	A	5	6	7	8	9	10	11	12	13	14
22345A0322	Sivaraj Mavuri	1	2	3	4	5	6	7	8	9	10	A	11	12	A	13
21341A03B8	Routhu Siva	1	2	A	3	4	5	6	7	8	9	10	11	12	13	14
21341A0369	Lopinti Ajay kumar	1	2	3	4	5	6	7	A	8	9	10	11	12	13	14
21341A03B2	Pydi Anandarao	A	1	2	3	4	5	A	6	7	8	9	10	11	12	13
21341A0384	Munukola Vamsi Krishna	1	2	3	4	5	A	6	7	8	9	10	11	12	13	A
23345A0338	A. Bhargav	1	2	3	4	5	6	7	8	9	10	11	A	12	13	14
22345A0338	Peerukatla Pavan	1	2	3	4	5	6	7	8	9	10	11	12	A	13	14
21341a03d9	V.Meghana	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
23345a0333	Sai Sivani Neelapu	1	A	2	3	4	5	6	7	8	9	10	11	12	13	14
21341A0378	MODALAVALASA RATNA TEJA	A	1	2	3	4	5	6	7	8	9	10	11	12	13	14
22345a0330	Varri Gopisanth	1	2	3	4	5	A	6	7	8	9	10	11	12	13	14
22341A03D3	S.sai	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
22345A0315	PATHIVADA DURGAPRASAD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	A
21341A03E1	VIVEKANANDA	1	2	3	4	5	6	7	A	8	9	10	11	12	13	14
21341A03A3	P.Gowthami	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

ITU Number	Name of Students	02-09-24	04-09-24	09-09-24	16-09-24	23-09-24	30-09-24	01-10-24	07-10-24	12-10-24	14-10-24	21-10-24	28-10-24	04-10-24	09-11-24	15-11-24
345A0337	Varanasi Sai	A	1	2	3	4	5	6	7	8	9	10	11	12	13	14
:345A0339	Gurujapu lakshmi narayana	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
:341A0343	Ippili Harish	1	2	3	4	5	6	7	A	8	9	10	11	12	13	14
)341A0379	K.Vivek	1	2	A	3	4	5	6	7	8	9	10	11	A	12	13
2345A0304	B.VAMSI	1	2	3	4	5	A	6	7	8	9	10	11	12	13	14
1341A0303	A.Manikanta	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
:2345a0310	D venkatesh	1	A	2	3	4	5	6	7	8	9	10	11	12	13	14
:1341A03C3	Satya Sai Sanka	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
21341a03e2	Vysyaraju prudhvi Raj	1	2	3	4	5	6	7	8	A	9	10	11	12	13	14
22341a0355	K.Harshavardhan	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
22341A03F8	Yanda Jairam	1	2	3	4	5	6	A	7	8	9	10	11	12	13	14
22341A0330	Ganagalla Appalaraju	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
22341A0350	Kancharla Madhava	1	2	3	4	5	6	7	8	9	10	A	11	12	13	14
21341A03B9	Routhu Sivakumar	A	1	2	3	4	5	6	7	8	9	10	11	12	13	14
22345A0327	voonna.jagadeesh kumar	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
22345A0334	YELURI DEVI	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
21341A0356	KETIREDDY GOWTHAM KUMAR	1	2	3	4	5	6	A	7	8	9	10	11	12	13	14
21341A0370	MACHARLA VENKATA SURYA TEJA	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
21341A03b0	Potnuru varun	1	2	3	4	5	6	7	8	9	10	11	12	A	13	14
21341a0352	Karaka Abhishek	1	2	3	4	A	5	6	7	8	9	10	11	12	13	14
21341A0365	Leelakumari Koyyana	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
21341a03b4	R.JITHENDRA	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

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FEEDBACK Form
CFD Simulations with ANSYS FLUENT for Engineering Applications

1. Was the course content aligned with engineering applications and industry needs?

1	2	3 ✓	4	5

2. Did it cover relevant CFD concepts and simulations effectively?

1	2	3	4 ✓	5

3. Were the simulation exercises in Ansys Fluent engaging and useful?

1	2	3 ✓	4	5

4. Was the instructor knowledgeable about CFD principles and software tools?

1	2	3	4	5

5. Were explanations clear, and were queries addressed effectively?

1	2	3	4 ✓	5

6. Were lecture notes, simulation files, and reference materials useful?

1	2	3 ✓	4	5

7. Was the content structured for easy learning and future reference?

1	2	3	4	5 ✓

8. Were case studies or industrial applications discussed effectively?

1	2	3	4	5 ✓

9. Was the course duration adequate for the topics covered?

1	2	3	4	5 ✓

10. How would you rate your overall learning experience in this course?

1	2	3	4 ✓	5

M. Ratna Teja
Student's Signature

FEEDBACK Form
CFD Simulations with ANSYS FLUENT for Engineering Applications

1. Was the course content aligned with engineering applications and industry needs?

[1] [2] [3] [4] [5]✓

2. Did it cover relevant CFD concepts and simulations effectively?

[1] [2] [3] [4] [5]✓

3. Were the simulation exercises in Ansys Fluent engaging and useful?

[1] [2] [3] [4] [5]✓

4. Was the instructor knowledgeable about CFD principles and software tools?

[1] [2] [3]✓ [4] [5]

5. Were explanations clear, and were queries addressed effectively?

[1] [2] [3] [4]✓ [5]

6. Were lecture notes, simulation files, and reference materials useful?

[1] [2] [3] [4]✓ [5]

7. Was the content structured for easy learning and future reference?

[1] [2] [3]✓ [4] [5]

8. Were case studies or industrial applications discussed effectively?

[1] [2] [3] [4] [5]✓

9. Was the course duration adequate for the topics covered?

[1] [2] [3] [4]✓ [5]

10. How would you rate your overall learning experience in this course?

[1] [2] [3]✓ [4] [5]✓

M. Sivaraj
Student's Signature

FEEDBACK Form

CFD Simulations with ANSYS FLUENT for Engineering Applications

1. Was the course content aligned with engineering applications and industry needs?

   1 2 3✓ 4 5

2. Did it cover relevant CFD concepts and simulations effectively?

   1 2 3✓ 4 5

3. Were the simulation exercises in Ansys Fluent engaging and useful?

   1 2 3 4✓ 5

4. Was the instructor knowledgeable about CFD principles and software tools?

   1 2 3 4✓ 5

5. Were explanations clear, and were queries addressed effectively?

   1 2 3✓ 4 5

6. Were lecture notes, simulation files, and reference materials useful?

   1 2 3 4✓ 5

7. Was the content structured for easy learning and future reference?

   1 2 3✓ 4 5

8. Were case studies or industrial applications discussed effectively?

   1 2 3 4✓ 5

9. Was the course duration adequate for the topics covered?

   1 2 3 4✓ 5

10. How would you rate your overall learning experience in this course?

    1 2 3 4✓ 5

L. Ajay K

Student's Signature

FEEDBACK Form

CFD Simulations with ANSYS FLUENT for Engineering Applications

1. Was the course content aligned with engineering applications and industry needs?

   [1] [2] [3] [4✓] [5]

2. Did it cover relevant CFD concepts and simulations effectively?

   [1] [2] [3] [4✓] [5]

3. Were the simulation exercises in Ansys Fluent engaging and useful?

   [1] [2] [3] [4] [5]

4. Was the instructor knowledgeable about CFD principles and software tools?

   [1] [2] [3] [4✓] [5]

5. Were explanations clear, and were queries addressed effectively?

   [1] [2] [3] [4✓] [5]

6. Were lecture notes, simulation files, and reference materials useful?

   [1] [2] [3✓] [4] [5]

7. Was the content structured for easy learning and future reference?

   [1] [2] [3] [4✓] [5]

8. Were case studies or industrial applications discussed effectively?

   [1] [2] [3✓] [4] [5]

9. Was the course duration adequate for the topics covered?

   [1] [2] [3] [4] [5✓]

10. How would you rate your overall learning experience in this course?

    [1] [2] [3] [4✓] [5]

K. Leela Kumari
Student's Signature

FEEDBACK Form
CFD Simulations with ANSYS FLUENT for Engineering Applications

1. Was the course content aligned with engineering applications and industry needs?

[1] [2] [3] [4] ✓ [5]

2. Did it cover relevant CFD concepts and simulations effectively?

[1] [2] [3] [4] ✓ [5]

3. Were the simulation exercises in Ansys Fluent engaging and useful?

[1] [2] [3] [4] [5]

4. Was the instructor knowledgeable about CFD principles and software tools?

[1] [2] [3] ✓ [4] [5]

5. Were explanations clear, and were queries addressed effectively?

[1] [2] [3] [4] ✓ [5]

6. Were lecture notes, simulation files, and reference materials useful?

[1] [2] [3] [4] ✓ [5]

7. Was the content structured for easy learning and future reference?

[1] [2] [3] ✓ [4] [5]

8. Were case studies or industrial applications discussed effectively?

[1] [2] [3] [4] [5] ✓

9. Was the course duration adequate for the topics covered?

[1] [2] [3] [4] ✓ [5]

10. How would you rate your overall learning experience in this course?

[1] [2] [3] [4] ✓ [5]

M. V. Suryateja

Student's Signature

Department of Mechanical Engineering

Minimum Credits to be Earned: 160 (for Regular Students)
127 (for Lateral Entry Students)

No.	Course Code	Course	Pos	Contact Hours			
				L	T	P	C
First Semester							
1	21HSX01	Communicative English	1,9,10,11,12	2	-	-	2
2	21MAX01	Engineering Mathematics I	1,2,3,4,12	3	-	-	3
3	21PYX01/ 21CYX01	Engineering Physics / Engineering Chemistry	1,2,7,10,12 / 1,2,6,7,12	3/3	-	-	3/3
4	21BEX01/ 21BEX06	Basics of Engineering / IT Workshop	1,2,3,6,7,9,12/ 1,5,6,9,12	3/ -	-	-/ 3	3/1.5
5	21BEX02	Problem Solving and Programming Skills	1,2,3,5,10,12	3	-	-	3
6	21BEX03	Problem Solving and Programming Skills Lab	1,2,3,4,5,10,12	-	-	3	1.5
7	21BEX04/ 21BEX05	Engineering Drawing / Engineering Workshop	1,2,3,4,5,10,12/ 1,2,3,9,10,12	-	-	3/3	1.5/1.5
8	21PYX02/ 21CYX02	Engineering Physics Lab / Engineering Chemistry Lab	1,2,3,4,9,11/ 1,6,7,9,12	-	-	3/3	1.5/1.5
9	21HSX02	Communicative English Lab	1,9,10,11,12	-	-	3/-	1.5/-
			Total	**14/11**	**-**	**12/12**	**20/17**
Second Semester							
1		Language Elective	1,9,10,11,12	2	-	-	2
2	21MAX02	Engineering Mathematics II	1,2,3,4,12	3	-	-	3
3	21CYX01/ 21PYX01	Engineering Chemistry / Engineering Physics	1,2,6,7,12/ 1,2,7,10,12	3/3	-	-	3/3
4	21BEX01/ 21BEX06	Basics of Engineering / IT Workshop	1,2,3,6,7,9,11,12/ 1,5,6,9,12	-/3	-	3/-	1.5/3
5	21BEX07	Python Programming	1,2,3,5,12	3	-	-	3
6	21BEX08	Python Programming Lab	1,2,3,4,5,12	-	-	3	1.5
7	21BEX05/ 21BEX04	Engineering Workshop / Engineering Drawing	1,2,3,9,10,12/ 1,2,3,4,5,10,12	-	-	3/3	1.5/1.5
8	21CYX02/ 21PYX02	Engineering Chemistry Lab / Engineering Physics Lab	1,6,7,9,12/ 1,2,3,4,9,11	-	-	3/3	1.5/1.5
9	21HSX02	Communicative English Lab	1,9,10,11,12	-	-	-/3	-/1.5
			Total	**11/14**	**-**	**12/12**	**17/20**
Third Semester							
1	21ME301	Engineering Materials and Manufacturing Technology	1,2,9,10,12,PSO_2	3	-	2	4
2	21ME302	Computer Aided Machine Drawing	1,2,3,5,10,12,PSO1	3	-	2	4
3	21ME303	Engineering Mechanics	1,2,3,10,12,PSO1	3	-	-	3
4	21ME304	Fluid Mechanics and Hydraulic Machines	1,2,3,7,10,12,PSO2	3	-	-	3
5	21ME305	Kinematics of Machinery	1,2,3, 10,12,PSO1	3	-	-	3
6	21ME306	Thermodynamics	1,2,3,10,12,PSO_1	3	-	-	3
7	21ME307	Fluid Mechanics and Hydraulic Machines Lab	1,2,7,9,10,12, PSO2	-	-	3	1.5
8	21MA305	Computational Mathematics Lab	1,2,3,4,5,10,12	-	-	3	1.5
9	21ESX01	Employability Skills I	1,2,5,8,10,12	-	-	2	-
10	21HSX11	CC & EC Activities I	6,7,9,10,12	-	-	1	-
			Total	**18**	**-**	**13**	**23**
Fourth Semester							
1	21IT306	Object Oriented Programming through Java	1,2,3,4,5,10,12	3	-	2	4
2	21ME401	Applied Thermodynamics	1,2,3,7,10,12,PSO2	3	-	-	3
3	21ME402	Dynamics of Machinery	1,2,3,10,12,PSO1	3	-	-	3
4	21ME403	Metal Cutting and Machine Tools	1,2,10,12,PSO2	3	-	-	3
5	21ME404	Mechanics of Solids	1,2,3,6,10,12,PSO1	3	-	-	3
6	21ME405	Thermal Engineering Lab	1,2,3,4,8,9,10,PSO2	-	-	3	1.5
7	21ME406	Mechanics of Solids Lab	1,2,3,4,10,12	-	-	3	1.5
8	21ESX01	Employability Skills I	1,2,5,8,10,12	-	-	2	2
9	21HSX11	CC & EC Activities I	6,7,9,10,12	-	-	1	1
			Total	**15**	**-**	**11**	**22**

Fifth Semester							
1	21ME501	Computer Aided Design and Manufacturing	1,2,5,9,10,12, PSO1 PSO2	3	-	2	4
2	21ME502	Design of Machine Members I	1,2,3,12, PSO1	3	-	-	3
3	21ME503	Steam and Gas Turbines	1,2,3,6,7,10,12, PSO2	3	-	-	3
4	21ME504	Mechanical Measurements and Metrology	1,2,3,6,10,12	3	-	2	4
5		Elective I (Professional Elective)		3	-	-	3
6		Elective II (Open Elective I)		3	-	-	3
7	21ME507	Metal Cutting and Machine Tools Lab	1,2,3,9,10, 12,PSO2	-	-	3	1.5
8	21TPX01	Term Paper	1,2,3,4,10,12	-	-	3	1.5
9	21ESX02	Employability Skills II	1,2,5,8,10,12	-	-	2	-
10	21HSX12	CC & EC Activities II	6,7,9,10,12	-	-	1	-
11	21SIX01	Summer Internship #I	1,2,8,9,10,12	-	-	-	1
			Total	**18**	**-**	**13**	**24**
Sixth Semester							
1	21ME601	Design of Machine Members II	1,2,3,12,PSO_1	3	-	-	3
2	21ME602	Finite Element Methods	1,2,3,PSO_1,PSO_2	3	-	-	3
3	21ME603	Heat Transfer	1,2,3,7,10,12, PSO_2	3	-	-	3
4		Elective III (Professional Elective)		3	-	2	4
5		Elective IV (Open Elective II)		3	-	-	3
6	21ME606	Heat Transfer Lab	1,2,3,4,7,10,12	-	-	3	1.5
7	21MPX01	Mini Project	All POs	-	-	3	1.5
8	21ESX02	Employability Skills II	1,6,8,10,12	-	-	2	2
9	21HSX12	CC & EC Activities II	6,7,9,10,12	-	-	1	1
10	21ATX01	Environmental Studies	1,6,7,8,12	-	-	-	-
11	21ATX02	Professional Ethics and Human Values		-	-	-	-
12	21ATX--	Audit Course		-	-	-	-
			Total	**15**	**-**	**11**	**22**
Seventh Semester							
1	21PWX01	Project Work	All Pos	-	-	16	8
2		Elective V (Professional Elective)		3	-	-	3
3		Elective VI (Professional Elective)		3	-	-	3
4		Elective VII (Open Elective III)		3	-	-	3
5	21SIX02	Summer Internship #II	1,2,8,10,12	-	-	-	1
			Total	**9**	**-**	**16**	**18**
Eighth Semester							
1	21FIX01	Full Semester Internship (FSI)	1,2,5,8,9,10, PSO_1,PSO_2	-	-	-	8
2		Elective VIII (Professional Elective)		-	-	-	3
3		Elective IX (Open Elective IV)		-	-	-	3
			Total	**-**	**-**	**-**	**14**
			Total Credits	**100**	**-**	**88**	**160**

List of Electives

No.	Course Code	Course	POs	Contact Hours			
				L	T	P	C
Language Electives							
1	21HSX03	Advanced Communicative English	1,9,10,11,12	2	-	-	2
2	21HSX04	Communicative German		2	-	-	2
3	21HSX05	Communicative French		2	-	-	2
4	21HSX06	Communicative Japanese		2	-	-	2
5	21HSX07	Communicative Spanish		2	-	-	2
6	21HSX08	Communicative Korean		2	-	-	2
7	21HSX09	Communicative Hindi		2	-	-	2
Elective I : Career Path I, II, III and Other Core Electives							
1	21MEC11	Automotive Informatics **(Automotive ElectronicsCareer Path)**	1,5,6,12,PSO2	3	-	-	3
2	21MEC21	Fundamentals of Digital Manufacturing Science**(Digital Manufacturing Career Path)**	1,5,10,12, PSO_2	3	-	-	3
3	21MEC31	Data Analytics & Operations Management**(Smart Management Analytics Career Path)**	1,2,10,11,12	3	-	-	3
4	21ME005	Alternate Fuels and Emission Control in Automotives	1,6,7,10,12	3	-	-	3
5	21ME006	Industrial Robotics and Applications	1,2,3, 12,PSO_1	3	-	-	3
6	21ME007	Nontraditional Machining and Forming Processes	1,2,10,12,PSO_2	3	-	-	3
Elective III : Career Path I, II, III and Other Core Electives							
1	21MEC12	Sensors & Actuators for Automotive Electronics**(Automotive Electronics Career Path)**	1,2,10,12,PSO2	3	-	2	4
2	21MEC22	Artificial Intelligence & Robotics**(Digital Manufacturing Career Path)**	2,5,10,12,PSO1	3	-	2	4
3	21MEC32	Smart Supply Chain Analytics**(Smart Management Analytics Career Path)**	1,2,3,5,12	3	-	2	4
4	21ME008	Additive Manufacturing	1,2,3,10,12,PSO2	3	-	2	4
5	21ME009	Mechatronics	1,2,3,4,9,10,12, PSO1	3	-	2	4
6	21ME010	Computational Fluid Dynamics	1,2,3,4,7,10,12	3	-	2	4
Elective V : Career Path I, II, III and Other Core Electives							
1	21MEC13	Automotive Instrumentation and Diagnostics **(Automotive Electronics Career Path)**	1,2,7,12,PSO1	3	-	-	3
2	21MEC23	3D Printing **(Digital Manufacturing Career Path)**	1,5,10,12,PSO_2	3	-	-	3
3	21MEC33	Quality Assurance & Reliability Engineering for Sustainability **(Smart Management Analytics Career Path)**	1,3,5,10,12	3	-	-	3
4	21ME011	Automobile Engineering	1,2,6,7,12, PSO1,PSO2	3	-	-	3
5	21ME012	Design for Manufacturing	1,2,6,7,10,12, PSO2	3	-	-	3
6	21ME013	Operations Research	1,2,3,5,12	3	-	-	3
Elective VI							
1	21ME014	Refrigeration and Air Conditioning	1,2,3,7,12,PSO2	3	-	-	3
2	21ME015	Industrial IOT for Manufacturing	1,2, 12,PSO1,PSO2	3	-	-	3
3	21ME016	Quality Engineering	1,2,5,8,10,12	3	-	-	3
Elective VIII							
1	21ME017	Power Plant Engineering	1,2,6,7,10,12, PSO2	3	-	-	3
2	21ME018	Supply Chain Management	1,2,5,10,11,12	3	-	-	3
3	21ME019	Industrial Tribology	1,2,3,6,12	3	-	-	3
4	21ME020	Piping & Pressure Vessel Engineering	1,2 3, 5 12, PSO2	3	-	-	3

Open Electives							
1	21CE001	Disaster Management	1,2,3,6,12	3	-	-	3
2	21EE001	Electrical Installation, Safety and Auditing	1,2,3,6,12	3	-	-	3
3	21ME001	Fundamentals of Optimization Techniques	1,2,3,10,12	3	-	-	3
4	21EC001	Sensors for Engineering Applications	1,2,3,5,6,10	3	-	-	3
5	21CS001	Fundamentals of Artificial Intelligence	1,2,3,5,6,12	3	-	-	3
6	21CH001	Energy Conversion and Storage Devices	1,2,3,6,12	3	-	-	3
7	21IT001	Fundamentals of Multimedia	1,2,3,6,12	3	-	-	3
8	21BS001	Nano Materials and Technology	1,2,3,6,12	3	-	-	3
9	21DS001	Fundamentals of Data Science	1,2,3,6,12	3	-	-	3
10	21CE002	Air Pollution and Environmental Impact Assessment	1,2,3,6,7,8,10	3	-	-	3
11	21EE002	Renewable Energy Sources	1,2,3,6,7.8,10	3	-	-	3
12	21ME002	Principles of Entrepreneurship	1,2,5,6,8,10, 11,12	3	-	-	3
13	21EC002	Electronics for Agriculture	1,2,3,6,10	3	-	-	3
14	21CS002	Fundamentals of Machine Learning	1,2,3,6,10	3	-	-	3
15	21CH002	Industrial Safety and Hazard Management	1,2,3,6,7,8,12	3	-	-	3
16	21IT002	Fundamentals of Cloud Computing	1,2,3,6,12	3	-	-	3
17	21BS002	Advanced Numerical Techniques	1,2,3,6,12	3	-	-	3
18	21BS003	Functional Materials and Applications	1,2,3,6,10	3	-	-	3
19	21CE003	Solid Waste Management	1,2,3,6,10	3	-	-	3
20	21EE003	Fundamentals of Electrical Vehicle Technology	1,2,3,6,7,10	3	-	-	3
21	21ME003	Industrial Engineering and Management	1,2,5,8,11,12	3	-	-	3
22	21EC003	Interfacing and Programming with Arduino	1,2,3,6,10	3	-	-	3
21	21CS003	Data Science for Engineering Applications	1,2,3,6,10	3	-	-	3
24	21CH003	Industrial Ecology for Sustainable Development	1,2,3,6,7.8,10	3	-	-	3
25	21IT003	Fundamentals of Mobile Computing	1,2,3,6,10	3	-	-	3
26	21BS004	Advanced Materials of Renewable Energy	1,2,3,6,10	3	-	-	3
27	21BS005	Applied Linear Algebra for Engineers	1,2,3,6,10	3	-	-	3
28	21CE019	Green Buildings	1,2,3,6,10	3	-	-	3
29	21EE017	Sustainable Energy	1,2,3,6,7.8,10	3	-	-	3
30	21ME004	Total Quality Management	1,2,8,10,11,12	3	-	-	3
31	21EC011	Communication Technologies	1,2,3,6,10	3	-	-	3
32	21CS020	Applications of Artificial Intelligence	1,2,3,6,10	3	-	-	3
33	21CH016	Green Technologies	1,2,3,6,10	3	-	-	3
34	21IT015	Human Computer Interaction	1,2,3,6,10	3	-	-	3
35	21BS006	Handling of Industrial waste and waste water	1,2,3,6,10	3	-	-	3
36	21OE001	Robotics and Automation	1,2,3,6,10	3	-	-	3
37	21OE002	Introduction to IoT	1,2,3,6,10	3	-	-	3
38	21OE003	Fundamentals of Image processing	1,2,3,6,10	3	-	-	3
39	21OE004	Fundamentals of Data Acquisition systems	1,2,3,6,10	3	-	-	3
40	21OE005	Airport Operations Management	1,2,3,6,10	3	-	-	3
41	21OE006	Fundamentals of Embedded Systems	1,2,3,6,10	3	-	-	3
42	21OE007	Remote Sensing and GIS	1,2,3,6,10	3	-	-	3
43	21OE008	Big Data Analytics	1,2,3,6,10	3	-	-	3
44	21OE009	Fundamentals of Cyber Security	1,2,3,6,10	3	-	-	3
45	21OE010	Smart Cities	1,2,3,6,10	3	-	-	3
46	21OE011	Nano Materials and Thin Film Technology	1,2,3,6,10	3	-	-	3
47	21CSMC1	Cloud computing	1,2,3,6,10	3	-	-	3
48	21CSMC2	Ethical Hacking	1,2,3,6,10	3	-	-	3
49	21CSMC3	Fundamentals of Web Development	1,2,3,5,6,10	4	-	-	4
50	21OE012	Business Intelligence & Analytics	1,2,3,5,6,10	3	-	-	3
51	21OE013	Introduction To Industry 4.0 And Industrial IoT	1,2,3,6,10	3	-	-	3
52	21OE014	Natural Language Processing	1,2,3,6,10	3	-	-	3
Audit Course							
1	21AT001	Communication Etiquette in Workplaces					
2	21AT002	Contemporary India: Economy, Policy and Society					
3	21AT003	Design The Thinking					
4	21AT004	Ethics and Integrity					
5	21AT005	Indian Heritage and Culture					
6	21AT006	Intellectual Property Rights and Patents					
7	21AT007	Introduction to Journalism					
8	21AT008	Mass Media Communication					
9	21AT009	Science, Technology and Development					

10	21AT010	Social Responsibility	
11	21AT011	The Art of Photography and Film Making	
12	21AT012	Gender Equality for Sustainability	
13	21AT013	Women in Leadership	
14	21AT014	Introduction to Research Methodology	
15	21AT015	Climate Change and Circular Economy	

B.Tech. (Honors)							
Domain I-Automobile Technology and Systems							
1	21MEH11	Alternative Energy Sources for Automobiles	1,6,7,12,PSO2	4	-	-	4
2	21MEH12	Automobile body and Chassis Systems	1,6,7,12,PSO2	4	-	-	4
3	21MEH13	Automotive Transmission Systems	1,2,3, 12,PSO2	4	-	-	4
4	21MEH14	Vehicle Aero Dynamics	1,3,6,12,PSO1	4	-	-	4
Domain II- Application of Vibro-dynamics and lubrication in Modern Engineering							
1	21MEH21	Dynamics of Systems	1,2,6,12,PSO1	4	-	-	4
2	21MEH22	Mechanical Vibrations	1,2,6,12,PSO1	4	-	-	4
3	21MEH23	Modern Concepts of Engineering Design	1,2,6,12,PSO1	4	-	-	4
4	21MEH24	Theory of Lubrication	1,2,12,PSO1, PSO2	4	-	-	4
Domain III-Manufacturing Automation and Inspection							
1	21MEH31	Welding Technology	1,5,6,12,PSO_1	4	-	-	4
2	21MEH32	Precision Engineering	1,2,6,7,PSO2	4	-	-	4
3	21MEH33	Automation in Manufacturing	1,2,6.12,PSO_2	4	-	-	4
4	21MEH34	Non-Destructive Testing Methods	1,2,6.12,PSO_2	4	-	-	4
Domain IV-Production & Operations Strategy							
1	21MEH41	Maintenance Engineering	1,5,12,PSO2	4	-	-	4
2	21MEH42	Production Operations and Management	1,5,11,PSO2	4	-	-	4
3	21MEH43	Advanced Assessment systems of Industrial Processes	1,2,3,4,11	4	-	-	4
4	21MEH44	Enterprise Resource Planning	1,6,9,11,PSO2	4	-	-	4

B.Tech. (Minors)							
Energy Science & Technology							
1	21CHM11	Foundation of Energy Science and Technology	1,2,3,5,7,12	4	-	-	4
2	21CHM12	Energy Generation from Waste	1,2,3,4,5	4	-	-	4
3	21CHM13	Energy Storage Systems	1,2,3,6,7	4	-	-	4
4	21CHM14	Hydrogen Energy and Fuel Cells	1,2,3,7.12	4	-	-	4
Nano Science & Technology							
1	21CHM21	Introduction and Characterization of Nano Materials	1,2,3,7,12	4	-	-	4
2	21CHM22	Carbon NanoStructures and Applications	1,3,4,5,12	4	-	-	4
3	21CHM23	Energy, Environment & Biomedical Nanotechnology	1,2,3,7,12	4	-	-	4
4	21CHM24	Industrial Applications of Nano Technology	2,3,5,7,12	4	-	-	4
Environment Engineering							
1	21CEM11	Watershed Engineering	6,7,8,10,12	4	-	-	4
2	21CEM12	Industrial Pollution Control and Engineering	3,6,7,8,12	4	-	-	4
3	21CEM13	Solid and Hazardous Waste Management	1,3,6,7,12	4	-	-	4
4	21CEM14	Ecology and Environmental Assessment	1,3,6,7,12	4	-	-	4
Artificial Intelligence & Machine Leaning							
1	21CSM11	Fundamentals of AI & Machine Learning	1,2,5.10,12	4	-	-	4
2	21CSM12	Feature Engineering for Machine Learning	1,2,5,10,12	4	-	-	4
3	21CSM13	Exploratory Data Analytics	1,2,5.10,12	4	-	-	4
4	21CSM14	Deep Learning	1,2,5,10,12	4	-	-	4
Cyber Security							
1	21CSM21	Fundamentals of Security	1,2,5.10,12	4	-	-	4
2	21CSM22	Management of Information Security	1,2,5,10,12	4	-	-	4
3	21CSM23	Cyber Security	1,2,5.10,12	4	-	-	4
4	21CSM24	Cloud Security	1,2,5,10,12	4	-	-	4
Data Science & Analytics							
1	21CSM31	Data Cleaning	1,2,5.10,12	4	-	-	4
2	21CSM32	Data Engineering	1,2,5,10,12	4	-	-	4
3	21CSM33	Text Analytics	1,2,5.10,12	4	-	-	4
4	21CSM34	Social Network and Semantic Analysis	1,2,5,10,12	4	-	-	4
Computer Systems Programming							
1	21CSM41	Programming Fundamentals	1,2,5.10,12	4	-	-	4
2	21CSM41	Data Structures & Algorithms	1,2,5,10,12	4	-	-	4
3	21CSM41	Fundamentals of Databases	1,2,5.10,12	4	-	-	4
4	21CSM41	Fundamentals of Computer Networks & Operating Systems	1,2,5.10,12	4	-	-	4

Digital IC Design							
1	21ECM11	Fundamentals of VLSI Design	1,2,3,10,12	4	-	-	4
2	21ECM12	Digital Design using HDL	1,2,3,10,12	4	-	-	4
3	21ECM13	FPGA Technology	1,2,3,10,12	4	-	-	4
4	21ECM14	Analog and Mixed Signal Design	1,2,3,10,12	4	-	-	4
Industrial Automation							
1	21ECM21	Microcontrollers and Interfacing	1,2,3,10,12	4	-	-	4
2	21ECM22	Sensors and Data Acquisition System	1,2,3,10,12	4	-	-	4
3	21ECM23	Fundamentals of Labview	1,2,3,10,12	4	-	-	4
4	21ECM24	Medical Robotics	1,2,3,10,12	4	-	-	4
Communications and Networking							
1	21ECM31	Principles of communications	1,2,3,10,12	4	-	-	4
2	21ECM32	Coding Theory and Practice	1,2,3,10,12	4	-	-	4
3	21ECM33	Ad-hoc and wireless sensor Networks	1,2,3,10,12	4	-	-	4
4	21ECM34	Fundamentals of Multimedia Networking	1,2,3,10,12	4	-	-	4
Avionics							
1	21ECM41	Principles of Aerodynamics	1,2,3,10,12	4	-	-	4
2	21ECM42	Aircraft Electrical Systems	1,2,3,10,12	4	-	-	4
3	21ECM43	Aircraft Instrument Systems	1,2,3,10,12	4	-	-	4
4	21ECM44	Aircraft Communication and Navigational systems	1,2,3,10,12	4	-	-	4
Geographic Information System							
1	21ECM51	Sensors and Sensing Technology	1,2,3,10,12	4	-	-	4
2	21ECM52	Geographic Information Systems	1,2,3,10,12	4	-	-	4
3	21ECM53	Digital Image Processing	1,2,3,10,12	4	-	-	4
4	21ECM54	Lidar Systems	1,2,3,10,12	4	-	-	4
Electric Vehicles Technology							
1	21EEM11	Introduction to Electric Vehicles Technologies	1,2,3,6,10,12	4	-	-	4
2	21EEM12	Electrical Drives and Controllers for Electric Vehicles	1,2,3,6,10,12	4	-	-	4
3	21EEM13	Charging Technology in Electric Vehicles	1,2,3,6,10,12	4	-	-	4
4	21EEM14	Computer Vision in Electric Vehicles	1,2,3,6,10,12	4	-	-	4
Smart City Management							
1	21EEM21	Fundamentals of Smart City	1,2,3,6,10,12	4	-	-	4
2	21EEM22	Smart City Infrastructure	1,2,3,6,10,12	4	-	-	4
3	21EEM23	Computational Methods for Smart City Management	1,2,3,6,10,12	4	-	-	4
4	21EEM24	Communication Technologies and Mobility for smart city	1,2,3,6,10,12	4	-	-	4
Industrial Applications and Control							
1	21EEM31	Modelling and Simulations of Industrial Applications	1,2,3,10,12	4	-	-	4
2	21EEM32	Industrial Sensors and Actuators	1,2,3,10,12	4	-	-	4
3	21EEM33	Programmable Logic Controllers	1,2,3,10,12	4	-	-	4
4	21EEM34	Control Design for Industrial Applications	1,2,3,10,12	4	-	-	4
Cloud Application Development							
1	21ITM11	Introduction to Cloud Computing	1,2,3,10,12	4	-	-	4
2	21ITM12	Introduction to Web Development with HTML, CSS, JavaScript	1,2,3,10,12	4	-	-	4
3	21ITM13	Developing Cloud Native Applications	1,2,3,10,12	4	-	-	4
4	21ITM14	Developing Cloud Apps with Node.js and React	1,2,3,10,12	4	-	-	4
Mechanical Engineering							
1	21MEM01	Materials and Manufacturing Processes	1,2,3,10,12	4	-	-	4
2	21MEM02	Fundamentals of Thermal Engineering	1,2,3,10,12	4	-	-	4
3	21MEM03	Basic Elements of Machine design	1,2,3,10,12	4	-	-	4
4	21MEM04	Industrial Engineering & Operations Management	1,2,3,10,12	4	-	-	4
5	21MEM05	Modern Manufacturing Systems	1,2,3,10,12	4	-	-	4