LAKKIREDDY BALI REDDY COLLEGE OF ENGINEERING
DEPARTMENT OF MECHANICAL ENGINEERING
(Autonomous & Affiliated to JNTUK, Kakinada & Approved by AICTE, New Delhi, Accredited by NBA, Certified by ISO 9001:2015)
L B Reddy Nagar, Mylavaram-521 230, Krishna District, Andhra Pradesh.

COURSE HANDOUT

PROGRAM : B.Tech., VII-Sem. ME A-Section

ACADEMIC YEAR : 2025-2026

COURSE NAME & CODE : Refrigeration and Air-Conditioning - 20ME24

L-T-P STRUCTURE : 2-1-0

COURSE CREDITS : 3

COURSE INSTRUCTOR : **Dr. V. DHANA RAJU**

COURSE COORDINATOR : **Dr. V. DHANA RAJU**

PRE-REQUISITE: Thermodynamics

COURSE OBJECTIVE: In a broader way, this course provides the simple understanding of refrigeration and air conditioning fundamentals. First, it covers the different refrigeration cycles and its analysis. Then the concepts of psychrometry and psychrometry processes used for air conditioning are imparted. Finally, the concepts of comfort air conditioning, cooling load design and its estimation are addressed.

COURSE OUTCOMES (COs)

CO1: Describe the basic concepts of refrigeration and its applications.
CO2: Evaluate the performance parameters of refrigeration systems.
CO3: Identify the desirable refrigerants and its use in various refrigeration systems.
CO4: Analyze the psychrometric properties and processes used in Air Conditioning systems.
CO5: Design of Air Conditioning systems for thermal comfort conditions.

COURSE ARTICULATION MATRIX (Correlation between COs&POs,PSOs):

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	2	2	2	2		2	2					2	3		
CO2	3	3	3	2		2	2					2	3		
CO3	2	2	2	2		3	3					2	2		
CO4	3	3	2	2		2	2					2	2		
CO5	3	3	3	2		2	2					2	3		

Note: Enter Correlation Levels **1** or **2** or **3.** If there is no correlation, **put '-'**
1- Slight(Low), **2 -** Moderate(Medium), **3 -** Substantial (High).

BOS APPROVED TEXT BOOKS:

T1 C. P. Arora. , Refrigeration and air conditioning - TMH, 2nd Edition, 2000.

T2 R. Dossat, Principles of Refrigeration - - Pearson 4th Edition 2001.

BOS APPROVED REFERENCE BOOKS:

R1 S. C. Arora, Domkundwar, A course in refrigeration and air conditioning-Dhanapat Rai& sons 5th Edition 1997.

R2 Wilbert F.Stoecker, Jerold W. J.Jones, MGH, 1986.

R3 Manohar Prasad, Refrigeration and Air conditioning, New Age international, 2003

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

UNIT-I FUNDAMENTALS OF REFRIGERATION

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	Textbook followed	HOD Sign Weekly
1.	**Unit-1:** Introduction to R&AC	1	30-06-2025		TLM2	CO1	**T1**	
2.	Unit of refrigeration and COP	1	02-07-2025		TLM2	CO2	**T1**	
3.	Heat Engine, Refrigerator and Heat pump	1	04-07-2025		TLM2	CO1	**T1**	
4.	Types of Refrigeration systems	1	05-07-2025		TLM2	CO1	**T1**	
5.	Problems on refrigeration basics	1	07-07-2025		TLM2, TLM 4	CO2	**T1**	
6.	**Refrigerant:** Desirable characteristics of ideal refrigerant	1	09-07-2025		**TLM2**	CO3	**T1**	
7.	Classification of refrigerants- Desirable Properties-Nomenclature, Refrigerant Designation	1	11-07-2025		**TLM 1**	CO3	**T1**	
8.	Commonly used refrigerants, Alternate refrigerants, Green House effect& Global	1	14-07-2025		**TLM 1**	CO3	**T1**	
9.	**Air refrigeration system**: working on Reversed Carnot cycle	1	16-07-2025		**TLM 1**	CO2	**T1**	
10.	Air refrigeration system working on Bell Coleman cycle, Air refrigeration Problems	1	18-07-2025		**TLM 1**	CO2	**T1**	
11.	COP- Open and Dense air systems Problems	1	19-07-2025		**TLM 1**	CO2	**T1**	
12.	Tutorial-1	1	21-07-2025		**TLM 1**	CO2	**T1**	
No. of classes required to complete UNIT-I = 12			No. of classes taken:					

UNIT-II VAPOUR COMPRESSION REFRIGERATION SYSTEM & COMPONENTS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	Text Book followed	HOD Sign Weekly
13	**Introduction to VCR system: VCR cycle**	**1**	**23-07-2025**		**TLM 1**	CO1	**T1**	
14	Simple vapour compression refrigeration cycle, COP	1	25-07-2025		**TLM 1**	CO1	**T1**	
15	Representation of cycle on T-S and p-h Charts	1	26-07-2025		**TLM 1**	CO1	**T2**	
16	VCR numerical problems	1	28-07-2025		**TLM 1**	CO1	**T2**	
17	Tutorial-2	1	30-07-2025		**TLM 1**	CO1	**T2**	
18	Effect of sub cooling and superheating,	1	01-08-2025		**TLM 1**	CO1	**T2**	

19	Effect of condenser and evaporator pressure, Actual VCR and theoretical VCR,	1	02-08-2025		**TLM 1**	CO1	**T2**	
20	**VCR-System Components**: Compressors -Classification-Working Principles	1	04-08-2025		TLM 1	CO1	**T2**	
21	Work expression for the reciprocating compressor	1	06-08-2025		TLM 1	CO1	**T2**	
22	Rotary compressors, Problems, Condensers – Classification-working principle,	1	08-08-2025		TLM 1	CO1	**R1**	
23	Evaporators-Classification-working principle,	1	11-08-2025		TLM 1	CO1	**R1**	
24	Expansion valve – Classification-working principle-	1	13-08-2025		TLM 1	CO1	**R1**	
No. of classes required to complete UNIT-II = 12			No. of classes taken:					

UNIT-III VAPOUR ABSORPTION, STEAM JET & NON-CONVENTIONAL REFRIGERATION SYSTEM

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	Text Book followed	HOD Sign Weekly
25	Introduction to VAR system and its working principle,	1	15-08-2025		TLM 1	CO1	**T2**	
26	Max. COP derivation for the VAR system and VAR problems	1	16-08-2025		TLM 1	CO1	**T2**	
27	Description and working of NH_3-Water system, Refrigerant-Absorbent solution requirements	1	18-08-2025		TLM 1	CO1	**T2**	
28	LiBr-Water (Two shell & Four shell) System,	1	20-08-2025		TLM 1	CO1	**T2**	
29	Principle of operation of Three fluid absorption systems, Salient features	1	22-08-2025		TLM 1	CO1	**T2**	
Technical Training: 25-08-2025 to 06-09-2025								
I-Mid Exams :08.09.2025 to 13.09.2025								
30	**Steam Jet Refrigeration System:** Working Principle, Basic Analysis- Applications	1	15-09-2025		TLM 1	CO1	**T2**	
31	. **Non-Conventional Refrigeration Systems:** Thermo electric refrigeration,	1	17-09-2025		TLM 1	CO1	**T2**	
32	Vortex tube refrigeration,	1	19-09-2025		TLM 1	CO1	**T2**	
33	Adiabatic Demagnetization refrigeration		20-09-2025					
No. of classes required to complete UNIT-III = 09			No. of classes taken:					

UNIT-IV PSYCHROMETRY & HUMAN COMFORT

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	Text Book followed	HOD Sign Weekly
34	**Psychrometry**: Introduction,	1	22-09-2025		TLM 1	CO4	**T1**	
35	Psychometric properties and relations	1	24-09-2025		TLM 1	CO4	**T1**	
36	Psychometric problems	1	26-09-2025		TLM 1	CO4	**T1**	
37	Psychometric problems		27-09-2025		TLM 1	CO4	**T1**	
38	Psychometric chart and its analysis,	1	29-09-2025		TLM 1	CO4	**T1**	
39	Psychometric processes and its analysis	1	06-10-2025		TLM 1	CO4	**T1**	
40	**Tutorial**	1	08-10-2025		TLM 1	CO4	**T1**	
41	Psychometric processes and its analysis	1	10-10-2025		TLM 1	CO4	**T1**	
42	Sensible, Latent and Total heat,	1	13-10-2025		TLM 1	CO4	**T1**	
43	Sensible Heat Factor and Bypass Factor, Solving Problems	1	15-10-2025		TLM 1	CO4	**T1**	
44	**Human Comfort:** Thermodynamics of human body	1	17-10-2025		TLM 1	CO4	**T1**	
45	Factors affecting the human comfort and its analysis.	1	18-10-2025		TLM 1	CO4	**T1**	
46	Effective temperature – Comfort chart	1	20-10-2025		TLM 1	CO4	**T1**	
47	**Tutorial-4**	1	22-10-2025		TLM 1	CO4	**T1**	
No. of classes required to complete UNIT-IV = 14			No. of classes taken:					

UNIT-V AIR CONDITIONING SYSTEMS AND DESIGN

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
48	**Introduction**: Air Conditioning Systems,	1	24-10-2025		TLM 1	CO5	**T1**	
49	Components of Air conditioning	1	25-10-2025		TLM 1	CO5	**T1**	
50	Classification of air conditioning system	1	27-10-2025		TLM 1	CO5	**T1**	
51	Central and Unitary systems, Winter and Year-round systems	1	29-10-2025		TLM 1	CO5	**T1**	
52	Cooling load estimation and its procedure	1	31-10-2025		TLM 1	CO5	**T1**	
53	Cooling load components	1	01-11-2025		TLM 1	CO5	**R1**	
54	Infiltration load, Design of Air Condition Systems,	1	03-11-2025		TLM 1	CO5	**R1**	
55	Bypass factor-circulated air with ADP, System with Ventilated and re-circulation,	1	05-11-2025		TLM 1	CO5	**T1**	
56	RSHF, GSHF and ESHF, Solving cooling load Problems	1	07-11-2025		TLM 1	CO5	**R1**	

57	Solving cooling load Problems	1	10-11-2025		TLM 1	CO5	**R1**	
58	Solving cooling load Problems	1	12-11-2025		TLM 1	CO5	**R1**	
No. of classes required to complete UNIT-V = 10			No. of classes taken:					

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
59	Air craft Refrigeration System and Cryogenics	1	14-11-2025		TLM2	CO1,CO4	R3	
60	Eco-friendly refrigerants	1	15-11-2025		TLM2	CO4	R3	
II-Mid Exams :17.11.2025 to 22.11.2025								

Teaching Learning Methods					
TLM1	Chalk and Talk	**TLM4**	Problem Solving	**TLM7**	Seminars or GD
TLM2	PPT	**TLM5**	Programming	**TLM8**	Lab Demo
TLM3	Tutorial	**TLM6**	Assignment or Quiz	**TLM9**	Case Study

ACADEMIC CALENDER:

Commencement of Class work		**24.06.2024**	
I Phase of Instructions	30.06.2025	23.08.2025	8 Weeks
Technical Training	25.08.2025	06.09.2025	2 weeks
I Mid Examinations	08.09.2025	13.09.2025	1 Week
II Phase of Instructions	15.09.2025	15.11.2025	9Weeks
II Mid Examinations	17.11.2025	22.11.2025	1 Week
Preparation and Practical's	24.11.2025	29.11.2025	1 Week
Semester End Examinations	01.12.2025	13.12.2025	2 Weeks

PART-C

EVALUATION PROCESS (R17 Regulations):

Evaluation Task	**Marks**
Assignment-I (Unit-I)	A1=5
Assignment-II (Unit-II)	A2=5
I-Mid Examination (Units-I & II)	M1=20
I-Quiz Examination (Units-I & II)	Q1=10
Assignment-III (Unit-III)	A3=5
Assignment-IV (Unit-IV)	A4=5
Assignment-V (Unit-V)	A5=5
II-Mid Examination (Units-III, IV & V)	M2=20
II-Quiz Examination (Units-III, IV & V)	Q2=10
Attendance	B=5
Assignment Marks = Best Four Average of A1, A2, A3, A4, A5	A=5
Mid Marks =75% of Max(M1,M2)+25% of Min(M1,M2)	M=20
Quiz Marks =75% of Max(Q1,Q2)+25% of Min(Q1,Q2)	B=10
Cumulative Internal Examination (CIE) : A+B+M+Q	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
PO 6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
PO 7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	**Communication:** Design and develop modern communication technologies for building the inter disciplinary skills to meet current and future needs of industry.
PSO 2	**VLSI and Embedded Systems:** Design and Analyze Analog and Digital Electronic Circuits or systems and Implement real time applications in the field of VLSI and Embedded Systems using relevant tools
PSO 3	**Signal Processing:** Apply the Signal processing techniques to synthesize and realize the issues related to real time applications

Course Instructor	Course Coordinator	Module Coordinator	HOD
Dr.V.Dhana Raju	Dr.V.Dhana Raju	Dr. P.Vijay Kumar	Dr. M.B.S.Sreekara Reddy

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
(AUTONOMOUS)
Approved by AICTE, New Delhi and Permanently affiliated to JNTUK, Kakinada
L.B. Reddy Nagar, Mylavaram, N.T.R. District, Andhra Pradesh-521230
Estd. 1998
ASE,CE,CSE,ECE, EEE, IT & ME Under Tier-I
NAAC CGPA: 3.20/4

DEPARTMENT OF MECHANICAL ENGINEERING

COURSE HANDOUT

Part-A

PROGRAM : B.Tech, VII Sem., Mechanical Engineering
ACADEMIC YEAR : 2025-26
COURSE NAME & CODE : **Automobile Engineering-17ME29**
L-T-P STRUCTURE : 3 (L) – 0 (T) – 0 (P)
COURSE CREDITS : 3
COURSE INSTRUCTOR :**Dr.S.Rami Reddy**
COURSE COORDINATOR : **Dr.S.Rami Reddy**
RE-REQUISITES : **Thermodynamics, Internal Combustion Engines**

COURSE EDUCATIONAL OBJECTIVES (CEOs): The objective of this course is to make students learn about automobile layout, Engine Emissions, working of Transmission system, Steering system, Suspension system, Braking system, Fuel system and different Electrical systems.

COURSE OUTCOMES (COs)

At the end of the course, the student will be able to:

CO1	:	List and illustrate the basic components of Automobile (Remembering –L2).
CO2	:	Differentiate the Fuel supply systems in petrol and Diesel Engines (Understanding –L2)
CO3	:	Comprehend the function of various Electrical systems in Automobile (Understanding –L2)
CO4	:	Distinguish various transmission systems, Wheels & Tyres (Understanding –L2)
CO5	:	Compare various types of Steering systems, Braking systems and Suspension systems. (Understanding –L2).

COURSE ARTICULATION MATRIX (Correlation between COs&POs,PSOs):

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		3	2				2					2	2		
CO2						2	3	2		1		2	2		
CO3			2			2	2						2		1
CO4	1	1				2	2					2	2		2
CO5		2				2	2					2	2		2

Note: Enter Correlation Levels **1** or **2** or **3.** If there is no correlation, **put '-' 1-** Slight (Low), **2 –** Moderate (Medium), **3 -** Substantial (High).

BOS APPROVED TEXT BOOKS:

T1 Dr. Kirpal Singh, Automobile Engineering-Vol I& II, 13thEdition, Standard Publishers Distributors, 2014.
T2 R.B.Gupta, Automobile Engineering, 8th edition, Tech India publication series, 2013.
T3 Automotive Mechanics, Vol- 1 & 2, Kripal Singh, Standard Publishers.
T4 Automobile Engineering, William Course, TMH Distributors

BOS APPROVED REFERENCE BOOKS:

R1 V.A.W Hillier and David R.Rogers, Hillier's Fundamentals of Motor Vehicle Technology, Book1, 5th edition- 2007.

R2 Heinz Heisler, Advanced Vehicle Technology, 2nd edition, Butterworth-Heinemann
Series, 2002.

R3 David A Crolla, Automotive Engineering,1st edition, Butterworth-Heinemann series,
2009.

Part-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

UNIT-I: INTRODUCTION, ENGINE AND AUTOMOBILE POLLUTION

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction to CO's and PO's	1	30.06.25		TLM1/ TLM2	CO1	T1,T2	
2.	**Introduction-** Components of an Automobile	1	01.07.25		TLM1/ TLM2	CO1	T1,T2	
3.	classification of automobiles , Chassis and Frame,	2	02.07.25 05.07.25		TLM1/ TLM2	CO1	T1,T2	
4.	Rear wheel drive, front wheel drive and four wheel drive	2	07.07.25 08.07.25		TLM1/ TLM2	CO1	T1,T2	
5.	**Engine construction:** Cylinder Block and Crankcase- Cylinder Head- Oil Pan- Manifolds- Gaskets- Cylinder Liners- Piston- Connecting Rod- Engine Valves, Firing Order	3	09.07.25 14.07.25 15.07.25		TLM1/ TLM2	CO1	T1,T2	
6.	**Engine Emission and control:** Nitrogen oxides, Carbon monoxide, Hydrocarbons, Particulates and Soot, Types of pollutants in SI and CI Engines, Thermal Convertors, Three way catalytic convertor, Exhaust gas recirculation.	2	16.07.25 19.07.25		TLM1/ TLM2	CO1	T1,T2	
No. of classes required to complete UNIT-I: 10					No. of classes taken:			15.07.25

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UNIT-II: ENGINE SERVICING, FUEL SUPPLY SYSTEM IN PETROL& DIESEL ENGINES

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	**ENGINE SERVICING:** Engine Removal, Cylinder Head, Gaskets, Valves, Piston-connecting Rod Assembly.	2	21.07.25 22.07.25		TLM1/ TLM2	CO2	T1,T2	
2.	Fuel Supply system in petrol engines-Fuel pump, fuel gauge, simple carburetor-defects	2	23.07.25 26.07.25		TLM1/ TLM2	CO2	T1,T2	
3.	**Zenith carburetor, SU carburetor**	2	28.07.25 29.07.25		TLM1/ TLM2	CO2	T1,T2	
4.	Petrol Injection- Types, Mechanical and Electronic injection systems.	1	30.07.25		TLM1/ TLM2	CO2	T1,T2	
5.	Types of Injection systems in Diesel Engines-Fuel filters, fuel filters, Air cleaners	1	02.08.25		TLM1/ TLM2	CO2	T1,T2	
6.	**Fuel injection pumps-Jerk type pump**	1	04.08.25		TLM1/ TLM2	CO2	T1,T2	
7.	Governors-Types	2	05.08.25 06.08.25		TLM1/ TLM2	CO2	T1,T2	
No. of classes required to complete UNIT-II: 11					No. of classes taken:			

UNIT-III: IGNITION SYSTEM, CHARGING SYSTEM & STARTING SYTEMS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	**IGNITION SYSTEM:** Types of Ignition systems	1	11.08.25		TLM1/ TLM2	CO3	T1,T2	
2.	Battery Ignition system- Components of Battery Ignition system, Spark plug construction, Ignition timing	2	12.08.25 13.08.25		TLM1/ TLM2	CO3	T1,T2	
3.	Magneto Ignition system,	1	18.08.25		TLM1/ TLM2	CO3	T1,T2	
4.	Electronic Ignition system- Capacitive discharge Ignition system.	1	19.08.25		TLM1/ TLM2	CO3	T1,T2	
5.	**CHARGING SYSTEM & STARTING SYTEMS:** Batteries- Types-Lead acid battery, battery ratings	1	20.09.25		TLM1/ TLM2	CO3	T1,T2	
6.	Charging system- Introduction- Principle of Generator and constructional details, Generator output control	2	23.08.25 15.09.25		TLM1/ TLM2	CO3	T1,T2	
7.	Starting Motor, Starting drives, Bendix rives, Solenoid switch.	2	16.09.25 17.09.25		TLM1/ TLM2	CO3	T1,T2	
No. of classes required to complete UNIT-III: 10					No. of classes taken:			

UNIT-IV: TRANSMISSION SYSTEM, WHEELS AND TYRES

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	**TRANSMISSION SYSTEM:** Clutches- Introduction, Types, Single plate clutch,	1	20.09.25		TLM1/ TLM2	CO4	T1,T2	
2.	Multi plate Clutch, Centrifugal clutch, Fluid Fly wheel,	2	22.09.25 23.09.25		TLM1/ TLM2	CO4	T1,T2	
3.	Necessity of Transmission, Types of Transmission, Sliding Mesh Gear Box.	1	24.09.25		TLM1/ TLM2	CO4	T1,T2	
4.	Constant Mesh gear box, Torque convertor, Propeller shaft,	2	27.09.25 04.10.25		TLM1/ TLM2	CO4	T1,T2	
5.	Final drive, Differential	1	06.10.25		TLM1/ TLM2	CO4	T1,T2	
6.	**WHEELS AND TYRES:** Types of Wheels, Wheel dimensions	1	07.10.25		TLM1/ TLM2	CO4	T1,T2	
7.	Tyre- Types of Tyres, Carcass types, Tyre Materials, Tyre designations.	1	08.10.25		TLM1/ TLM2	CO4	T1,T2	
8.	Sensors: Speed control, Traction Control.	2	13.10.25 14.10.25		TLM1/ TLM2	CO4	T1,T2	
No. of classes required to complete UNIT-IV:-11					No. of classes taken:			

UNIT-V: FRONT AXLE AND STEERING, SUSPENSION SYSTEM, BRAKING SYSTEM

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Front Axle and Steering- Front Axle, Types of stub axle, Steering geometry- Camber- Kingpin inclination	2	15.10.25 18.10.25		TLM1/ TLM2	CO5	T1,T2	
2.	Combined angle and scrub radius- Castor- Toe in and Toe out,	1	21.10.25		TLM1/ TLM2	CO5	T1,T2	
3.	Understeer and Oversteer, Power steering, Types of Steering gears.	1	22.10.25		TLM1/ TLM2	CO5	T1,T2	
4.	**SUSPENSION SYSTEM:** Introduction, Types of Suspension springs, Leaf springs, Coil springs, Torsion bars,	1	25.10.25		TLM1/ TLM2	CO5	T1,T2	
5.	Shock Absorbers, Independent suspension- Types,	2	27.10.25 28.10.25		TLM1/ TLM2	CO5	T1,T2	
6.	Air-suspension, Suspension sensors-Types ,	2	29.10.25 01.11.25		TLM1/ TLM2	CO5	T1,T2	
7.	**BRAKING SYSTEM:** Braking Requirements ,Types of Brakes, Drum brakes and Disc Brakes,	2	03.11.25 04.11.25		TLM1/ TLM2	CO5	T1,T2	
8.	Hydraulic Brakes, Air brakes, Anti-lock braking systems.	2	10.10.25 11.10.25		TLM1/ TLM2	CO5	T1,T2	
No. of classes required to complete UNIT-V: 13					No. of classes taken:			

CONTENTS BEYOND THE SYLLABUS:

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign
1.	Advanced Topics in all Units	2	12.10.25 15.10.25		TLM1/ TLM2	CO1 - CO5	T1, T2, R1 to R5	

Teaching Learning Methods			
TLM1	Chalk and Talk	TLM4	Demonstration (Lab/Field Visit)
TLM2	PPT	TLM5	ICT (NPTEL/Swayam Prabha/MOOCS)
TLM3	Tutorial	TLM6	Group Discussion/Project

ACADEMIC CALENDAR:

Description	From	To	Weeks
Commencement of Class Work: 30.06.2025			
I Phase of Instructions	30.06.2025	23.08.2025	8
Technical Training	25.08.2025	06.09.2025	2
I Mid Examinations	08.09.2025	13.09.2025	1
II Phase of Instructions	15.09.2025	15.11.2025	9
II Mid Examinations	17.11.2025	22.112025	1
Preparation and Practical	24.11.2025	29.11.2025	1
Semester End Examinations	01.12.2025	13.12.2025	2

Part - C

EVALUATION PROCESS:

Evaluation Task	COs	Marks
Assignment/Quiz – 1	1,2,3	A1=05
I-Mid Examination	1,2,3	B1=15
I-Online Mid Examination	1,2,3	C1=10
Assignment/Quiz – 2	3,4,5	A3=05
II-Mid Examination	3,4,5	B2=20
II-Online Mid Examination	3,4,5	C2=10
Evaluation of Assignment/Quiz Marks: A=(A1+A2)/5	1,2,3,4,5	**A=05**
Evaluation of Mid Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2	1,2,3,4,5	**B=15**
Evaluation of Online Mid Marks: C=75% of Max(C1,C2)+25% of Min(C1,C2)	1,2,3,4,5	**C=10**
Cumulative Internal Examination: A+B+C	**1,2,3,4,5**	**A+B+C=30**
Semester End Examinations: E	**1,2,3,4,5**	**E=70**
Total Marks: A+B+C+D+E	**1,2,3,4,5**	**100**

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

PEO1: To build a professional career and pursue higher studies with sound knowledge in Mathematics, Science and Mechanical Engineering.

PEO2: To inculcate strong ethical values and leadership qualities for graduates to become successful in multidisciplinary activities.

PEO3: To develop inquisitiveness towards good communication and lifelong learning.

PROGRAMME OUTCOMES (POs):

Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO1: To apply the principles of thermal sciences to design and develop various thermal systems.

PSO2: To apply the principles of manufacturing technology, scientific management towards improvement of quality and optimization of engineering systems in the design, analysis and manufacturability of products.

PSO3: To apply the basic principles of mechanical engineering design for evaluation of performance of various systems relating to transmission of motion and power, conservation of energy and other process equipment.

Position	*Course Instructor*	*Course Coordinator*	*Module Coordinator*	*HOD*
Name	Dr.S.Rami Reddy	Mr.K.Lakshmi Prasad	Dr.P.Vijay Kumar	Dr. M B S Sreekara Reddy
Signature				

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(An Autonomous Institution since 2010)
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L.B. Reddy Nagar, Mylavaram, NTR District, Andhra Pradesh - 521230

DEPARTMENT OF MECHANICAL ENGIMNEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : KAMALA PRIYA B
Course Name & Code : POWER PLANT ENGINEERING
L-T-P Structure : 3-0-0 Credits : 3
Program/Sem/Sec : B.Tech., MECH., VII-Sem., A.Y : 2025-26

PRE-REQUISITE: Applied Thermodynamics and Heat transfer

COURSE EDUCATIONAL OBJECTIVES (CEOs):
This course provides understanding of the power plant engineering fundamentals which includes the details of steam, hydro, gas nuclear, combined cycle power plants along with solar, wind and geothermal power energy systems in addition to the direct energy conversion systems. The economics of power generation and the environmental aspect of power generation are also being addressed in this course.

COURSE OUTCOMES (COs): At the end of the course, the student will be able to

CO 1	Describe the energy scenario, the energy generation sources and various circuitry systems in power plants. (Understanding – L2)
CO 2	Draw the layout of different power plants. (Remembering – L1)
CO 3	Compute the power generation from different power plants. (Applying – L3)
CO 4	Analyze the input parameters requirement for power generation from various power plant systems. (Analyzing-L4)
CO5	Calculate the economics of power generation from various power plants, pollution issues from power plant systems. (Applying – L3)

COURSE ARTICULATION MATRIX (Correlation between COs, POs & PSOs):

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	-	-	-	-	-	-	-	1	-	-	-
CO2	1	1	-	-	-	-	-	-	-	-	-	1	-	-	-
CO3	3	2	-	2	-	-	-	-	-	-	-	1	3	-	3
CO4	2	3	-	1	-	-	-	-	-	-	-	2	2	-	2
CO5	3	2	-	2	-	-	-	-	-	-	-	3	3	-	3

Note: Enter Correlation Levels **1** or **2** or **3.** If there is no correlation, **put '-'**
1- Slight (Low), **2** – Moderate (Medium), **3** - Substantial (High).

TEXT BOOKS:

T1 Arora &Domkundwar, A course in Power Plant Engineering- Dhanpat Rai & Company 5th Revised Reprint Edition, 2004.

T2 P.K.Nag, Power Plant Engineering,3rd Edition ,2008 TMH, New Delhi,

REFERENCE BOOKS:

R1.R.K.Rajput, A Text book of Power Plant Engineering, Laxmi Publications ,2nd Edition 2001

R2.P.C.Sharma, Power Plant Engineering, 9th Revised & Reprint Edition 2012, S.K.Kataria&

Sons
R3. P.K.Nag, power plant engineering-2020
R4. M.M.ElWakil, Power plant technology, 3rd Edition 2010 TMH.
R5. G.R.Nagpal, Power plant engineering, Khanna Publishers.14th Edition 2000.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: STEAM POWER PLANT

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Course Outcomes	1	30-06-2025		TLM2	
2.	Introduction to Subject	1	01-07-2025		TLM2	
3.	Energy sources, Resources and Development of Power in India.	1	03-07-2025		TLM2	
4.	Steam power plant: Plant Layout, Working of Different circuits, factors to be considered for the selection of the plant	1	04-07-2025		TLM2	
5.	Tutorial-1	1	04-07-2025		TLM3	
6.	Types of Coal-Fuel handling systems-	1	07-07-2025		TLM2	
7.	Coal handling, choice of coal handling equipment, Coal Storage	2	08-07-2025 10-07-2025		TLM2	
8.	Ash handling systems	1	11-07-2025		TLM2	
9.	Overfeed and underfeed stokers	1	14-07-2025		TLM2	
10.	Traveling grate stokers, Spreader stokers, Retort stokers	1	15-07-2025		TLM2	
11.	Pulverized fuel burning system and, its components	1	17-07-2025		TLM2	
12.	Draught system, Cyclone furnace	1	18-07-2025		TLM2	
13.	Tutorial-2	1	18-07-2025		TLM3	
14.	Design and construction, Dust collectors	1	21-07-2025		TLM2	
15.	Dust collectors, Electrostatic precipitator	1	22-07-2025		TLM2	
16.	Cooling towers and heat rejection	1	24-07-2025		TLM2	
No. of classes required to complete UNIT-I: 17				No. of classes taken:		

UNIT-II: DIESEL POWER PLANT AND GAS TURBINE PLANT

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	General Layout & Components of Diesel Power Plant	1	25-07-2025		TLM2	
2.	Tutorial-3	1	25-07-2025		TLM3	
3.	Fuel System, Lubrication System	1	28-07-2025		TLM2	
4.	Air Intake and admission system, Supercharging system, Exhaust System	1	29-07-2025		TLM2	

5.	Diesel Plant operation and efficiency, Heat balance	1	31-07-2025		TLM2	
6.	Site selection of diesel power plant, Comparative study of diesel power plant with steam power plant.	1	01-08-2025		TLM2	
7.	Tutorial-4	1	01-08-2025		TLM3	
8.	Introduction, Classification-Layout with auxiliaries	1	04-08-2025		TLM2	
9.	Principles of working of Closed and Open cycle gas turbines	1	05-08-2025		TLM2	
10.	Introduction to combined cycle power plants and comparison.	1	07-08-2025		TLM2	
11.	Numerical problems on closed cycle gas turbines.	1	08-08-2025		TLM1	
12.	Tutorial-5	1	08-08-2025		TLM3	
13.	Numerical problems on closed cycle gas turbines	1	11-08-2025		TLM1	
No. of classes required to complete UNIT-II: 13				No. of classes taken:		

UNIT-III: HYDRO ELECTRIC POWER PLANT AND NUCLEAR POWER GENERATION

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Hydrology-Hydrological cycle	1	12-08-2025		TLM2	
2.	Rainfall- Run off Hydrograph	1	14-08-2025		TLM2	
3.	Flow duration curve- Mass curve	1	18-08-2025		TLM2	
4.	Site selection of hydro plant-layout	1	19-08-2025		TLM2	
5.	Types of hydro plants	2	21-08-2025 22-08-2025		TLM2	
6.	Tutorial-6	1	22-08-2025		TLM3	
7.	Numerical problems on hydro power generation	1	15-09-2025		TLM1	
8.	Nuclear Fission and Fusion - Nuclear Fuels	1	16-09-2025		TLM2	
9.	Breeding- Components of Reactor	1	18-09-2025		TLM2	
10.	Types of Nuclear Reactors-Pressurized water reactor(PWR)-	1	19-09-2025		TLM2	
11.	Tutorial-7	1	19-09-2025		TLM3	
12.	Boiling water reactor (BWR)	1	22-09-2025		TLM2	
13.	CANDU reactor-Gas cooled reactor	1	23-09-2025		TLM2	
14.	Liquid metal cooled reactor-Fast Breeder Reactor	1	25-09-2025		TLM2	
15.	Nuclear waste and its Disposal	1	26-09-2025		TLM2	
16.	Tutorial-8	1	26-09-2025		TLM3	
17.	Simple problems on nuclear power generation.	1	29-09-2025		TLM1	
No. of classes required to complete UNIT-III: 18				No. of classes taken:		

UNIT-IV : COMBINED CYCLE POWER GENERATION AND DIRECT ENERGY CONVERSION SYSTEMS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction, Working of cogeneration	1	03-10-2025		TLM2	
2.	Tutorial-9	1	03-10-2025		TLM3	
3.	combined cycles, Performance of Combined cycle	1	06-10-2025		TLM2	
4.	Future scenario of Combined Cycles	1	07-10-2025		TLM2	
5.	Numerical Problems on combined cycle.	1	09-10-2025		TLM1	
6.	Numerical Problems on combined cycle.	1	10-10-2025		TLM1	
7.	Tutorial-10	1	10-10-2025		TLM3	
8.	Solar cell- Fuel cell	1	13-10-2025		TLM2	
9.	Thermo Electric and Thermo ionic conversion system	1	14-10-2025		TLM2	
10.	MHD power generation	1	16-10-2025		TLM2	
11.	Numerical problems on fuel cell.	1	17-10-2025		TLM1	
12.	Tutorial-11	1	17-10-2025		TLM3	
No. of classes required to complete UNIT-IV:12				No. of classes taken:		

UNIT-V : ECONOMICS OF POWER GENERATION AND POLLUTION & CONTROL

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Factors affecting the economics, Load factor	1	20-10-2025		TLM2	
2.	Utilization factor, Performance and operating characteristics of Power Plants	1	23-10-2025		TLM2	
3.	Economic load sharing, Depreciation, Energy Rates	1	24-10-2025		TLM2	
4.	Tutorial-12	1	24-10-2025		TLM3	
5.	Energy rates	1	27-10-2025		TLM2	
6.	Criteria for optimum loading	1	28-10-2025		TLM2	
7.	Specific economic energy generation problems.	1	30-10-2025		TLM2	
8.	Introduction- Particulate and gaseous pollutants	1	31-10-2025		TLM2	
9.	Tutorial-13	1	31-10-2025		TLM3	
10.	Air and Water pollution by Thermal plants and its control	1	03-11-2025		TLM2	
11.	Acid rains -Methods to control pollution.	1	04-11-2025		TLM2	

12.	Numerical Problems on economics of power generation	2	06-11-2025 07-11-2025		TLM1	
13.	Tutorial-14	1	07-11-2025		TLM3	
14.	Revision	1	10-11-2025		TLM3	
15.	Revision	1	11-11-2025		TLM3	
16.	Revision	1	13-11-2025		TLM3	
17.	Revision	2	14-11-2025 14-11-2025		TLM3	
No. of classes required to complete UNIT-V: 19				No. of classes taken:		

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM4**	Demonstration(Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/Swayam Prabha/ MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

Academic Calendar

Description	From	To	Weeks
I Phase of Instructions	30-06-2025	23-08-2025	8
Technical Training	25-08-2025	06-09-2025	2
I MID Examinations	08-09-2025	13-09-2025	1
II Phase of Instructions	15-09-2025	15-11-2025	9
II MID Examinations	17-11-2025	22-11-2025	1
Preparation and Practicals	24-11-2025	29-11-2025	1
Semester End Examinations	01-12-2025	13-12-2025	2

PART-C

EVALUATION PROCESS (R20 Regulation):

Evaluation Task	**Marks**
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	M1=15
I-Quiz Examination (Units-I, II & UNIT-III (Half of the Syllabus))	Q1=10
Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)	A2=5
II-Descriptive Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	M2=15
II-Quiz Examination (UNIT-III (Remaining Half of the Syllabus),IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1),(M2+Q2+A2))+20% of Min((M1+Q1+A1),(M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE):M	30
Semester End Examination (SEE)	70
Total Marks = CIE+SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
PO 6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
PO 7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	To apply the principles of thermal sciences to design and develop various thermal systems.
PSO 2	To apply the principles of manufacturing technology, scientific management towards improvement of quality and optimization of engineering systems in the design, analysis and manufacturability of products.
PSO 3	To apply the basic principles of mechanical engineering design for evaluation of performance of various systems relating to transmission of motion and power, conservation of energy and other process equipment.

Course Instructor	Course Coordinator	Module Coordinator	HOD
Kamala Priya B	Kamala Priya B	Dr. P.Vijay Kumar	Dr. M B S Sreekar Reddy

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DEPARTMENT OF MECHANICAL ENGINEERING

COURSE HANDOUT

PART-A

DEPARTMENT OF MECHANICAL ENGINEERING
COURSE HANDOUT
PART - A

PROGRAM	**: B.Tech. - VII-Sem.- Mechanical Engineering – A& B Section**
ACADEMIC YEAR	**:** 2025-26
COURSE NAME & CODE	**: Total Quality management& 20ME35**
L-T-P STRUCTURE	**:** 4-0-0
COURSE CREDITS	**:** 3
COURSE INSTRUCTOR	**: Seelam Srinivasa Reddy, Assoc., Professor**
COURSE COORDINATOR	**: Seelam Srinivasa Reddy, Associate Professor**
PER-REQUISITE	**: Industrial Management**

COURSE EDUCATIONAL OBJECTIVES: The main objective of this course is to familiarize the concepts of quality management techniques in industries

COURSE OUTCOMES:

After completion of the course student will be able to:

CO1: Comprehend the principles and strategies of quality control(**Understanding - L2**).
CO2: Apply the principles of total quality management to improve the quality of the product**(Applying - L3)**.
CO3: Choose the appropriate statistical quality control tool to check the process capability. **(Applying - L3**).
CO4: Examine various TQM techniques for industrial applications **(Applying - L3)**.
CO5: Interpret ISO quality standards in an organization **(Understanding - L2)**.

COURSE ARTICULATION MATRIX(Correlation between Cos & POs, PSOs):

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1				2							3	3	3	3	3
CO2			3	3		2	2				3	3	3	3	3
CO3	3	3	3	3							3	3	3	3	3
CO4	2		3								3	3	3	3	3
CO5	1		3	3		2	2				3	3	3	3	3

Note: Enter Correlation Levels **1** or **2** or **3.** If there is no correlation, **put '-'**
1- Slight (Low), **2 -** Moderate (Medium), **3 -** Substantial (High).

BOS-APPROVEDTEXTBOOKS:

T : Dale H. Besterfiled., Total Quality Management, Pearson Education, 3rd Edition 2010

BOS APPROVED REFERENCE BOOKS:

R1. James R. Evans & William M. Lidsay, The Management and Control of Quality, South-Western (Thomson Learning), 2002.

R2. Feigenbaum.A.V, Total Quality Management, MCGraw-Hill, 2005.
R3. Narayana V. and Sreenivasan, N.S, Quality Management- Concepts and Tasks, New Age International, 2006.
R4. Zeiri, Total Quality Management for Engineers, Wood Head Publishers, 2009.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: **INTRODUCTION TO TQM**

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	**Introduction to TQM**	1	30-06-2025		TLM1	
2.	CEOs, Course Outcomes, POs and PSOs	1	1-07-2025		TLM1	
3.	Evolution of total quality management	1	3-07-2025		TLM2	
4.	Definition of Quality	1	4-07-2025		TLM2	
5.	Quality costs,	1	7-07-2025		TLM2	
6.	Quality Council	1	8-07-2025		TLM2	
7.	Strategic Planning	1	10-07-2025		TLM1	
8.	Deming Philosophy,Deming 14 principles	1	11-07-2025		TLM2	
9.	Barriers to TQM Implementation	1	14-07-2025		TLM1	
10.	**Assignment/** Quiz-1	1	15-07-2025		TLM2	
No. of classes required to complete UNIT-I: 10				**No. of classes taken:**		

UNIT-II: TQM PRINCIPLES

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
11.	Types of Customers, customer supply chain	1	17-07-2025		TLM1	
12.	Customer perception of quality, customer feedback.	1	18-07-2025		TLM2	
13.	customer retention, Service quality.	1	21-07-2025		TLM1	
14.	Employee Involvement, Motivation.	1	22-07-2025		TLM1	
15.	Maslow ‘s hierarchy of needs, Herzberg theory,	1	24-07-2025		TLM1	

16.	Empowerment and Teamwork, Performance appraisal, Benefits,	1	25-07-2025		TLM1	
17.	Continuous process improvement- Juran Trilogy.	1	28-07-2025		TLM2	
18.	PDSA cycle, 5S, Kaizen, Supplier	1	29-07-2025		TLM1	
19.	Partnership-Partnering, sourcing,	1	31-07-2025		TLM1	
20.	supplier selection,	1	01-08-2025		TLM1	
21.	Performance Measures-Basic Concepts, Strategy,	1	04-08-2025		TLM2	
22.	**Assignment/** Quiz	1	05-08-2025			
No. of classes required to complete UNIT-II: 12				**No. of classes taken:**		

UNIT-III: STATISTICAL PROCESS CONTROL

23.	STATISTICAL PROCESS CONTROL: The seven tools of quality,	1	07-08-2025		TLM2	
24.	Statistical Fundamentals,	1	11-08-2025		TLM1	
25.	Population and Sample,	1	13-08-2025		TLM1	
26.	Normal curve,	1	14-08-2025		TLM1	
27.	Control charts for variables	1	18-08-2025		TLM1	
28.	Problems solving	1	19-08-225		TLM1	
29.	Control charts for attributes	1	21-08-2025		TLM1	
30.	Problems solving	1	22-08-2025		TLM1	
I-Mid Exams :08-09-2025 To 13-09-2025						
31.	SIX SIGMA:	1	15-09-2025		TLM1	
32.	Introduction to six sigma	1	16-09-2025		TLM1	
33.	Indicators of six sigma	1	18-09-2025		TLM1	
34.	Principles	1	19-09-2025		TLM1	
35.	Process capability,	1	22-09-2025		TLM1	
36.	Advantages, Limitations	1	23-09-2025		TLM1	
37.	Applications.	1	25-09-2025		TLM3	
38.	**Assignment/ Quiz-III**	1	26-09-2025		TLM2	
No. of classes required to complete UNIT-III: 16						

UNIT-IV: TQM TOOLS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
39.	TQM TOOLS: Benchmarking,	1	29-09-2025		TLM2	
40.	Benchmarking Process,	1	03-10-2025		TLM1	
41.	Quality Function Deployment (QFD),	1	06-10-2025		TLM1	
42.	House of Quality, QFD Process	1	07-10-2025		TLM1	
43.	Taguchi Quality Loss Function,	1	9-10-2025		TLM2	
44.	Total Productive Maintenance Concept,	1	10-10-2025		TLM2	

45.	improvement needs,.	1	13-10-2025		TLM1	
46.	FMEA- Stages of FMEA	1	14-10-2025		TLM1	
47.	Revision	1	16-10-2025		TLM1	
48.	**Assignment/ /Quiz-IV**	1	17-10-2025		TLM1	
No. of classes required to complete UNIT-IV: 10				**No. of classes taken:**		

UNIT-V: QUALITY SYSTEMS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
49.	QUALITY SYSTEMS: Need for ISO 9000 and	1	20-10-2025		TLM1	
50.	other Quality systems,	1	23-10-2025		TLM1	
51.	ISO 9000:2000 Quality System,	1	24-10-2025		TLM1	
52.	Implementation of Quality system,	1	27-10-2025		TLM1	
53.	Documentation,	1	29-10-2025		TLM1	
54.	Quality Auditing,	1	30-10-2025		TLM1	
55.	TS 16949, - concepts.	1	31-10-2025		TLM1	
56.	ISO 14000-concepts	1	3-11-2025		TLM3	
57.	**Revison**	1	4-11-2025		TLM2	
58.	**Assignment/ Quiz-V**	1	6-11-2025		TLM1	
59.	**Beyond Syllabus -**.	1	7-11-2025		TLM2	
60.	**Beyond Syllabus -**.	1	10-11-225		TLM2	
61.	**Beyond Syllabus -**.	1	11-11-2025		TLM2	
62.	**Beyond Syllabus -**.	1	13-11-225		TLM2	
63.	**Beyond Syllabus -**.	1	14-11-2025		TLM2	
No. of classes required to complete UNIT-V: 15				**No. of classes taken:**		
II-Mid Exams :17-11-2025 To 22-11-2025						

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/Swayam Prabha/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

PART-C

EVALUATION PROCESS (R17 Regulation):

Evaluation Task	**Marks**
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	M1=15
I-Quiz Examination (Units-I, II & UNIT-III (Half of the Syllabus))	Q1=10
Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)	A2=5

II- Descriptive Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	M2=15
II-Quiz Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering Problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, Natural sciences, and engineering sciences.
PO 3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PO 6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO 7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the Engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO 12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	To apply the principles of thermal sciences to design and develop various thermal systems.
PSO 2	To apply the principles of manufacturing technology, scientific management towards Improvement of quality and optimization of engineering systems in the design, analysis and manufacturability of products.
PSO 3	To apply the basic principles of mechanical engineering design for evaluation of performance of various systems relating to transmission of motion and power, conservation of energy and other process equipment.

Faculty Name	**Mr.S.Srinivasa Reddy**	**Mr.S.Srinivasa Reddy**	**Mr.J.Subba Reddy**	**Dr.M.B.S. Sreekara Reddy**
Designation	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**HOD**
Signature				

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L.B. REDDY NAGAR, MYLAVARAM, KRISHNA DIST., A.P.-521 230.
Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF CIVIL ENGINEERING

COURSE HANDOUT
PART-A

Name of Course Instructor : B NARASIMHARAO
Course Name & Code : DISASTER MANAGEMENT & 20CE82
L-T-P Structure : 3-0-0 Credits : 3
Program/Sem/Sec : B.Tech., MECH-A/VII-Sem., A.Y : 2025-26

PRE-REQUISITE: NIL

COURSE EDUCATIONAL OBJECTIVES (CEOs): This course deals with different types of disasters, impacts of disasters, importance of technology in handling disaster management situations, importance of planning and risk prevention in case of occurrence of disaster, importance of education and community approach for the responsive actions to be taken in case of occurrence of disaster.

COURSE OUTCOMES (COs): At the end of the course, students are able to

CO 1	Identify the basic terms, types of disasters and their impact (Understand – L2)
CO 2	Illustrate the role of technology in handling disaster management situations (Understand-L2)
CO 3	Identify the stake-holders concerned and design the different action plans for responding in case of disaster occurrence (Understand – L2)
CO 4	Evaluate the importance of education and community approach for the responsive actions to be taken in case of disaster occurrence (Understand – L2)

COURSE ARTICULATION MATRIX (Correlation between COs, POs & PSOs):

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	-	1	2	1	-	-	-	-	-	1	2	1	2
CO2	1	1	1	2	2	1	-	-	-	-	-	1	2	1	2
CO3	1	-	-	1	2	1	1	1	-	-	-	1	1	1	2
CO4	1	-	-	1	1	1	1	1	1	1	1	1	1	1	2

Note: Enter Correlation Levels **1** or **2** or **3.** If there is no correlation, **put '-'**
1- Slight (Low), **2** – Moderate (Medium), **3** - Substantial (High).

TEXT BOOKS:

T1 Tushar Bhattacharya, "Disaster Science and Management", Tata McGraw Hill Publications, New Delhi, 2012.
T2 R.Subramanian, "Disaster Management ", Vikas Publishing house Pvt. Ltd, 2022.

REFERENCE BOOKS:

R1 G.K. Ghosh, "Disaster Management", APH Publishing Corporation, 2006.
R2 U.K. Chakrabarty, "Industrial Disaster Management and Emergency Response", Asian Books Pvt. Ltd., New Delhi 2007.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT –I: DEFINITIONS & TYPES OF DISASTER

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction	1	**30-06-2025**		**TLM2**	
2.	Introduction to Disaster Management	1	**02-07-2025**		**TLM2**	
3.	Basic definitions	1	**04-07-2025**		**TLM2**	
4.	Types of Disasters	1	**05-07-2025**		**TLM2**	
5.	Concept of disaster management	1	**07-07-2025**		**TLM2**	
6.	Disaster management cycle	1	**09-07-2025**		**TLM2**	
7.	Vulnerability	1	**11-07-2025**		**TLM2**	
8.	Mitigation	1	**14-07-2025**		**TLM2**	
9.	Natural disasters: Drought and cyclone	1	**16-07-2025**		**TLM2**	
10.	Natural disasters: Earthquake and landslides	1	**18-07-2025**		**TLM2**	
11.	Engineering	1	**19-07-2025**		**TLM2**	
12.	Technical failure	1	**21-07-2025**		**TLM2**	
13.	Nuclear and chemical disaster	1	**23-07-2025**		**TLM2**	
14.	Accident-related disasters	1	**25-07-2025**		**TLM2**	
15.	HPC on DM in India-	1	**28-07-2025**		**TLM2**	
16.	DM Act 2005	1	**30-07-2025**		**TLM2**	
17.	Revision		**01-08-2025**		**TLM2**	
No. of classes required to complete UNIT-I:15				No. of classes taken:		

UNIT-II: IMPACT OF DISASTERS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Impacts due to earthquake and cyclone	1	**02-08-2025**		**TLM2**	
2.	Impacts due to landslides and fire hazards	1	**04-08-2025**		**TLM2**	
3.	Impacts on life &livestock and habitation	1	**06-08-2025**		**TLM2**	
4.	Impacts on habitation	1	**08-08-2025**			
5.	Agriculture & livelihood loss	1	**11-08-2025**		**TLM2**	
6.	Health hazards		**13-08-2025**		**TLM2**	
7.	Malnutrition problems	1	**18-08-2025**		**TLM2**	
8.	Contamination of water	1	**20-08-2025**		**TLM2**	
9.	Impact on children- environmental loss	1	**22-08-2025**		**TLM2**	
10.	Revision		**23-08-2025**		**TLM2**	
No. of classes required to complete UNIT-II:08				No. of classes taken:		

UNIT-III: ROLE OF TECHNOLOGY IN DISASTER MANAGEMENT

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Role of remote sensing	1	**25-08-2025**		**TLM2**	
2.	Information system and decision-making tool	1	**29-08-2025**		**TLM2**	
3.	DM for infra structure	1	**30-08-2025**		**TLM2**	
4.	DM for electrical substances	1	**01-09-2025**		**TLM2**	
5.	DM for roads and bridges	1	**03-09-2025**		**TLM2**	
6.	Revision	1	**05-09-2025**		**TLM2**	
7.	Revision	1	**06-09-2025**		**TLM2**	
8.	Mitigation programme for earthquakes	1	**15-09-2025**		**TLM2**	
9.	Geospatial information in agriculture drought assessment	1	**17-09-2025**		**TLM2**	
10.	Multimedia technology in disaster risk management and training	1	**19-09-2025**		**TLM2**	
11.	Transformable indigenous knowledge in disaster reduction	1	**20-09-2025**		**TLM2**	
12.	Transformable indigenous knowledge in disaster reduction	1	**22-09-2025**		**TLM2**	
13.	Revision		**24-09-2025**		**TLM2**	
No. of classes required to complete UNIT-III:11				No. of classes taken:		

UNIT- IV: PLANNING & RISK PREVENTION

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction	1	**26-09-2025**		**TLM2**	
2.	Planning	1	**27-09-2025**			
3.	Early warning system	1	**06-10-2025**		**TLM2**	
4.	Crisis intervention and management	1	**08-10-2025**		**TLM2**	
5.	Response and Rehabilitation after Disasters	1	**10-10-2025**		**TLM2**	
6.	Temporary shelter – food and nutrition-safe drinking water	1	**13-10-2025**		**TLM2**	
7.	Rehabilitation after cyclones	1	**15-10-2025**		**TLM2**	
8.	Response to drought	1	**17-10-2025**		**TLM2**	
9.	Response to river erosion	1	**18-10-2025**		**TLM2**	
10.	Response after earthquake	1	**20-10-2025**		**TLM2**	
11.	Response after Tsunami- Hunger and Disaster	1	**22-10-2025**		**TLM2**	
12.	Revision		**24-10-2025**			
No. of classes required to complete UNIT-IV:11				No. of classes taken:		

UNIT-V: EDUCATION AND COMMUNITY PREPAREDNESS & CASE STUDIES

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction	1	**25-10-2025**		**TLM2**	
2.	Essentials of disaster education	1	**27-10-2025**			
3.	School awareness and safety programs, Community based disaster recovery	1	**29-10-2025**		**TLM2**	
4.	Voluntary agencies and community	1	**31-10-2025**		**TLM2**	

	participation at various stages of disaster management					
5.	Building community capacity for action	1	**01-11-2025**		**TLM2**	
6.	Corporate sector and disaster risk reduction	1	**03-11-2025**		**TLM2**	
7.	A community focused approach	1	**05-11-2025**		**TLM2**	
8.	Case studies on different disasters in the world-1	1	**07-11-2025**		**TLM2**	
9.	Case studies on different disasters in the world-2	1	**10-11-2025**		**TLM2**	
10.	Case studies on different disasters in the world-3	1	**12-11-2025**		**TLM2**	
11.	Case studies on different disasters in the world-4	1	**14-11-2025**		**TLM2**	
12.	Revision		**15-11-2025**			
No. of classes required to complete UNIT-V:11				No. of classes taken:		

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/Swayam Prabha/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

PART-C

EVALUATION PROCESS (R20 Regulations):

Evaluation Task	**Marks**
Assignment-I (Unit-I)	A1=5
Assignment-II (Unit-II)	A2=5
I-Mid Examination (Units-I & II)	M1=15
I-Quiz Examination (Units-I & II)	Q1=10
Assignment-III (Unit-III)	A3=5
Assignment-IV (Unit-IV)	A4=5
Assignment-V (Unit-V)	A5=5
II-Mid Examination (Units-III, IV & V)	M2=15
II-Quiz Examination (Units-III, IV & V)	Q2=10
Assignment Marks = Best Four Average of A1, A2, A3, A4, A5	A=5
CIE-I (Mid-I, Assignment-I. Quiz-I)	30
CIE-II (Mid-II, Assignment-II. Quiz-II)	30
Cumulative Internal Examination (CIE): 80% best and 20% least	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO 6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO 7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Possesses necessary skill set to analyze and design various systems using analytical and software tools related to civil engineering
PSO 2	Possesses ability to plan, examine and analyze the various laboratory tests required for the professional demands
PSO 3	Possesses basic technical skills to pursue higher studies and professional practice in civil engineering domain

Course Instructor	Course Coordinator	Module Coordinator	HOD
(B NARASIMHARAO)	(B NARASIMHARAO)	(B NARASIMHARAO)	(Dr.K.V.R)

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L.B.Reddy Nagar, Mylavaram-521230, Krishna Dist, Andhra Pradesh, India

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : Dr.A.V.G.A.Marthanda
Course Name & Code : Utilization of Electrical Energy & 20EE83
L-T-P Structure : 3-0-0 Credits : 3
Program/Sem/Sec : B.Tech, ME-A., VII-Sem. A.Y : 2025-26

Pre-requisites : --NIL

Course Educational Objective: This course enables the student to familiarize with characteristics of various drives, comprehend the different issues related to heating, welding and illumination.

COURSE OUTCOMES (COs): At the end of the course, students are able to

CO 1	Understand mechanism of electric heating and electric welding**(Understanding –L2)**
CO 2	Analyze performance of various lighting schemes**(Understanding –L2)**
CO 3	Analyze the performance of electric drive systems**(Understanding –L2)**
CO 4	Illustrate the different schemes of traction and its main components **(Understanding –L2)**
CO5	Understand various tariff methods and power factor improvement techniques **(Understanding –L2)**

COURSE ARTICULATION MATRIX (Correlation between COs, POs & PSOs):

Cos	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO a	PSO b	PSO c
CO1	2	2	2												
CO2	2	2	2								2				
CO3	2	2	2												
CO4	2	2	2								2				
CO5	2	2	2								2				

Note: Enter Correlation Levels **1** or **2** or **3.** If there is no correlation, **put '-'**
1- Slight (Low), **2 –** Moderate (Medium), **3 -** Substantial (High).

TEXT BOOKS:

T1: C.L.Wadhwa "Generation, Distribution and Utilization of Electrical energy, New Age International Publishers,3rd Edition,2015.

T2: N.V.Suryanarayana "Utilization of electric power including electric drives and electric traction, New age international publishers New Delhi,2nd edition 2014.

REFERENCE BOOKS:

R1: Art & Science of Utilization of electrical Energy, Partab, Dhanpat Rai & Co., 2004.
R2: Utilization of Electric Energy, E. Openshaw Taylor and V. V. L. Rao, Universities Press, 2009.

Part - B
COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I : ELECTRIC HEATING &WELDING

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction, CEO's &CO's	1	30-06-2025		TLM1	
2.	Advantages &applications of Electric heating	1	02-07-2025		TLM2	
3.	Classification of electric heating	1	03-07-2025		TLM2	
4.	Resistance heating	1	05-07-2025		TLM2	
5.	Arc heating	1	07-07-2025		TLM2	
6.	Induction heating	1	9-07-2025		TLM2	
7.	dielectric heating	1	10-07-2025		TLM2	
8.	Causes of failures of heating elemdents	1	12-07-2025		TLM2, TLM6	
9.	Materials for heating elements	1	14-07-2025		TLM2, TLM6	
10.	Requirement of good heating material	1	16-07-2025		TLM2	
11.	ARC Furnace	1	17-07-2025		TLM2, TLM4	
12.	Resistance welding	1	19-07-2025		TLM2	
13.	Spot welding,seam welding	1	21-07-2025		TLM2, TLM4	
14.	,Arc welding	1	23-07-2025		TLM2, TLM4	
15.	Comparision between AC and DC welding	1	24-07-2025		TLM2, TLM6	
No. of classes required to complete UNIT-I : 15					No. of classes taken:	

UNIT-II : ILLUMINATION ENGINEERING

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
16	Introduction	1	28-07-2025		TLM1	
17	Nature of light	1	30-07-2025		TLM2	
18	Laws of illumination	1	02-08-2025		TLM1	
19	Laws of illumination	1	02-08-2025		TLM1	
20	Lighting schemes, sources of light	1	04-08-2025		TLM2	
21	Fluorescent Lamp, CFL and LED	1	06-08-2025		TLM1, TLM4	
22	Sodium Vapor Lamp	1	08-08-2025		TLM1, TLM4	
23	Neon lamps	1	11-08-2025		TLM1, TLM2	
24	mercury vapor lamps	1	13-08-2025		TLM1, TLM2	

25	Comparision between tungsten &fluroscent tubes	1	14-08-2025		TLM1, TLM2	
26	Requirements of good lighting	1	18-08-2025		TLM2, TLM6	
27	Street lighting	1	20-08-2025		TLM2	
28	Assignment/Quiz	1	21-08-2025		TLM1	
No. of classes required to complete UNIT-II : 13					No. of classes taken:	

UNIT-III: ELECTRIC DRIVES

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
29	Introduction	1	23-08-2025		TLM2	
30	Elements of drive, advantages	1	15-09-2025		TLM2	
31	Factors affecting selection of motor	1	17-09-2025		TLM2	
32	Types of loads	1	18-09-2025		TLM2	
33	Industrial applications	1	20-09-2025		TLM1, TLM2	
34	Transient Characteristics of drives	1	22-09-2025		TLM1, TLM2	
35	Steady state characteristics of drives	1	24-09-2025		TLM1, TLM2	
36	Size of motor	1	25-09-2025		TLM1, TLM2	
37	Load Equalization	1	27-09-2025		TLM2	
38	Industrial applications Assignment/Quiz	1	04-10-2025		TLM1, TLM2	
No. of classes required to complete UNIT-III : 10					No. of classes taken:	

UNIT-IV : ELECTRIC TRACTION

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
39	Introduction	1	04-10-2025		TLM2	
40	Requirement of an ideal traction system	1	06-10-2025		TLM2	
41	Supply system for electric traction	1	08-10-2025		TLM2	
42	Train movement	1	9-10-2025		TLM2	
43	mechanism of train movement	1	11-10-2025		TLM2	
44	Traction motors	1	13-10-2025		TLM1, TLM2	
45	Modern trends in electric traction	1	15-10-2025		TLM2, TLM6	
46	Automation in traction	1	16-10-2025		TLM1, TLM2	
47	Speed time curves for different services	1	18-10-2025		TLM1, TLM2	

48	Trapezoidal speed time curves	1	20-10-2025		TLM1, TLM2	
49	Quadrilateral speed time curves	1	22-10-2025		TLM1	
50	Problems on train movement	1	23-10-2025		TLM1	
51	Assignment/quiz	1	25-10-2025		TLM2	
No. of classes required to complete UNIT-IV : 13					No. of classes taken:	

UNIT-V: TARIFF AND POWER FACTOR IMPROVEMENT

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	**Teaching Learning Methods**	HOD Sign Weekly
52	Desirable characteristics	1	27-10-2025		TLM2	
53	Types of Tariff, Flat rate, Block-rate	1	29-10-2025		TLM2	
54	KVA maximum demand	1	01-11-2025		TLM1, TLM2	
55	Time of Day tariff	1	03-11-2025		TLM1, TLM2	
56	Disadvantages of low power factor, Advantages of improved p.f	1	05-11-2025		TLM1, TLM2	
57	Improvement devices , Power factor improvement using static capacitor	1	06-11-2025		TLM1, TLM2	
58	Most economical power factor	1	10-11-2025		TLM2	
59	Location of power factor improvement devices from consumer	1	12-11-2025		TLM1, TLM2	
60	REVISION	1	13-11-2025		TLM1, TLM2	
61	REVISION	1	15-11-2025		TLM1, TLM2	
No. of classes required to complete UNIT-V : 10					No. of classes taken:	

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
44	Economic aspects in utilization of electrical energy	2	28-10-2025 & 01-11-2025		TLM2, TLM6	

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/Swayam Prabha/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

PART-C

EVALUATION PROCESS (R20 Regulation):

Evaluation Task	Marks
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	M1=15
I-Quiz Examination (Units-I, II & UNIT-III (Half of the Syllabus))	Q1=10
Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)	A2=5
II- Descriptive Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	M2=15
II-Quiz Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions	30-06-2025	23-08-2025	8 W
Technical Training	25-08-2025	06-09-2025	2 W
I Mid Examinations	08-09-2025	13-09-2025	1 W
II Phase of Instructions	15-09-2025	15-11-2025	9 W
II Mid Examinations	17-11-2025	22-11-2025	1 W
Preparation and Practicals	24-11-2025	29-11-2025	1 W
Semester End Examinations	01-12-2025	13-12-2025	2 W

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations

PO 6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
PO 7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO1: The ability to apply Software Engineering practices and strategies in software project development using open source programming environment for the success of organization.

PSO2: The ability to design and develop computer programs in networking, web applications and IoT as per the society needs.

PSO3: To inculcate an ability to analyze, design and implement database applications.

Dr.A.V.G.A. Marthanda	Dr.A.V.G.A. Marthanda	Dr.M.S. Giridhar	Dr. P. Sobha Rani
Course Instructor	**Course Coordinator**	**Module Coordinator**	**HOD**

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DEPARTMENT OF MECHANICAL ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr.K.V.Viswanadh, Dr. Ch. Siva Sankara Babu, Mr.V.Sankararao

Course Name & Code **:** Practical FEA using Hypermesh and LS-Dyna (23MES4)

Regulation : R23

L-T-P Structure **: 1-0-3** **Credits:** 02

Program/Sem/Sec : B.Tech – VIII Semester – A Section **A.Y.:** 2024-25

PREREQUISITE: Finite Element Method, Computer Aided Machinde Drawing

COURSE EDUCATIONAL OBJECTIVES (CEOs):

The main objective of this course is to improve the modelling and analysis skills of students in Hypermesh & LS-Dyna.

COURSE OUTCOMES (COs): At the end of the course, student will be able to

CO1	Apply the report writing skills in the document after training (Applying-L3)
CO2	Evaluate the quality report writing skills in the document (Applying-L3)
CO3	Organize thoughts and ideas into a compelling presentation. (Applying-L3)
CO4	Compile/Interact information together in a different way by combining artifacts (Applying-L3)

COURSE ARTICULATION MATRIX (Correlation between COs, POs & PSOs):

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	1	3	1	3			1	2			2	1		1
CO2	3	2	3	2	3			1	2			2	3		3
CO3	1	1	3	1	3			1	2			2	1		1
CO4	3	2	3	2	3			1	2			2	1		1
1 - Low						**2** –Medium						**3** - High			

SOFTWARE PACKAGES:ANSYS

Web REFERENCES:

1.https://www.slideshare.net/nageshsurner/introduction-to-ansys-workbench-80635115
2.https://www.youtube.com/watch?v=C8WvCQpzT2A
3.https://www.youtube.com/watch?v=FwKkjAr9Kbk
4.https://www.youtube.com/watch?v=6QaFX1CG-ZE

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/Swayam Prabha/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

Schedule of Experiments: Tuesday (from 10.00 AM – 11.00 PM & 1.00 PM – 4.00 PM)

S. No.	Topics to be covered (Experiment Name)	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
01	Introduction to Altair Hypermesh	4	**01-07-2025**		TLM2	
02	Hypermesh Preprocessing-Geometry, properties, Materials	4	08-07-2025		TLM2	
03	Hypermesh Preprocessing-Meshing-1D, 2D & 3D meshing	4	15-07-2025		TLM2	
04	Hypermesh Preprocessing-Intersection & penetration	4	22-07-2025		TLM2	
05	Hypermesh Preprocessing-Connectors, Loads & Boundary Conditions	4	29-07-2025		TLM2	
06	Hypermesh Preprocessing-Contacts, Control Cards & Database cards	4	05-08-2025		TLM2	
07	Solution in LS-Dyna	4	12-08-2025		TLM2	
08	Post Processing for stress, strain & deformation	4	19-08-2025		TLM2	
Technical Training & I Mid Exams: 25-08-2025 to 03-09-2025						
08	Selection of Hypermesh Project	4	16-09-2025		TLM6	
09	Project work Excecution	4	23-09-2025		TLM6	
10	Project work Excecution	4	30-09-2025		TLM6	
11	Review on the Project	4	07-10-2025		TLM6	
12	Completion of Project	4	14-10-2025		TLM6	
13	Report Preperation	4	21-10-2025		TLM6	
14	Review on the Project	4	28-10-2025		TLM6	
15	Submission of Rough Document	4	04-11-2025		TLM6	
16	Completion of report	4	11-11-2025		TLM6	
II Mid Exams:07-04-2025 to 12-04-2025						
No. of classes required to complete: 56				**No. of classes taken:**		

PART-B

EVALUATION PROCESS (R23 Regulation):

Evaluation Task	Marks
Semester End Examination	
Report	10
Quality of work	10
Presentation	20
Interaction / Queries	10
Total Marks:	**50**

Academic calendar

Commencement of IV Semester Classwork	30-06-2025		
Description	**From**	**To**	**Weeks**
I Phase of Instructions	30-06-2025	23-08-2025	8 W
Technical Training	25-08-2025	06-09-2025	2 W
I Mid Examinations	08-09-2025	13-09-2025	1 W
II Phase of Instructions	15-09-2025	15-11-2025	9 W
II Mid Examinations	17-11-2025	22-11-2025	1 W
Preparation and Practicals	24-11-2025	29-11-2025	1 W
Semester End Examinations	01-12-2025	13-12-2025	2 W
Commencement of V Semester Classwork	**15 – 12– 2025**		

Lab Occupancy Time Table (B.Tech IV Sem: A Section)

↓Day/Date→	09.00 – 10.00	10.00 – 11.00	11.00 – 12.00	12.00- 01.00	01.00 – 02.00	02.00 – 03.00	03.00 – 04.00
Monday				LUNCH BREAK			
Tuesday		VII Sem (A/S)			VII Sem (A Sec)		
Wednesday							
Thursday							
Friday							
Saturday							

Faculty – In Charges:

S.No	Class	Section	Faculty – In Charge	Lab Technician
1	B.Tech – IV Semester	A	Mr.K.V.Viswanadh, Dr.A.Nageswara Rao Mrs.B.Kamala Priya	Mr. Jamala Reddy

PART-C

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

PEO 1	To build a professional career and pursue higher studies with sound knowledge in Mathematics, Science and Mechanical Engineering.
PEO 2	To inculcate strong ethical values and leadership qualities for graduates to become successful in multidisciplinary activities.
PEO 3	To develop inquisitiveness towards good communication and lifelong learning.

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO 4	**Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PO 6	**The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO 7	**Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO10	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO11	**Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO12	**Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	To apply the principles of thermal sciences to design and develop various thermal systems.
PSO 2	To apply the principles of manufacturing technology, scientific management towards improvement of quality and optimization of engineering systems in the design, analysis and manufacturability of products.
PSO 3	To apply the basic principles of mechanical engineering design for evaluation of performance of various systems relating to transmission of motion and power, conservation of energy and other process equipment.

Signature				
Name of the Faculty	Mr.K.V.Viswanadh, Dr.A.Nageswara Rao Mrs.B.Kamala Priya	K.V.Viswanadh	Dr.B.Sudheer Kumar	Dr.M.B.S.Sreekara Reddy
Designation	Course Instructors	Course Coordinator	Module Coordinator	HoD

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DEPARTMENT OF MECHANICAL ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Mr. SEELAM SRINIVASA REDDY

Course Name & Code : INDUSTRIAL ECONOMICS AND MANAGEMENT & 20HS03

L-T-P Structure : 4-0-0 **Credits:** 03

Program/Sem/Sec : B.Tech/VII/A -SEC **A.Y.:** 2025-26

PREREQUISITE: Nil

COURSE EDUCATIONAL OBJECTIVES (CEOs):

COURSE OUTCOMES (COs): At the end of the course, student will be able to

CO1	Comprehend the principles of Management. (Understanding-L2)
CO2	Estimate the budget requirements considering break even analysis for industrial applications.(Applying-L3)
CO3	Implement work study techniques to identify the effective method of production. (Applying-L3)
CO4	Apply the principles of quality control to check the process capability and quality of the product. (Applying-L3)
CO5	Describe the functions of human resource management. (Understanding-L2)

COURSE ARTICULATION MATRIX (Correlation between COs, POs & PSOs):

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1						3		1	2	1	3	2		3	
CO2						3		1	2	1	3	2		3	
CO3						3		1	2	1	3	2		3	
CO4						3		1	2	1	3	2		3	
CO5						3		1	2	1	3	2		3	
1 - Low						**2** –Medium							**3** - High		

TEXTBOOKS:

T1 Dr A.R.Aryasri, Management Science; TMH, 4th Edition 2009

REFERENCE BOOKS:

R1 Neville Stanton et al., Handbook of Human Factors and Ergonomics Methods; CRC press, 2009

R2 Khan MI; Industrial Ergonomics; PHI Learning

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: INTRODUCTION, ORGANIZATIONAL STRUCTURE

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	INDUSTRIAL ECONOMICS AND MANAGEMENT Introduction	01	30-06-2025			
2.	Management – Definition, Nature, Importance of management	01	2-07-2025			
3.	Functions of Management	01	3-07-2025			
4.	Taylor's scientific management theory	01	4-07-2025			
5.	Fayal's principles of management	01	7-07-2025			
6.	Contribution of Elton mayo, Maslow,	01	9-07-2025			
7.	Herzberg, Douglas Mc Gregor Theories	01	10-07-2025			
8.	Basic concepts of Organization	01	11-07-2025			
9.	Departmentation and Decentralization	01	14-07-2025			
10.	Organization structures, Line organization, Functional organization,	01	16-07-2025			
11.	Committee organization, Matrix organization	01	17-07-2025			
12.	Revision/Assignment/Quiz	01	18-07-2025			
No. of classes required to complete UNIT-I: 12				**No. of classes taken:**		

UNIT-II: COST ANALYSIS, CAPITAL BUDGETING

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
13.	COST ANALYSIS: Cost concepts	1	21-07-2025			
14.	Break-even Analysis (BEA)	1	23-07-2025			
15.	Determination of Break-Even Point (simple problems)	1	24-07-2025			
16.	Simple problems	1	25-07-2025			
17.	Managerial Significance	1	28-07-2025			
18.	CAPITAL BUDGETING: Capital and its significance	1	30-07-2025			
19.	Types of Capital	1	31-07-2025			
20.	Estimation of Fixed and Working capital requirements	1	01-08-2025			
21.	Methods and sources of raising capital	1	04-08-2025			
22.	Trading Forecast	1	06-08-2025			
23.	Capital Budget, Cash Budget	1	07-08-2025			
24.	Revision/Assignment/Quiz	1	11-08-2025			
No. of classes required to complete UNIT-II: 12				**No. of classes taken:**		

UNIT-III: OPERATONS MANAGEMENT, WORK STUDY

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
25.	OPERATONS MANAGEMENT	1	14-08-2025			
26.	Plant location	1	18-08-2025			
27.	Factors influencing location	1	20-08-2025			
28.	Principles and types of plant layouts	1	13-08-2025			
29.	Methods of production: Job batch	1	21-08-2025			
30.	Mass production , Applications	1	22-08-2025			
31.	WORK STUDY	1	15-09-2025			
32.	Basic procedure	1	17-09-2025			
33.	Method study	1	18-09-2025			
34.	Work measurement	1	19-09-2025			
35.	Advantages, limitations, Applications.	1	22-09-2025			
36.	Applications.	1	24-09-2025			
37.	Revision/Assignment/Quiz	1	25-09-2025			
No. of classes required to complete UNIT-III: 13				**No. of classes taken:**		

UNIT-IV: QUALITY AND MATERIALS MANAGEMENT

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
38.	QUALITY AND MATERIALS MANAGEMENT	1	26-09-2025			
39.	Statistical quality control	1	29-09-2025			
40.	Meaning Variables	1	03-10-2025			
41.	Attributes	1	06-10-2025			
42.	X chart,	1	08-10-2025			
43.	R Chart	1	9-10-2025			
44.	Simple Problems	1	10-10-2025			
45.	Simple Problems	1	13-10-2025			
46.	Acceptance sampling	1	15-10-2025			
47.	Sampling plans	1	16-10-2025			
48.	Deming's contribution to quality	1	17-10-2025			
49.	RevisionAssignment//Quiz	1	20-10-2025			
No. of classes required to complete UNIT-IV: 12				**No. of classes taken:**		

UNIT-V: HUMAN RESOURCE MANAGEMENT (HRM), FUNCTIONS OF HR MANAGER

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
50.	**Human Resource Management:** Introduction to HRM	1	22-10-2025			
51.	Concepts of HRM	1	23-10-2025			
52.	Personal Management and	1	24-10-2025			
53.	Industrial Relations	1	27-10-2025			
54.	**Functions of HR Manager**: Manpower planning,	1	29-10-2025			
55.	Recruitment,	1	30-10-2025			
56.	Selection, Training and	1	31-10-2025			

57.	Development, placement,	1	30-10-2025			
58.	Wage and salary administration,	1	31-10-2025			
59.	Transfers Separation	1	03-11-2025			
60.	Performance appraisal,	1	6-11-2025			
61.	Job evaluation and	1	7-11-2025			
62.	Merit rating.	1	10-11-225			
63.	Revision /Assignment/Quiz	1	12-11-2025			
64.	Beyond syllabus	1	13-11-2025			
65.	Beyond syllabus	1	14-11-2025			
No. of classes required to complete UNIT-V: 15				**No. of classes taken:**		

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/Swayam Prabha/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

PART-C

EVALUATION PROCESS (R20 Regulation):

Evaluation Task	**Marks**
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	M1=15
I-Quiz Examination (Units-I, II & UNIT-III (Half of the Syllabus))	Q1=10
Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)	A2=5
II- Descriptive Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	M2=15
II-Quiz Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem Analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design / Development of Solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct Investigations of Complex Problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO 6	**The Engineer and Society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO 7	**Environment and Sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and Team Work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project Management and Finance:** Demonstrate knowledge and understanding of the ring and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long Learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	To apply the principles of thermal sciences to design and develop various thermal systems.
PSO 2	To apply the principles of manufacturing technology, scientific management towards improvement of quality and optimization of engineering systems in the design, analysis and manufacturability of products.
PSO 3	To apply the basic principles of mechanical engineering design for evaluation of performance of various systems relating to transmission of motion and power, conservation of energy and other process equipment.

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Mr. Seelam Srinvasa Reddy**	**Dr. S. Pichi Reddy**	**Mr. J. Subb Reddy**	**Dr. M.B.S.Sreekar Reddy**
Signature				

LAKKIREDDY BALI REDDY COLLEGE OF ENGINEERING
DEPARTMENT OF MECHANICAL ENGINEERING
(Autonomous & Affiliated to JNTUK, Kakinada & Approved by AICTE, New Delhi, Accredited by NBA, Certified by ISO 9001:2015)
L B Reddy Nagar, Mylavaram-521 230, Krishna District, Andhra Pradesh.

COURSE HANDOUT

PROGRAM : B.Tech., VII-Sem. ME B-Section

ACADEMIC YEAR : 2025-2026

COURSE NAME & CODE : Refrigeration and Air-Conditioning - 20ME24

L-T-P STRUCTURE : 2-1-0

COURSE CREDITS : 3

COURSE INSTRUCTOR : **Dr. V. DHANA RAJU**

COURSE COORDINATOR : **Dr. V. DHANA RAJU**

PRE-REQUISITE: Thermodynamics

COURSE OBJECTIVE: In a broader way, this course provides the simple understanding of refrigeration and air conditioning fundamentals. First, it covers the different refrigeration cycles and its analysis. Then the concepts of psychrometry and psychrometry processes used for air conditioning are imparted. Finally, the concepts of comfort air conditioning, cooling load design and its estimation are addressed.

COURSE OUTCOMES (COs)

CO1: Describe the basic concepts of refrigeration and its applications.
CO2: Evaluate the performance parameters of refrigeration systems.
CO3: Identify the desirable refrigerants and its use in various refrigeration systems.
CO4: Analyze the psychrometric properties and processes used in Air Conditioning systems.
CO5: Design of Air Conditioning systems for thermal comfort conditions.

COURSE ARTICULATION MATRIX (Correlation between COs&POs,PSOs):

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1	2	2	2	2		2	2					2	3		
CO2	3	3	3	2		2	2					2	3		
CO3	2	2	2	2		3	3					2	2		
CO4	3	3	2	2		2	2					2	2		
CO5	3	3	3	2		2	2					2	3		

Note: Enter Correlation Levels **1** or **2** or **3.** If there is no correlation, **put '-'**
1- Slight(Low), **2 -** Moderate(Medium), **3 -** Substantial (High).

BOS APPROVED TEXT BOOKS:

T1 C. P. Arora. , Refrigeration and air conditioning - TMH, 2nd Edition, 2000.

T2 R. Dossat, Principles of Refrigeration - - Pearson 4th Edition 2001.

BOS APPROVED REFERENCE BOOKS:

R1 S. C. Arora, Domkundwar, A course in refrigeration and air conditioning-Dhanapat Rai& sons 5th Edition 1997.

R2 Wilbert F.Stoecker, Jerold W. J.Jones, MGH, 1986.

R3 Manohar Prasad, Refrigeration and Air conditioning, New Age international, 2003

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

UNIT-I FUNDAMENTALS OF REFRIGERATION

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	Textbook followed	HOD Sign Weekly
1.	**Unit-1:** Introduction to R&AC	1	30-06-2025		TLM2	CO1	**T1**	
2.	Unit of refrigeration and COP	1	01-07-2025		TLM2	CO2	**T1**	
3.	Heat Engine, Refrigerator and Heat pump	1	03-07-2025		TLM2	CO1	**T1**	
4.	Types of Refrigeration systems	1	05-07-2025		TLM2	CO1	**T1**	
5.	Problems on refrigeration basics	1	07-07-2025		TLM2, TLM 4	CO2	**T1**	
6.	**Refrigerant:** Desirable characteristics of ideal refrigerant	1	08-07-2025		**TLM2**	CO3	**T1**	
7.	Classification of refrigerants- Desirable Properties-Nomenclature, Refrigerant Designation	1	10-07-2025		**TLM 1**	CO3	**T1**	
8.	Commonly used refrigerants, Alternate refrigerants, Green House effect& Global	1	14-07-2025		**TLM 1**	CO3	**T1**	
9.	**Air refrigeration system**: working on Reversed Carnot cycle	1	15-07-2025		**TLM 1**	CO2	**T1**	
10.	Air refrigeration system working on Bell Coleman cycle, Air refrigeration Problems	1	17-07-2025		**TLM 1**	CO2	**T1**	
11.	COP- Open and Dense air systems Problems	1	19-07-2025		**TLM 1**	CO2	**T1**	
12.	Tutorial-1	1	21-07-2025		**TLM 1**	CO2	**T1**	
No. of classes required to complete UNIT-I = 12			No. of classes taken:					

UNIT-II VAPOUR COMPRESSION REFRIGERATION SYSTEM & COMPONENTS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	Text Book followed	HOD Sign Weekly
13	**Introduction to VCR system: VCR cycle**	**1**	**22-07-2025**		**TLM 1**	CO1	**T1**	
14	Simple vapour compression refrigeration cycle, COP	1	24-07-2025		**TLM 1**	CO1	**T1**	
15	Representation of cycle on T-S and p-h Charts	1	26-07-2025		**TLM 1**	CO1	**T2**	
16	VCR numerical problems	1	28-07-2025		**TLM 1**	CO1	**T2**	
17	Tutorial-2	1	29-07-2025		**TLM 1**	CO1	**T2**	
18	Effect of sub cooling and superheating,	1	31-07-2025		**TLM 1**	CO1	**T2**	

19	Effect of condenser and evaporator pressure, Actual VCR and theoretical VCR,	1	02-08-2025		**TLM 1**	CO1	**T2**	
20	**VCR-System Components**: Compressors -Classification-Working Principles	1	04-08-2025		TLM 1	CO1	**T2**	
21	Work expression for the reciprocating compressor	1	05-08-2025		TLM 1	CO1	**T2**	
22	Rotary compressors, Problems, Condensers – Classification-working principle,	1	07-08-2025		TLM 1	CO1	**R1**	
23	Evaporators-Classification-working principle,	1	11-08-2025		TLM 1	CO1	**R1**	
24	Expansion valve – Classification-working principle-	1	12-08-2025		TLM 1	CO1	**R1**	
No. of classes required to complete UNIT-II = 12			No. of classes taken:					

UNIT-III VAPOUR ABSORPTION, STEAM JET & NON-CONVENTIONAL REFRIGERATION SYSTEM

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	Text Book followed	HOD Sign Weekly
25	Introduction to VAR system and its working principle,	1	14-08-2025		TLM 1	CO1	**T2**	
26	Max. COP derivation for the VAR system and VAR problems	1	16-08-2025		TLM 1	CO1	**T2**	
27	Description and working of NH_3-Water system, Refrigerant-Absorbent solution requirements	1	18-08-2025		TLM 1	CO1	**T2**	
28	LiBr-Water (Two shell & Four shell) System,	1	19-08-2025		TLM 1	CO1	**T2**	
29	Principle of operation of Three fluid absorption systems, Salient features	1	21-08-2025		TLM 1	CO1	**T2**	
30	Tutorial	1	21-08-2025		TLM 1	CO1	**T2**	
Technical Training: 25-08-2025 to 06-09-2025								
I-Mid Exams :08.09.2025 to 13.09.2025								
	Steam Jet Refrigeration System: Working Principle, Basic Analysis- Applications	1	15-09-2025		TLM 1	CO1	**T2**	
31	. **Non-Conventional Refrigeration Systems:** Thermo electric refrigeration,	1	16-09-2025		TLM 1	CO1	**T2**	
32	Vortex tube refrigeration,	1	18-09-2025		TLM 1	CO1	**T2**	
33	Adiabatic Demagnetization refrigeration		20-09-2025					
No. of classes required to complete UNIT-III = 10			No. of classes taken:					

UNIT-IV PSYCHROMETRY & HUMAN COMFORT

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome Cos	Text Book followed	HOD Sign Weekly
34	**Psychrometry**: Introduction,	1	22-09-2025		TLM 1	CO4	**T1**	
35	Psychometric properties and relations	1	23-09-2025		TLM 1	CO4	**T1**	
36	Psychometric problems	1	25-09-2025		TLM 1	CO4	**T1**	
37	Psychometric problems		27-09-2025		TLM 1	CO4	**T1**	
38	Psychometric chart and its analysis,	1	29-09-2025		TLM 1	CO4	**T1**	
39	Psychometric processes and its analysis	1	30-09-2025		TLM 1	CO4	**T1**	
40	**Tutorial**	1	07-10-2025		TLM 1	CO4	**T1**	
41	Psychometric processes and its analysis	1	09-10-2025		TLM 1	CO4	**T1**	
42	Sensible, Latent and Total heat,	1	13-10-2025		TLM 1	CO4	**T1**	
43	Sensible Heat Factor and Bypass Factor, Solving Problems	1	14-10-2025		TLM 1	CO4	**T1**	
44	**Human Comfort:** Thermodynamics of human body	1	16-10-2025		TLM 1	CO4	**T1**	
45	Factors affecting the human comfort and its analysis.	1	18-10-2025		TLM 1	CO4	**T1**	
46	Effective temperature – Comfort chart	1	20-10-2025		TLM 1	CO4	**T1**	
47	**Tutorial-4**	1	21-10-2025		TLM 1	CO4	**T1**	
No. of classes required to complete UNIT-IV = 14			No. of classes taken:					

UNIT-V AIR CONDITIONING SYSTEMS AND DESIGN

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
48	**Introduction**: Air Conditioning Systems,	1	23-10-2025		TLM 1	CO5	**T1**	
49	Components of Air conditioning	1	25-10-2025		TLM 1	CO5	**T1**	
50	Classification of air conditioning system	1	27-10-2025		TLM 1	CO5	**T1**	
51	Central and Unitary systems, Winter and Year-round systems	1	28-10-2025		TLM 1	CO5	**T1**	
52	Cooling load estimation and its procedure	1	30-10-2025		TLM 1	CO5	**T1**	
53	Cooling load components	1	01-11-2025		TLM 1	CO5	**R1**	
54	Infiltration load, Design of Air Condition Systems,	1	03-11-2025		TLM 1	CO5	**R1**	
55	Bypass factor-circulated air with ADP, System with Ventilated and re-circulation,	1	04-11-2025		TLM 1	CO5	**T1**	
56	RSHF, GSHF and ESHF, Solving cooling load Problems	1	06-11-2025		TLM 1	CO5	**R1**	

57	Solving cooling load Problems	1	10-11-2025		TLM 1	CO5	**R1**	
58	Solving cooling load Problems	1	11-11-2025		TLM 1	CO5	**R1**	
No. of classes required to complete UNIT-V = 10			No. of classes taken:					

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
59	Air craft Refrigeration System and Cryogenics	1	13-11-2025		TLM2	CO1,CO4	R3	
60	Eco-friendly refrigerants	1	15-11-2025		TLM2	CO4	R3	
II-Mid Exams :17.11.2025 to 22.11.2025								

Teaching Learning Methods					
TLM1	Chalk and Talk	**TLM4**	Problem Solving	**TLM7**	Seminars or GD
TLM2	PPT	**TLM5**	Programming	**TLM8**	Lab Demo
TLM3	Tutorial	**TLM6**	Assignment or Quiz	**TLM9**	Case Study

ACADEMIC CALENDER:

Commencement of Class work		**24.06.2024**	
I Phase of Instructions	30.06.2025	23.08.2025	8 Weeks
Technical Training	25.08.2025	06.09.2025	2 weeks
I Mid Examinations	08.09.2025	13.09.2025	1 Week
II Phase of Instructions	15.09.2025	15.11.2025	9Weeks
II Mid Examinations	17.11.2025	22.11.2025	1 Week
Preparation and Practical's	24.11.2025	29.11.2025	1 Week
Semester End Examinations	01.12.2025	13.12.2025	2 Weeks

PART-C

EVALUATION PROCESS (R17 Regulations):

Evaluation Task	**Marks**
Assignment-I (Unit-I)	A1=5
Assignment-II (Unit-II)	A2=5
I-Mid Examination (Units-I & II)	M1=20
I-Quiz Examination (Units-I & II)	Q1=10
Assignment-III (Unit-III)	A3=5
Assignment-IV (Unit-IV)	A4=5
Assignment-V (Unit-V)	A5=5
II-Mid Examination (Units-III, IV & V)	M2=20
II-Quiz Examination (Units-III, IV & V)	Q2=10
Attendance	B=5
Assignment Marks = Best Four Average of A1, A2, A3, A4, A5	A=5
Mid Marks =75% of Max(M1,M2)+25% of Min(M1,M2)	M=20
Quiz Marks =75% of Max(Q1,Q2)+25% of Min(Q1,Q2)	B=10
Cumulative Internal Examination (CIE) : A+B+M+Q	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
PO 6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
PO 7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	**Communication:** Design and develop modern communication technologies for building the inter disciplinary skills to meet current and future needs of industry.
PSO 2	**VLSI and Embedded Systems:** Design and Analyze Analog and Digital Electronic Circuits or systems and Implement real time applications in the field of VLSI and Embedded Systems using relevant tools
PSO 3	**Signal Processing:** Apply the Signal processing techniques to synthesize and realize the issues related to real time applications

Course Instructor	Course Coordinator	Module Coordinator	HOD
Dr.V.Dhana Raju	Dr.V.Dhana Raju	Dr. P.Vijay Kumar	Dr. M.B.S.Sreekara Reddy

DEPARTMENT OF MECHANICAL ENGINEERING

COURSE HANDOUT

Part-A

PROGRAM : B.Tech, VII Sem., Mechanical Engineering
ACADEMIC YEAR : 2025-26
COURSE NAME & CODE : **Automobile Engineering-20ME29**
L-T-P STRUCTURE : 3 (L) – 0 (T) – 0 (P)
COURSE CREDITS : 3
COURSE INSTRUCTOR : **Mr. K Lakshmi Prasad**
COURSE COORDINATOR : **Mr. K Lakshmi Prasad**
RE-REQUISITES : **Thermodynamics, Internal Combustion Engines**

COURSE EDUCATIONAL OBJECTIVES (CEOs): The objective of this course is to make students learn about automobile layout, Engine Emissions, working of Transmission system, Steering system, Suspension system, Braking system, Fuel system and different Electrical systems.

COURSE OUTCOMES (COs)

At the end of the course, the student will be able to:

CO1	:	List and illustrate the basic components of Automobile (Remembering –L2).
CO2	:	Differentiate the Fuel supply systems in petrol and Diesel Engines (Understanding –L2)
CO3	:	Comprehend the function of various Electrical systems in Automobile (Understanding –L2)
CO4	:	Distinguish various transmission systems, Wheels & Tyres (Understanding –L2)
CO5	:	Compare various types of Steering systems, Braking systems and Suspension systems. (Understanding –L2).

COURSE ARTICULATION MATRIX (Correlation between COs&POs,PSOs):

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1		3	2				2					2	2		
CO2						2	3	2		1		2	2		
CO3			2			2	2						2		1
CO4	1	1				2	2					2	2		2
CO5		2				2	2					2	2		2

Note: Enter Correlation Levels **1** or **2** or **3.** If there is no correlation, **put '-' 1-** Slight (Low), **2 –** Moderate (Medium), **3 -** Substantial (High).

BOS APPROVED TEXT BOOKS:

T1 Dr. Kirpal Singh, Automobile Engineering-Vol I& II, 13thEdition, Standard Publishers Distributors, 2014.

T2 R.B.Gupta, Automobile Engineering, 8th edition, Tech India publication series, 2013.

T3 Automotive Mechanics, Vol- 1 & 2, Kripal Singh, Standard Publishers.

T4 Automobile Engineering, William Course, TMH Distributors

BOS APPROVED REFERENCE BOOKS:

R1 V.A.W Hillier and David R.Rogers, Hillier‘s Fundamentals of Motor Vehicle Technology, Book1, 5th edition- 2007.

R2 Heinz Heisler, Advanced Vehicle Technology, 2nd edition, Butterworth-Heinemann Series, 2002.

R3 David A Crolla, Automotive Engineering,1st edition, Butterworth-Heinemann series, 2009.

Part-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

UNIT-I: INTRODUCTION, ENGINE AND AUTOMOBILE POLLUTION

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction to CO's and PO's	1	30.06.25		TLM1/ TLM2	CO1	T1,T2	
2.	**Introduction-** Components of an Automobile	1	01.07.25		TLM1/ TLM2	CO1	T1,T2	
3.	classification of automobiles , Chassis and Frame,	2	03.07.25 05.07.25		TLM1/ TLM2	CO1	T1,T2	
4.	Rear wheel drive, front wheel drive and four wheel drive	2	07.07.25 08.07.25		TLM1/ TLM2	CO1	T1,T2	
5.	**Engine construction:** Cylinder Block and Crankcase- Cylinder Head- Oil Pan- Manifolds- Gaskets- Cylinder Liners- Piston- Connecting Rod- Engine Valves, Firing Order	3	10.07.25 14.07.25 15.07.25		TLM1/ TLM2	CO1	T1,T2	
6.	**Engine Emission and control:** Nitrogen oxides, Carbon monoxide, Hydrocarbons, Particulates and Soot, Types of pollutants in SI and CI Engines, Thermal Convertors, Three way catalytic convertor, Exhaust gas recirculation.	2	17.07.25 19.07.25		TLM1/ TLM2	CO1	T1,T2	
No. of classes required to complete UNIT-I: 10					No. of classes taken:			

UNIT-II: ENGINE SERVICING, FUEL SUPPLY SYSTEM IN PETROL& DIESEL ENGINES

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	**ENGINE SERVICING:** Engine Removal, Cylinder Head, Gaskets, Valves, Piston-connecting Rod Assembly.	2	21.07.25 22.07.25		TLM1/ TLM2	CO2	T1,T2	
2.	Fuel Supply system in petrol engines-Fuel pump, fuel gauge, simple carburetor-defects	2	24.07.25 28.07.25		TLM1/ TLM2	CO2	T1,T2	
3.	**Zenith carburetor, SU carburetor**	2	29.07.25 31.07.25		TLM1/ TLM2	CO2	T1,T2	
4.	Petrol Injection- Types, Mechanical and Electronic injection systems.	1	02.08.25		TLM1/ TLM2	CO2	T1,T2	
5.	Types of Injection systems in Diesel Engines-Fuel filters, fuel filters, Air cleaners	1	04.08.25		TLM1/ TLM2	CO2	T1,T2	
6.	**Fuel injection pumps-Jerk type pump**	1	05.08.25		TLM1/ TLM2	CO2	T1,T2	
7.	Governors-Types	2	07.08.25 11.08.25		TLM1/ TLM2	CO2	T1,T2	
No. of classes required to complete UNIT-II: 11					No. of classes taken:			

UNIT-III: IGNITION SYSTEM, CHARGING SYSTEM & STARTING SYTEMS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	**IGNITION SYSTEM:** Types of Ignition systems	1	12.08.25		TLM1/ TLM2	CO3	T1,T2	
2.	Battery Ignition system- Components of Battery Ignition system, Spark plug construction, Ignition timing	2	14.08.25 18.08.25		TLM1/ TLM2	CO3	T1,T2	
3.	Magneto Ignition system,	1	19.08.25		TLM1/ TLM2	CO3	T1,T2	
4.	Electronic Ignition system- Capacitive discharge Ignition system.	1	21.08.25		TLM1/ TLM2	CO3	T1,T2	
5.	**CHARGING SYSTEM & STARTING SYTEMS:** Batteries- Types-Lead acid battery, battery ratings	1	15.09.25		TLM1/ TLM2	CO3	T1,T2	
6.	Charging system- Introduction- Principle of Generator and constructional details, Generator output control	2	16.09.25 18.09.25		TLM1/ TLM2	CO3	T1,T2	
7.	Starting Motor, Starting drives, Bendix rives, Solenoid switch.	2	20.09.25 22.09.25		TLM1/ TLM2	CO3	T1,T2	
No. of classes required to complete UNIT-III: 10					No. of classes taken:			

UNIT-IV: TRANSMISSION SYSTEM, WHEELS AND TYRES

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	**TRANSMISSION SYSTEM:** Clutches- Introduction, Types, Single plate clutch,	1	23.09.25		TLM1/ TLM2	CO4	T1,T2	
2.	Multi plate Clutch, Centrifugal clutch, Fluid Fly wheel,	2	25.09.25 27.09.25		TLM1/ TLM2	CO4	T1,T2	
3.	Necessity of Transmission, Types of Transmission, Sliding Mesh Gear Box.	1	29.09.25		TLM1/ TLM2	CO4	T1,T2	
4.	Constant Mesh gear box, Torque convertor, Propeller shaft,	2	04.10.25 06.10.25		TLM1/ TLM2	CO4	T1,T2	
5.	Final drive, Differential	1	07.10.25		TLM1/ TLM2	CO4	T1,T2	
6.	**WHEELS AND TYRES:** Types of Wheels, Wheel dimensions	1	09.10.25		TLM1/ TLM2	CO4	T1,T2	
7.	Tyre- Types of Tyres, Carcass types, Tyre Materials, Tyre designations.	1	13.10.25		TLM1/ TLM2	CO4	T1,T2	
8.	Sensors: Speed control, Traction Control.	2	14.10.25 16.10.25		TLM1/ TLM2	CO4	T1,T2	
No. of classes required to complete UNIT-IV:-11					No. of classes taken:			

UNIT-V: FRONT AXLE AND STEERING, SUSPENSION SYSTEM, BRAKING SYSTEM

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Front Axle and Steering- Front Axle, Types of stub axle, Steering geometry- Camber- Kingpin inclination	2	18.10.25 20.10.25		TLM1/ TLM2	CO5	T1,T2	
2.	Combined angle and scrub radius- Castor- Toe in and Toe out,	1	23.10.25		TLM1/ TLM2	CO5	T1,T2	
3.	Understeer and Oversteer, Power steering, Types of Steering gears.	1	25.10.25		TLM1/ TLM2	CO5	T1,T2	
4.	**SUSPENSION SYSTEM:** Introduction, Types of Suspension springs, Leaf springs, Coil springs, Torsion bars,	1	27.10.25		TLM1/ TLM2	CO5	T1,T2	
5.	Shock Absorbers, Independent suspension- Types,	2	28.10.25 30.10.25		TLM1/ TLM2	CO5	T1,T2	
6.	Air-suspension, Suspension sensors-Types ,	2	01.11.25 03.11.25		TLM1/ TLM2	CO5	T1,T2	
7.	**BRAKING SYSTEM:** Braking Requirements ,Types of Brakes, Drum brakes and Disc Brakes,	2	04.11.25 06.11.25		TLM1/ TLM2	CO5	T1,T2	
8.	Hydraulic Brakes, Air brakes, Anti-lock braking systems.	2	10.11.25 11.11.25		TLM1/ TLM2	CO5	T1,T2	
No. of classes required to complete UNIT-V: 13					No. of classes taken:			

CONTENTS BEYOND THE SYLLABUS:

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	Learning Outcome COs	Text Book followed	HOD Sign
1.	Advanced Topics in all Units	2	13.11.25 15.11.25		TLM1/ TLM2	CO1 - CO5	T1, T2, R1 to R5	

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/Swayam Prabha/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

ACADEMIC CALENDAR:

Description	From	To	Weeks
Commencement of Class Work: 30.06.2025			
I Phase of Instructions	30.06.2025	23.08.2025	8
Technical Training	25.08.2025	06.09.2025	2
I Mid Examinations	08.09.2025	13.09.2025	1
II Phase of Instructions	15.09.2025	15.11.2025	9
II Mid Examinations	17.11.2025	22.112025	1
Preparation and Practical	24.11.2025	29.11.2025	1
Semester End Examinations	01.12.2025	13.12.2025	2

Part - C

EVALUATION PROCESS:

Evaluation Task	COs	Marks
Assignment/Quiz – 1	1,2,3	A1=05
I-Mid Examination	1,2,3	B1=15
I-Online Mid Examination	1,2,3	C1=10
Assignment/Quiz – 2	3,4,5	A3=05
II-Mid Examination	3,4,5	B2=20
II-Online Mid Examination	3,4,5	C2=10
Evaluation of Assignment/Quiz Marks: A=(A1+A2)/5	1,2,3,4,5	**A=05**
Evaluation of Mid Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	1,2,3,4,5	**B=15**
Evaluation of Online Mid Marks: C=75% of Max(C1,C2)+25% of Min(C1,C	1,2,3,4,5	**C=10**
Cumulative Internal Examination: A+B+C	**1,2,3,4,5**	**A+B+C=30**
Semester End Examinations: E	**1,2,3,4,5**	**E=70**
Total Marks: A+B+C+D+E	**1,2,3,4,5**	**100**

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs):

PEO1: To build a professional career and pursue higher studies with sound knowledge in Mathematics, Science and Mechanical Engineering.

PEO2: To inculcate strong ethical values and leadership qualities for graduates to become successful in multidisciplinary activities.

PEO3: To develop inquisitiveness towards good communication and lifelong learning.

PROGRAMME OUTCOMES (POs):

Engineering Graduates will be able to:

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7. Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO1: To apply the principles of thermal sciences to design and develop various thermal systems.

PSO2: To apply the principles of manufacturing technology, scientific management towards improvement of quality and optimization of engineering systems in the design, analysis and manufacturability of products.

PSO3: To apply the basic principles of mechanical engineering design for evaluation of performance of various systems relating to transmission of motion and power, conservation of energy and other process equipment.

Position	***Course Instructor***	***Course Coordinator***	***Module Coordinator***	***HOD***
Name	Mr. K. Lakshmi Prasad	Mr. K. Lakshmi Prasad	Dr. P.Vijay Kumar	**Dr. M B S Sreekara Reddy**
Signature				

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(An Autonomous Institution since 2010)
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L.B. Reddy Nagar, Mylavaram, NTR District, Andhra Pradesh - 521230

DEPARTMENT OF MECHANICAL ENGIMNEERING

COURSE HANDOUT

PART-A

Name of Course Instructor : KAMALA PRIYA B
Course Name & Code : POWER PLANT ENGINEERING
L-T-P Structure : 3-0-0 Credits : 3
Program/Sem/Sec : B.Tech., MECH., VII-Sem., A.Y : 2025-26

PRE-REQUISITE: Applied Thermodynamics and Heat transfer

COURSE EDUCATIONAL OBJECTIVES (CEOs):
This course provides understanding of the power plant engineering fundamentals which includes the details of steam, hydro, gas nuclear, combined cycle power plants along with solar, wind and geothermal power energy systems in addition to the direct energy conversion systems. The economics of power generation and the environmental aspect of power generation are also being addressed in this course.

COURSE OUTCOMES (COs): At the end of the course, the student will be able to

CO 1	Describe the energy scenario, the energy generation sources and various circuitry systems in power plants. (Understanding – L2)
CO 2	Draw the layout of different power plants. (Remembering – L1)
CO 3	Compute the power generation from different power plants. (Applying – L3)
CO 4	Analyze the input parameters requirement for power generation from various power plant systems. (Analyzing-L4)
CO5	Calculate the economics of power generation from various power plants, pollution issues from power plant systems. (Applying – L3)

COURSE ARTICULATION MATRIX (Correlation between COs, POs & PSOs):

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	-	-	-	-	-	-	-	1	-	-	-
CO2	1	1	-	-	-	-	-	-	-	-	-	1	-	-	-
CO3	3	2	-	2	-	-	-	-	-	-	-	1	3	-	3
CO4	2	3	-	1	-	-	-	-	-	-	-	2	2	-	2
CO5	3	2	-	2	-	-	-	-	-	-	-	3	3	-	3

Note: Enter Correlation Levels **1** or **2** or **3.** If there is no correlation, **put '-'**
1- Slight (Low), **2** – Moderate (Medium), **3** - Substantial (High).

TEXT BOOKS:

T1 Arora &Domkundwar, A course in Power Plant Engineering- Dhanpat Rai & Company 5th Revised Reprint Edition, 2004.

T2 P.K.Nag, Power Plant Engineering,3rd Edition ,2008 TMH, New Delhi,

REFERENCE BOOKS:

R1.R.K.Rajput, A Text book of Power Plant Engineering, Laxmi Publications ,2nd Edition 2001

R2.P.C.Sharma, Power Plant Engineering, 9th Revised & Reprint Edition 2012, S.K.Kataria&

Sons
R3. P.K.Nag, power plant engineering-2020
R4. M.M.ElWakil, Power plant technology, 3rd Edition 2010 TMH.
R5. G.R.Nagpal, Power plant engineering, Khanna Publishers.14th Edition 2000.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: STEAM POWER PLANT

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Course Outcomes	1	30-06-2025		TLM2	
2.	Introduction to Subject	1	01-07-2025		TLM2	
3.	Energy sources, Resources and Development of Power in India.	1	03-07-2025		TLM2	
4.	Steam power plant: Plant Layout, Working of Different circuits, factors to be considered for the selection of the plant	1	04-07-2025		TLM2	
5.	Tutorial-1	1	04-07-2025		TLM3	
6.	Types of Coal-Fuel handling systems-	1	07-07-2025		TLM2	
7.	Coal handling, choice of coal handling equipment, Coal Storage	2	08-07-2025 10-07-2025		TLM2	
8.	Ash handling systems	1	11-07-2025		TLM2	
9.	Overfeed and underfeed stokers	1	14-07-2025		TLM2	
10.	Traveling grate stokers, Spreader stokers, Retort stokers	1	15-07-2025		TLM2	
11.	Pulverized fuel burning system and, its components	1	17-07-2025		TLM2	
12.	Draught system, Cyclone furnace	1	18-07-2025		TLM2	
13.	Tutorial-2	1	18-07-2025		TLM3	
14.	Design and construction, Dust collectors	1	21-07-2025		TLM2	
15.	Dust collectors, Electrostatic precipitator	1	22-07-2025		TLM2	
16.	Cooling towers and heat rejection	1	24-07-2025		TLM2	
No. of classes required to complete UNIT-I: 17				No. of classes taken:		

UNIT-II: DIESEL POWER PLANT AND GAS TURBINE PLANT

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	General Layout & Components of Diesel Power Plant	1	25-07-2025		TLM2	
2.	Tutorial-3	1	25-07-2025		TLM3	
3.	Fuel System, Lubrication System	1	28-07-2025		TLM2	
4.	Air Intake and admission system, Supercharging system, Exhaust System	1	29-07-2025		TLM2	

5.	Diesel Plant operation and efficiency, Heat balance	1	31-07-2025		TLM2	
6.	Site selection of diesel power plant, Comparative study of diesel power plant with steam power plant.	1	01-08-2025		TLM2	
7.	Tutorial-4	1	01-08-2025		TLM3	
8.	Introduction, Classification-Layout with auxiliaries	1	04-08-2025		TLM2	
9.	Principles of working of Closed and Open cycle gas turbines	1	05-08-2025		TLM2	
10.	Introduction to combined cycle power plants and comparison.	1	07-08-2025		TLM2	
11.	Numerical problems on closed cycle gas turbines.	1	08-08-2025		TLM1	
12.	Tutorial-5	1	08-08-2025		TLM3	
13.	Numerical problems on closed cycle gas turbines	1	11-08-2025		TLM1	
No. of classes required to complete UNIT-II: 13				No. of classes taken:		

UNIT-III: HYDRO ELECTRIC POWER PLANT AND NUCLEAR POWER GENERATION

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Hydrology-Hydrological cycle	1	12-08-2025		TLM2	
2.	Rainfall- Run off Hydrograph	1	14-08-2025		TLM2	
3.	Flow duration curve- Mass curve	1	18-08-2025		TLM2	
4.	Site selection of hydro plant-layout	1	19-08-2025		TLM2	
5.	Types of hydro plants	2	21-08-2025 22-08-2025		TLM2	
6.	Tutorial-6	1	22-08-2025		TLM3	
7.	Numerical problems on hydro power generation	1	15-09-2025		TLM1	
8.	Nuclear Fission and Fusion - Nuclear Fuels	1	16-09-2025		TLM2	
9.	Breeding- Components of Reactor	1	18-09-2025		TLM2	
10.	Types of Nuclear Reactors-Pressurized water reactor(PWR)-	1	19-09-2025		TLM2	
11.	Tutorial-7	1	19-09-2025		TLM3	
12.	Boiling water reactor (BWR)	1	22-09-2025		TLM2	
13.	CANDU reactor-Gas cooled reactor	1	23-09-2025		TLM2	
14.	Liquid metal cooled reactor-Fast Breeder Reactor	1	25-09-2025		TLM2	
15.	Nuclear waste and its Disposal	1	26-09-2025		TLM2	
16.	Tutorial-8	1	26-09-2025		TLM3	
17.	Simple problems on nuclear power generation.	1	29-09-2025		TLM1	
No. of classes required to complete UNIT-III: 18				No. of classes taken:		

UNIT-IV : COMBINED CYCLE POWER GENERATION AND DIRECT ENERGY CONVERSION SYSTEMS

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction, Working of cogeneration	1	03-10-2025		TLM2	
2.	Tutorial-9	1	03-10-2025		TLM3	
3.	combined cycles, Performance of Combined cycle	1	06-10-2025		TLM2	
4.	Future scenario of Combined Cycles	1	07-10-2025		TLM2	
5.	Numerical Problems on combined cycle.	1	09-10-2025		TLM1	
6.	Numerical Problems on combined cycle.	1	10-10-2025		TLM1	
7.	Tutorial-10	1	10-10-2025		TLM3	
8.	Solar cell- Fuel cell	1	13-10-2025		TLM2	
9.	Thermo Electric and Thermo ionic conversion system	1	14-10-2025		TLM2	
10.	MHD power generation	1	16-10-2025		TLM2	
11.	Numerical problems on fuel cell.	1	17-10-2025		TLM1	
12.	Tutorial-11	1	17-10-2025		TLM3	
No. of classes required to complete UNIT-IV:12				No. of classes taken:		

UNIT-V : ECONOMICS OF POWER GENERATION AND POLLUTION & CONTROL

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Factors affecting the economics, Load factor	1	20-10-2025		TLM2	
2.	Utilization factor, Performance and operating characteristics of Power Plants	1	23-10-2025		TLM2	
3.	Economic load sharing, Depreciation, Energy Rates	1	24-10-2025		TLM2	
4.	Tutorial-12	1	24-10-2025		TLM3	
5.	Energy rates	1	27-10-2025		TLM2	
6.	Criteria for optimum loading	1	28-10-2025		TLM2	
7.	Specific economic energy generation problems.	1	30-10-2025		TLM2	
8.	Introduction- Particulate and gaseous pollutants	1	31-10-2025		TLM2	
9.	Tutorial-13	1	31-10-2025		TLM3	
10.	Air and Water pollution by Thermal plants and its control	1	03-11-2025		TLM2	
11.	Acid rains -Methods to control pollution.	1	04-11-2025		TLM2	

12.	Numerical Problems on economics of power generation	2	06-11-2025 07-11-2025		TLM1	
13.	Tutorial-14	1	07-11-2025		TLM3	
14.	Revision	1	10-11-2025		TLM3	
15.	Revision	1	11-11-2025		TLM3	
16.	Revision	1	13-11-2025		TLM3	
17.	Revision	2	14-11-2025 14-11-2025		TLM3	
No. of classes required to complete UNIT-V: 19				No. of classes taken:		

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM4**	Demonstration(Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/Swayam Prabha/ MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

Academic Calendar

Description	From	To	Weeks
I Phase of Instructions	30-06-2025	23-08-2025	8
Technical Training	25-08-2025	06-09-2025	2
I MID Examinations	08-09-2025	13-09-2025	1
II Phase of Instructions	15-09-2025	15-11-2025	9
II MID Examinations	17-11-2025	22-11-2025	1
Preparation and Practicals	24-11-2025	29-11-2025	1
Semester End Examinations	01-12-2025	13-12-2025	2

PART-C

EVALUATION PROCESS (R20 Regulation):

Evaluation Task	**Marks**
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	M1=15
I-Quiz Examination (Units-I, II & UNIT-III (Half of the Syllabus))	Q1=10
Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)	A2=5
II-Descriptive Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	M2=15
II-Quiz Examination (UNIT-III (Remaining Half of the Syllabus),IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1),(M2+Q2+A2))+20% of Min((M1+Q1+A1),(M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE):M	30
Semester End Examination (SEE)	70
Total Marks = CIE+SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
PO 6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
PO 7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	To apply the principles of thermal sciences to design and develop various thermal systems.
PSO 2	To apply the principles of manufacturing technology, scientific management towards improvement of quality and optimization of engineering systems in the design, analysis and manufacturability of products.
PSO 3	To apply the basic principles of mechanical engineering design for evaluation of performance of various systems relating to transmission of motion and power, conservation of energy and other process equipment.

Course Instructor	Course Coordinator	Module Coordinator	HOD
Kamala Priya B	Kamala Priya B	Dr. P.Vijay Kumar	Dr. M B S Sreekar Reddy

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

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DEPARTMENT OF MECHANICAL ENGINEERING

COURSE HANDOUT

PART-A

DEPARTMENT OF MECHANICAL ENGINEERING
COURSE HANDOUT
PART - A

PROGRAM	**: B.Tech. - VII-Sem.- Mechanical Engineering – A& B Section**
ACADEMIC YEAR	**:** 2025-26
COURSE NAME & CODE	**: Total Quality management& 20ME35**
L-T-P STRUCTURE	**:** 4-0-0
COURSE CREDITS	**:** 3
COURSE INSTRUCTOR	**: Seelam Srinivasa Reddy, Assoc., Professor**
COURSE COORDINATOR	**: Seelam Srinivasa Reddy, Associate Professor**
PER-REQUISITE	**: Industrial Management**

COURSE EDUCATIONAL OBJECTIVES: The main objective of this course is to familiarize the concepts of quality management techniques in industries

COURSE OUTCOMES:

After completion of the course student will be able to:

CO1: Comprehend the principles and strategies of quality control(**Understanding - L2**).
CO2: Apply the principles of total quality management to improve the quality of the product**(Applying - L3)**.
CO3: Choose the appropriate statistical quality control tool to check the process capability. **(Applying - L3**).
CO4: Examine various TQM techniques for industrial applications **(Applying - L3)**.
CO5: Interpret ISO quality standards in an organization **(Understanding - L2)**.

COURSE ARTICULATION MATRIX(Correlation between Cos & POs, PSOs):

COs	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO1				2							3	3	3	3	3
CO2			3	3		2	2				3	3	3	3	3
CO3	3	3	3	3							3	3	3	3	3
CO4	2		3								3	3	3	3	3
CO5	1		3	3		2	2				3	3	3	3	3

Note: Enter Correlation Levels **1** or **2** or **3.** If there is no correlation, **put '-'**
1- Slight (Low), **2 -** Moderate (Medium), **3 -** Substantial (High).

BOS-APPROVEDTEXTBOOKS:

T : Dale H. Besterfiled., Total Quality Management, Pearson Education, 3rd Edition 2010

BOS APPROVED REFERENCE BOOKS:

R1. James R. Evans & William M. Lidsay, The Management and Control of Quality, South-Western (Thomson Learning), 2002.

R2. Feigenbaum.A.V, Total Quality Management, MCGraw-Hill, 2005.
R3. Narayana V. and Sreenivasan, N.S, Quality Management- Concepts and Tasks, New Age International, 2006.
R4. Zeiri, Total Quality Management for Engineers, Wood Head Publishers, 2009.

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: **INTRODUCTION TO TQM**

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	**Introduction to TQM**	1	30-06-2025		TLM1	
2.	CEOs, Course Outcomes, POs and PSOs	1	1-07-2025		TLM1	
3.	Evolution of total quality management	1	3-07-2025		TLM2	
4.	Definition of Quality	1	4-07-2025		TLM2	
5.	Quality costs,	1	7-07-2025		TLM2	
6.	Quality Council	1	8-07-2025		TLM2	
7.	Strategic Planning	1	10-07-2025		TLM1	
8.	Deming Philosophy,Deming 14 principles	1	11-07-2025		TLM2	
9.	Barriers to TQM Implementation	1	14-07-2025		TLM1	
10.	**Assignment/** Quiz-1	1	15-07-2025		TLM2	
No. of classes required to complete UNIT-I: 10				**No. of classes taken:**		

UNIT-II: TQM PRINCIPLES

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
11.	Types of Customers, customer supply chain	1	17-07-2025		TLM1	
12.	Customer perception of quality, customer feedback.	1	18-07-2025		TLM2	
13.	customer retention, Service quality.	1	21-07-2025		TLM1	
14.	Employee Involvement, Motivation.	1	22-07-2025		TLM1	
15.	Maslow ‘s hierarchy of needs, Herzberg theory,	1	24-07-2025		TLM1	

16.	Empowerment and Teamwork, Performance appraisal, Benefits,	1	25-07-2025		TLM1	
17.	Continuous process improvement- Juran Trilogy.	1	28-07-2025		TLM2	
18.	PDSA cycle, 5S, Kaizen, Supplier	1	29-07-2025		TLM1	
19.	Partnership-Partnering, sourcing,	1	31-07-2025		TLM1	
20.	supplier selection,	1	01-08-2025		TLM1	
21.	Performance Measures-Basic Concepts, Strategy,	1	04-08-2025		TLM2	
22.	**Assignment/** Quiz	1	05-08-2025			
No. of classes required to complete UNIT-II: 12				**No. of classes taken:**		

UNIT-III: STATISTICAL PROCESS CONTROL

23.	STATISTICAL PROCESS CONTROL: The seven tools of quality,	1	07-08-2025		TLM2	
24.	Statistical Fundamentals,	1	11-08-2025		TLM1	
25.	Population and Sample,	1	13-08-2025		TLM1	
26.	Normal curve,	1	14-08-2025		TLM1	
27.	Control charts for variables	1	18-08-2025		TLM1	
28.	Problems solving	1	19-08-225		TLM1	
29.	Control charts for attributes	1	21-08-2025		TLM1	
30.	Problems solving	1	22-08-2025		TLM1	
I-Mid Exams :08-09-2025 To 13-09-2025						
31.	SIX SIGMA:	1	15-09-2025		TLM1	
32.	Introduction to six sigma	1	16-09-2025		TLM1	
33.	Indicators of six sigma	1	18-09-2025		TLM1	
34.	Principles	1	19-09-2025		TLM1	
35.	Process capability,	1	22-09-2025		TLM1	
36.	Advantages, Limitations	1	23-09-2025		TLM1	
37.	Applications.	1	25-09-2025		TLM3	
38.	**Assignment/ Quiz-III**	1	26-09-2025		TLM2	
No. of classes required to complete UNIT-III: 16						

UNIT-IV: TQM TOOLS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
39.	TQM TOOLS: Benchmarking,	1	29-09-2025		TLM2	
40.	Benchmarking Process,	1	03-10-2025		TLM1	
41.	Quality Function Deployment (QFD),	1	06-10-2025		TLM1	
42.	House of Quality, QFD Process	1	07-10-2025		TLM1	
43.	Taguchi Quality Loss Function,	1	9-10-2025		TLM2	
44.	Total Productive Maintenance Concept,	1	10-10-2025		TLM2	

45.	improvement needs,.	1	13-10-2025		TLM1	
46.	FMEA- Stages of FMEA	1	14-10-2025		TLM1	
47.	Revision	1	16-10-2025		TLM1	
48.	**Assignment/ /Quiz-IV**	1	17-10-2025		TLM1	
No. of classes required to complete UNIT-IV: 10				**No. of classes taken:**		

UNIT-V: QUALITY SYSTEMS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
49.	QUALITY SYSTEMS: Need for ISO 9000 and	1	20-10-2025		TLM1	
50.	other Quality systems,	1	23-10-2025		TLM1	
51.	ISO 9000:2000 Quality System,	1	24-10-2025		TLM1	
52.	Implementation of Quality system,	1	27-10-2025		TLM1	
53.	Documentation,	1	29-10-2025		TLM1	
54.	Quality Auditing,	1	30-10-2025		TLM1	
55.	TS 16949, - concepts.	1	31-10-2025		TLM1	
56.	ISO 14000-concepts	1	3-11-2025		TLM3	
57.	**Revison**	1	4-11-2025		TLM2	
58.	**Assignment/ Quiz-V**	1	6-11-2025		TLM1	
59.	**Beyond Syllabus -**.	1	7-11-2025		TLM2	
60.	**Beyond Syllabus -**.	1	10-11-225		TLM2	
61.	**Beyond Syllabus -**.	1	11-11-2025		TLM2	
62.	**Beyond Syllabus -**.	1	13-11-225		TLM2	
63.	**Beyond Syllabus -**.	1	14-11-2025		TLM2	
No. of classes required to complete UNIT-V: 15				**No. of classes taken:**		
II-Mid Exams :17-11-2025 To 22-11-2025						

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/Swayam Prabha/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

PART-C

EVALUATION PROCESS (R17 Regulation):

Evaluation Task	**Marks**
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	M1=15
I-Quiz Examination (Units-I, II & UNIT-III (Half of the Syllabus))	Q1=10
Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)	A2=5

II- Descriptive Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	M2=15
II-Quiz Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering Problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, Natural sciences, and engineering sciences.
PO 3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
PO 6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO 7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the Engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO 12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	To apply the principles of thermal sciences to design and develop various thermal systems.
PSO 2	To apply the principles of manufacturing technology, scientific management towards Improvement of quality and optimization of engineering systems in the design, analysis and manufacturability of products.
PSO 3	To apply the basic principles of mechanical engineering design for evaluation of performance of various systems relating to transmission of motion and power, conservation of energy and other process equipment.

Faculty Name	**Mr.S.Srinivasa Reddy**	**Mr.S.Srinivasa Reddy**	**Mr.J.Subba Reddy**	**Dr.M.B.S. Sreekara Reddy**
Designation	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**HOD**
Signature				

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DEPARTMENT OF CIVIL ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: K HARISH KUMAR
Course Name & Code : Disaster Management & 20CE82
L-T-P Structure : **3-0-0** **Credits:** 3
Program/Sem/Sec : B.Tech, VII SEM, MECH-B **A.Y.:** 2025-26

PREREQUISITE: NILL

COURSE EDUCATIONAL OBJECTIVES (CEOs): This course deals with different types of disasters, impacts of disasters, importance of technology in handling disaster management situations, importance of planning and risk prevention in case of occurrence of disaster, importance of education and community approach for the responsive actions to be taken in case of occurrence of disaster.

COURSE OUTCOMES (COs): At the end of the course, student will be able to

CO1	Identify the basic terms, types of disasters and their impact (Understand – L2)
CO2	Illustrate the role of technology in handling disaster management situations(Understand-L2)
CO3	Identify the stake-holders concerned and design the different action plans for responding in case of disaster occurrence (Understand – L2)
CO4	Evaluate the importance of education and community approach for the responsive actions to be taken in case of disaster occurrence (Understand – L2)

COURSE ARTICULATION MATRIX (Correlation between COs, POs & PSOs):

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	1	1	-	1	2	1	-	-	-	-	-	1	2	1	2
CO2	1	1	1	2	2	1	-	-	-	-	-	1	2	1	2
CO3	1	-	-	1	2	1	1	1	-	-	-	1	1	1	2
CO4	1	-	-	1	1	1	1	1	1	1	1	1	1	1	2
1 - Low **2 –**Medium **3 -** High															

TEXTBOOKS:

T1 Tushar Bhattacharya, "Disaster Science and Management", Tata McGraw Hill Publications, New Delhi, 2012.

T2 R.Subramanian, "Disaster Management", Vikas Publishing house Pvt. Ltd, 2022.

REFERENCE BOOKS:

R1 G.K. Ghosh, "Disaster Management", APH Publishing Corporation, 2006.

R2 U.K. Chakrabarty, "Industrial Disaster Management and Emergency Response", Asian Books Pvt. Ltd., New Delhi 2007.

R3 H K Gupta (Ed.), "Disaster Management", Universities Press, 2003

R4 W.N. Carter, "Disaster Management: A Disaster Management Handbook", Asian Development Bank, Bangkok, 1991.

R5 Government of India website on Disaster Management: www.ndmindia.nic.in

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: DEFINITIONS & TYPES OF DISASTER

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction CO's & PO's, Subject	1	01/06/2025		**TLM2**	
2.	Definitions – types of Disasters	3	02/07/2025 03/07/2025 05/07/2025		**TLM2**	
3.	Concept of disaster management - Disaster Management Cycle	1	08/07/2025		**TLM2**	
4.	Vulnerability -	1	09/07/2025		**TLM2**	
5.	Mitigation	1	10/07/2025		**TLM2**	
6.	Various types of disasters: Natural: Drought, cyclone	1	15/07/2025		**TLM2**	
7.	Earthquake and landslides.	1	16/07/2025		**TLM2**	
8.	Manmade and Industrial: Engineering and Technical failure	1	17/07/2025		**TLM2**	
9.	Nuclear and Chemical disasters	1	19/07/2025		**TLM2**	
10.	Accident-Related Disasters	1	22/07/2025		**TLM2**	
11.	High Power Committee on Disaster Management in India	1	23/07/2025		**TLM2**	
12.	Disaster Management Act 2005	1	24/07/2025		**TLM2**	
13.	Tutorial– 1/ Quick revision	1	29/07/2025		**TLM3**	
14.	Revision	1	30/07/2025		**TLM3**	
No. of classes required to complete UNIT-I:				**No. of classes taken:**		

UNIT-II: IMPACT OF DISASTERS

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
15.	Impact due to – Earthquake	1	31/07/2025		**TLM2**	
16.	Impact due to – Cyclone	1	02/08/2025		**TLM2**	
17.	Landslides, Fire hazards	1	05/08/2025		**TLM2**	
18.	Life & livestock, Habitation	1	06/08/2025		**TLM2**	
19.	Agriculture & livelihood loss- Health hazards	2	07/08/2025 12/08/2025		**TLM2**	
20.	Malnutrition problems- Contamination of water	1	13/08/2025		**TLM2**	
21.	Impact on children	1	14/08/2025		**TLM2**	
22.	Environmental loss	1	19/08/2025		**TLM2**	
23.	Tutorial– 2/ Quick revision	1	20/08/2025		**TLM3**	
24.	Revision	1	21/08/2025		**TLM3**	
No. of classes required to complete UNIT-II:				**No. of classes taken:**		

UNIT-III: ROLE OF TECHNOLOGY IN DISASTER MANAGEMENT

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
25.	Role of remote sensing	1	23/08/2025		**TLM2**	
26.	information systems and decision	1	26/08/2025		**TLM2**	

	making tools					
27.	mitigation programme for earthquakes	1	28/08/2025		**TLM2**	
28.	Geospatial information in agriculture	2	30/08/2025 02/09/2025		**TLM2**	
29.	drought assessment	1	03/09/2025		**TLM2**	
30.	Disaster management for infra structures - electrical substations	1	04/09/2025		**TLM2**	
31.	Roads and bridges	1	06/09/2025		**TLM2**	
32.	Multimedia technology in disaster risk management and training	1	16/09/2025		**TLM2**	
33.	Transformable indigenous knowledge in disaster reduction.	3	17/09/2025 18/09/2025 20/09/2025		**TLM2**	
34.	Tutorial– 3/ Quick revision	1	23/09/2025		**TLM3**	
35.	Revision	1	24/09/2025		**TLM3**	
No. of classes required to complete UNIT-III:				**No. of classes taken:**		

UNIT-IV: PLANNING & RISK PREVENTION

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
	MID – I Examination	**08.09.2025 – 13.09.2025**				
36.	Planning, early warning system	1	25/09/2025		**TLM2**	
37.	crisis intervention and management	1	27/09/2025		**TLM2**	
38.	Response and Rehabilitation after Disasters	1	01/10/2025		**TLM2**	
39.	temporary shelter – food and nutrition-safe drinking water	1	04/10/2025		**TLM2**	
40.	response to drought	1	07/10/2025		**TLM2**	
41.	rehabilitation after cyclones	1	08/10/2025		**TLM2**	
42.	response to river erosion	1	09/10/2025		**TLM2**	
43.	response after earthquake	1	14/10/2025		**TLM3**	
44.	response after Tsunami- Hunger and Disaster	1	15/10/2025		**TLM2**	
45.	Tutorial– 4/ Quick revision	1	16/10/2025		**TLM3**	
46.	Revision	1	18/10/2025		**TLM3**	
No. of classes required to complete UNIT-IV:				**No. of classes taken:**		

UNIT-V: EDUCATION AND COMMUNITY PREPAREDNESS & CASE STUDIES

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
47.	Essentials of disaster education –	1	22/10/2025		**TLM2**	
48.	school awareness and safety programs	1	23/10/2025		**TLM2**	
49.	Community based disaster recovery – voluntary agencies	1	25/10/2025		**TLM2**	
50.	Community participation at various stages of disaster management	1	28/10/2025		**TLM1**	
51.	Building community capacity for action	1	29/10/2025		**TLM1**	
52.	Corporate sector and disaster risk reduction	1	30/10/2025		**TLM1**	
53.	A community focused approach	1	01/11/2025		**TLM2**	
54.	Case studies on different disasters in the world	1	04/11/2025		**TLM2**	
55.	Impacts, Technology usage	1	05/11/2025		**TLM3**	

56.	Risk prevention, Education and community preparedness	1	06/11/2025		**TLM2**	
57.	Tutorial– 5/ Quick revision	1	11/11/2025		**TLM3**	
58.	Revision		12/11/2025 13/11/2025 15/11/2025		**TLM3**	
	MID – II Examination	**17.11.2025 – 22.11.2025**				
No. of classes required to complete UNIT-V:				**No. of classes taken:**		

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/Swayam Prabha/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

PART-C

EVALUATION PROCESS (R20 Regulation):

Evaluation Task	**Marks**
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	M1=15
I-Quiz Examination (Units-I, II & UNIT-III (Half of the Syllabus))	Q1=10
Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)	A2=5
II- Descriptive Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	M2=15
II-Quiz Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO 5	Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations
PO 6	The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO 7	Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	Possesses necessary skill set to analyse and design various systems using analytical and software tools related to civil engineering
PSO 2	Possesses ability to plan, examine and analyse the various laboratory tests required for the professional demands
PSO 3	Possesses basic technical skills to pursue higher studies and professional practice in civil engineering domain

Title	**Course Instructor**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**K. Harish Kumar**	**Dr. C. RAJAMALLU**	**Dr. K.V.RAMANA**
Signature			

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L.B.Reddy Nagar, Mylavaram-521230, Krishna Dist, Andhra Pradesh, India

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

COURSE HANDOUT
PART-A

Name of Course Instructor : Dr.AV.G.A.Marthanda

Course Name & Code : Utilization of Electrical Energy & 20EE83
L-T-P Structure : 3-0-0 Credits : 3
Program/Sem/Sec : B.Tech, ME-A., VII-Sem. A.Y : 2025-26

Pre-requisites : --NIL

Course Educational Objective: This course enables the student to familiarize with characteristics of various drives, comprehend the different issues related to heating, welding and illumination.

COURSE OUTCOMES (COs): At the end of the course, students are able to

CO 1	Understand mechanism of electric heating and electric welding**(Understanding –L2)**
CO 2	Analyze performance of various lighting schemes**(Understanding –L2)**
CO 3	Analyze the performance of electric drive systems**(Understanding –L2)**
CO 4	Illustrate the different schemes of traction and its main components **(Understanding –L2)**
CO5	Understand various tariff methods and power factor improvement techniques **(Understanding –L2)**

COURSE ARTICULATION MATRIX (Correlation between COs, POs & PSOs):

Cos	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO a	PSO b	PSO c
CO1	2	2	2												
CO2	2	2	2								2				
CO3	2	2	2												
CO4	2	2	2								2				
CO5	2	2	2								2				

Note: Enter Correlation Levels **1** or **2** or **3.** If there is no correlation, **put '-'**
1- Slight (Low), **2 –** Moderate (Medium), **3 -** Substantial (High).

TEXT BOOKS:

T1: C.L.Wadhwa "Generation, Distribution and Utilization of Electrical energy, New Age International Publishers,3rd Edition,2015.

T2: N.V.Suryanarayana "Utilization of electric power including electric drives and electric traction, New age international publishers New Delhi,2nd edition 2014.

REFERENCE BOOKS:

R1: Art & Science of Utilization of electrical Energy, Partab, Dhanpat Rai & Co., 2004.
R2: Utilization of Electric Energy, E. Openshaw Taylor and V. V. L. Rao, Universities Press, 2009.

Part - B
COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I : ELECTRIC HEATING &WELDING

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	Introduction, CEO's &CO's	1	01-07-2025		TLM1	
2.	Advantages &applications of Electric heating	1	03-07-2025		TLM2	
3.	Classification of electric heating	1	04-07-2025		TLM2	
4.	Resistance heating	1	05-07-2025		TLM2	
5.	Arc heating	1	08-07-2025		TLM2	
6.	Induction heating	1	10-07-2025		TLM2	
7.	dielectric heating	1	11-07-2025		TLM2	
8.	Causes of failures of heating elemdents	1	15-07-2025		TLM2, TLM6	
9.	Materials for heating elements	1	17-07-2025		TLM2, TLM6	
10.	Requirement of good heating material	1	18-07-2025		TLM2	
11.	ARC Furnace	1	19-07-2025		TLM2, TLM4	
12.	Resistance welding	1	22-07-2025		TLM2	
13.	Spot welding,seam welding	1	24-07-2025		TLM2, TLM4	
14.	,Arc welding	1	25-07-2025		TLM2, TLM4	
15.	Comparision between AC and DC welding	1	26-07-2025		TLM2, TLM6	
No. of classes required to complete UNIT-I : 15					No. of classes taken:	

UNIT-II : ILLUMINATION ENGINEERING

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
16	Introduction	1	29-07-2025		TLM1	
17	Nature of light	1	31-07-2025		TLM2	
18	Laws of illumination	1	01-08-2025		TLM1	
19	Laws of illumination	1	02-08-2025		TLM1	
20	Lighting schemes, sources of light	1	05-08-2025		TLM2	
21	Fluorescent Lamp, CFL and LED	1	07-08-2025		TLM1, TLM4	
22	Sodium Vapor Lamp	1	08-08-2025		TLM1, TLM4	
23	Neon lamps	1	12-08-2025		TLM1, TLM2	

24	mercury vapor lamps	1	14-08-2025		TLM1, TLM2	
25	Comparision between tungsten &fluroscent tubes	1	16-08-2025		TLM1, TLM2	
26	Requirements of good lighting	1	19-08-2025		TLM2, TLM6	
27	Street lighting	1	21-08-2025		TLM2	
28	Assignment/Quiz	1	22-08-2025		TLM1	
No. of classes required to complete UNIT-II : 13					No. of classes taken:	

UNIT-III: ELECTRIC DRIVES

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
29	Introduction	1	23-08-2025		TLM2	
30	Elements of drive, advantages	1	16-09-2025		TLM2	
31	Factors affecting selection of motor	1	18-09-2025		TLM2	
32	Types of loads	1	19-09-2025		TLM2	
33	Industrial applications	1	20-09-2025		TLM1, TLM2	
34	Transient Characteristics of drives	1	23-09-2025		TLM1, TLM2	
35	Steady state characteristics of drives	1	25-09-2025		TLM1, TLM2	
36	Size of motor	1	26-09-2025		TLM1, TLM2	
37	Load Equalization	1	27-09-2025		TLM2	
38	Industrial applications Assignment/Quiz	1	03-10-2025		TLM1, TLM2	
No. of classes required to complete UNIT-III : 10					No. of classes taken:	

UNIT-IV : ELECTRIC TRACTION

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
39	Introduction	1	04-10-2025		TLM2	
40	Requirement of an ideal traction system	1	07-10-2025		TLM2	
41	Supply system for electric traction	1	09-10-2025		TLM2	
42	Train movement	1	10-10-2025		TLM2	
43	mechanism of train movement	1	14-10-2025		TLM2	
44	Traction motors	1	16-10-2025		TLM1, TLM2	
45	Modern trends in electric traction	1	17-10-2025		TLM2, TLM6	
46	Automation in traction	1	18-10-2025		TLM1, TLM2	

47	Speed time curves for different services	1	21-10-2025		TLM1, TLM2	
48	Trapezoidal speed time curves	1	23-10-2025		TLM1, TLM2	
49	Quadrilateral speed time curves	1	24-10-2025		TLM1	
50	Problems on train movement	1	25-10-2025		TLM1	
51	Assignment/quiz	1	28-10-2025		TLM2	
No. of classes required to complete UNIT-IV : 13					No. of classes taken:	

UNIT-V: TARIFF AND POWER FACTOR IMPROVEMENT

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	**Teaching Learning Methods**	HOD Sign Weekly
52	Desirable characteristics	1	30-10-2025		TLM2	
53	Types of Tariff, Flat rate, Block-rate	1	31-10-2025		TLM2	
54	KVA maximum demand	1	01-11-2025		TLM1, TLM2	
55	Time of Day tariff	1	04-11-2025		TLM1, TLM2	
56	Disadvantages of low power factor, Advantages of improved p.f	1	06-11-2025		TLM1, TLM2	
57	Improvement devices , Power factor improvement using static capacitor	1	07-11-2025		TLM1, TLM2	
58	Most economical power factor	1	11-11-2025		TLM2	
59	Location of power factor improvement devices from consumer	1	13-11-2025		TLM1, TLM2	
60	REVISION	1	14-11-2025		TLM1, TLM2	
61	REVISION	1	15-11-2025		TLM1, TLM2	
No. of classes required to complete UNIT-V : 10					No. of classes taken:	

Contents beyond the Syllabus

S.No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
44	Economic aspects in utilization of electrical energy	2	28-10-2025 & 01-11-2025		TLM2, TLM6	

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/Swayam Prabha/MOOCS)

TLM3	Tutorial	**TLM6**	Group Discussion/Project

PART-C

EVALUATION PROCESS (R20 Regulation):

Evaluation Task	Marks
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	M1=15
I-Quiz Examination (Units-I, II & UNIT-III (Half of the Syllabus))	Q1=10
Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)	A2=5
II- Descriptive Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	M2=15
II-Quiz Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

ACADEMIC CALENDAR:

Description	From	To	Weeks
I Phase of Instructions	30-06-2025	23-08-2025	8 W
Technical Training	25-08-2025	06-09-2025	2 W
I Mid Examinations	08-09-2025	13-09-2025	1 W
II Phase of Instructions	15-09-2025	15-11-2025	9 W
II Mid Examinations	17-11-2025	22-11-2025	1 W
Preparation and Practicals	24-11-2025	29-11-2025	1 W
Semester End Examinations	01-12-2025	13-12-2025	2 W

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations
PO 6	**The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice
PO 7	**Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethic**s: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO1: The ability to apply Software Engineering practices and strategies in software project development using open source programming environment for the success of organization.

PSO2: The ability to design and develop computer programs in networking, web applications and IoT as per the society needs.

PSO3: To inculcate an ability to analyze, design and implement database applications.

Dr.A.V.G.A.Marthanda	Dr.A.V.G.A.Marthanda	Dr.M.S.Giridhar	Dr. P. Sobha Rani

Course Instructor	Course Coordinator	Module Coordinator	HOD

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

(AUTONOMOUS)
Accredited by NAAC & NBA (Under Tier - I), ISO 9001:2015 Certified Institution
Approved by AICTE, New Delhi. and Affiliated to JNTUK, Kakinada
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Phone: 08659-222933, Fax: 08659-222931

DEPARTMENT OF MECHANICAL ENGINEERING

COURSE HANDOUT

PART-A

Name of Course Instructor: Dr S. PICHI REDDY.
Course Name & Code : INDUSTRIAL ECONOMICS AND MANAGEMENT & 20HS03
L-T-P Structure : 3-0-0 **Credits:** 03
Program/Sem/Sec : B.Tech/VII/B-SEC **A.Y.:** 2025-26

PREREQUISITE: Nil

COURSE EDUCATIONAL OBJECTIVES (CEOs):

COURSE OUTCOMES (COs): At the end of the course, student will be able to

CO1	Comprehend the principles of Management. (Understanding-L2)
CO2	Estimate the budget requirements considering break even analysis for industrial applications.(Applying-L3)
CO3	Implement work study techniques to identify the effective method of production. (Applying-L3)
CO4	Apply the principles of quality control to check the process capability and quality of the product. (Applying-L3)
CO5	Describe the functions of human resource management. (Understanding-L2)

COURSE ARTICULATION MATRIX (Correlation between COs, POs & PSOs):

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1						3		1	2	1	3	2		3	
CO2						3		1	2	1	3	2		3	
CO3						3		1	2	1	3	2		3	
CO4						3		1	2	1	3	2		3	
CO5						3		1	2	1	3	2		3	
1 - Low						**2 –**Medium							**3 -** High		

TEXTBOOKS:

T1 Dr A.R.Aryasri, Management Science; TMH, 4th Edition 2009

REFERENCE BOOKS:

R1 Neville Stanton et al., Handbook of Human Factors and Ergonomics Methods; CRC press, 2009

R2 Khan MI; Industrial Ergonomics; PHI Learning

PART-B

COURSE DELIVERY PLAN (LESSON PLAN):

UNIT-I: INTRODUCTION, ORGANIZATIONAL STRUCTURE

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
1.	INDUSTRIAL ECONOMICS AND MANAGEMENT Introduction	01	01-07-2025		1,2	
2.	Management – Definition, Nature, Importance of management	01	2-07-2025		1,2	
3.	Functions of Management	01	4-07-2025		1,2	
4.	Taylor's scientific management theory	01	5-07-2025		1,2	
5.	Tutorial – Case Study	01	5-07-2025		3	
6.	Fayal's principles of management	01	8-07-2025		1,2	
7.	Contribution of Elton mayo, Maslow,	01	9-07-2025		1,2	
8.	Herzberg, Douglas Mc Gregor Theories	01	11-07-2025		1,2	
9.	Basic concepts of Organization	01	15-07-2025		1,2	
10.	Departmentation and Decentralization	01	16-07-2025		1,2	
11.	Organization structures, Line organization, Functional organization,	01	18-07-2025		1,2	
12.	Committee organization, Matrix organization	01	19-07-2025		1,2	
13.	Revision/Assignment/Quiz	01	19-07-2025		1,2	
No. of classes required to complete UNIT-I: 13				**No. of classes taken:**		

UNIT-II: COST ANALYSIS, CAPITAL BUDGETING

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
14.	COST ANALYSIS: Cost concepts	01			1,2	
15.	Break-even Analysis (BEA)	01	22-07-2025		1,2	
16.	Determination of Break-Even Point (simple problems)	01	23-07-2025		1,2	
17.	Simple problems	01	25-07-2025		1,2	
18.	Managerial Significance	01	26-07-2025		1,2	
19.	Tutorial - Problems	01	26-07-2025		3	
20.	CAPITAL BUDGETING: Capital and its significance	01	29-07-2025		1,2	
21.	Types of Capital	01	30-07-2025		1,2	
22.	Estimation of Fixed and Working capital requirements	01	01-08-2025		1,2	
23.	Methods and sources of raising capital	01	02-08-2025		1,2	
24.	Tutorial – Problems/Case Study	01	02-08-2025		3	
25.	Trading Forecast	01	05-08-2025		1,2	

26.	Capital Budget, Cash Budget	01	06-08-2025		1,2	
27.	Revision/Assignment/Quiz	01	08-08-2025		1,2	
No. of classes required to complete UNIT-II: 14				**No. of classes taken:**		

UNIT-III: OPERATONS MANAGEMENT, WORK STUDY

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
28.	OPERATONS MANAGEMENT	01	12-08-2025		1,2	
29.	Plant location	01	13-08-2025		1,2	
30.	Factors influencing location	01	19-08-2025		1,2	
31.	Principles and types of plant layouts	01	20-08-2025		1,2	
32.	Methods of production: Job batch	01	22-08-2025		1,2	
33.	Mass production , Applications	01	23-08-2025		1,2	
34.	WORK STUDY	01	16-09-2022		1,2	
35.	Basic procedure	01	17-09-2025		1,2	
36.	Method study	01	19-09-2025		1,2	
37.	Work measurement	01	20-09-2025		1,2	
38.	Tutorial – Problems/Case Study	01	20-09-2025		3	
39.	Advantages, limitations, Applications.	01	23-09-2025		1,2	
40.	Applications.	01	24-09-2025		1,2	
41.	Revision/Assignment/Quiz	01	26-09-2025		1,2	
No. of classes required to complete UNIT-III: 14				**No. of classes taken:**		

UNIT-IV: QUALITY AND MATERIALS MANAGEMENT

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
42.	Quality And Materials Management	01	29-09-2025		1,2	
43.	Statistical Quality Control	01	27-09-2025		1,2	
44.	Tutorial – Problems/Case Study	01	27-09-2025		3	
45.	Meaning Variables	01	30-09-2025		1,2	
46.	Attributes	01	01-10-2025		1,2	
47.	X chart,	01	03-10-2025		1,2	
48.	Problems X charts	01	04-10-2025		1,2	
49.	Tutorial – Problems/Case Study	01	04-10-2025		3	
50.	R Chart	01	07-10-2025		1,2	

51.	Problems R charts	01	08-10-2025		1,2	
52.	Simple Problems	01	10-10-2025		1,2	
53.	Simple Problems	01	14-10-2025		1,2	
54.	Acceptance sampling	01	15-10-2025		1,2	
55.	Sampling plans	01	17-10-2025		1,2	
56.	Deming's contribution to quality	01	18-10-2025		1,2	
57.	Tutorial – Problems/Case Study	01	18-10-2025		3	
No. of classes required to complete UNIT-IV: 16				**No. of classes taken:**		

UNIT-V: HUMAN RESOURCE MANAGEMENT (HRM), FUNCTIONS OF HR MANAGER

S. No.	Topics to be covered	No. of Classes Required	Tentative Date of Completion	Actual Date of Completion	Teaching Learning Methods	HOD Sign Weekly
58.	**Human Resource Management:** Introduction to HRM	01	21-10-2025		1,2	
59.	Concepts of HRM	01	22-10-2025		1,2	
60.	Personal Management and	01	24-10-2025		1,2	
61.	Industrial Relations	01	25-10-2025		1,2	
62.	Tutorial – Problems/Case Study	01	25-10-2025		3	
63.	**Functions of HR Manager**: Manpower planning,	01	28-10-2025		1,2	
64.	Recruitment,	01	29-10-2025		1,2	
65.	Selection, Training and	01	31-10-2025		1,2	
66.	Development, placement,	01	01-11-2025		1,2	
67.	Tutorial – Problems/Case Study	01	01-11-2025		3	
68.	Wage and salary administration,	01	04-11-2025		1,2	
69.	Transfers Separation	01	05-11-2025		1,2	
70.	Performance appraisal,	01	07-11-2025		1,2	
71.	Job evaluation and	01	11-11-2025		1,2	
72.	Merit rating.	01	12-11-2025		1,2	
73.	Revision /Assignment/Quiz	01	14-11-2025		1,2	
74.	Beyond syllabus	01	15-11-2025		1,2	
75.	Beyond syllabus	01	15-11-2025		1,2	
No. of classes required to complete UNIT-V: 18				**No. of classes taken:**		

Teaching Learning Methods			
TLM1	Chalk and Talk	**TLM4**	Demonstration (Lab/Field Visit)
TLM2	PPT	**TLM5**	ICT (NPTEL/Swayam Prabha/MOOCS)
TLM3	Tutorial	**TLM6**	Group Discussion/Project

PART-C

EVALUATION PROCESS (R20 Regulation):

Evaluation Task	**Marks**
Assignment-I (Units-I, II & UNIT-III (Half of the Syllabus))	A1=5
I-Descriptive Examination (Units-I, II & UNIT-III (Half of the Syllabus))	M1=15
I-Quiz Examination (Units-I, II & UNIT-III (Half of the Syllabus))	Q1=10
Assignment-II (Unit-III (Remaining Half of the Syllabus), IV & V)	A2=5
II- Descriptive Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	M2=15
II-Quiz Examination (UNIT-III (Remaining Half of the Syllabus), IV & V)	Q2=10
Mid Marks =80% of Max ((M1+Q1+A1), (M2+Q2+A2)) + 20% of Min ((M1+Q1+A1), (M2+Q2+A2))	M=30
Cumulative Internal Examination (CIE): M	30
Semester End Examination (SEE)	70
Total Marks = CIE + SEE	100

PART-D

PROGRAMME OUTCOMES (POs):

PO 1	**Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
PO 2	**Problem Analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
PO 3	**Design / Development of Solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
PO 4	**Conduct Investigations of Complex Problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
PO 5	**Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
PO 6	**The Engineer and Society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
PO 7	**Environment and Sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
PO 8	**Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
PO 9	**Individual and Team Work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
PO 10	**Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
PO 11	**Project Management and Finance:** Demonstrate knowledge and understanding of the ring and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
PO 12	**Life-long Learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs):

PSO 1	To apply the principles of thermal sciences to design and develop various thermal systems.
PSO 2	To apply the principles of manufacturing technology, scientific management towards improvement of quality and optimization of engineering systems in the design, analysis and manufacturability of products.
PSO 3	To apply the basic principles of mechanical engineering design for evaluation of performance of various systems relating to transmission of motion and power, conservation of energy and other process equipment.

Title	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**Head of the Department**
Name of the Faculty	**Dr. S. Pichi Reddy**	**Dr. S. Pichi Reddy**	**Mr. J. Subb Reddy**	**Dr. M.B.S.Sreekar Reddy**
Signature				