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

COURSE HANDOUT

Part-A

PROGRAM : B.Tech., VIII-Sem., A/S, ME

ACADEMIC YEAR : 2018-19

COURSE NAME & CODE : **Power Plant Engineering** - S 343

L-T-P STRUCTURE : 4-1-0

COURSE CREDITS : 3

COURSE INSTRUCTOR : **Mr.** K.Lakshmi Prasad

COURSE COORDINATOR : **Mr.** K.Lakshmi Prasad

PRE-REQUISITES: TD, TE

COURSE EDUCATIONAL OBJECTIVES (CEOs): To study the various power plant potentials and its working principles.

COURSE OUTCOMES (COs)

After completion of the course, the student will be able to

CO1: Understand the basics of various energy sources and components of steam power plant.

CO2: Comprehend Diesel and Gas Turbine power plants.

CO3: Compare salient features of Hydroelectric and Nuclear power plants.

CO4: Distinguish non-conventional sources and direct energy conversion systems.

CO5: Analyze economics and pollution issues related to power plants.

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	2	1	1	1	1	1	-	1	2	1	1	1	-	1
CO2	3	3	2	2	2	1	2	-	1	2	2	1	3	-	1
CO3	2	3	2	1	2	1	3	-	1	2	2	1	3	-	1
CO4	3	2	1	2	1	1	2	-	1	2	2	1	3	-	1
CO5	2	2	2	3	2	1	3	-	1	2	3	1	3	-	1

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 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,

BOS APPROVED REFERENCE BOOKS:

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

R2 M.M.ElWakil, Power plant technology, 3rd Edition 2010 TMH.

Part-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-A

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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction to Subject	1	10.12.18		**TLM1**			
2.	Course Outcomes	1	11.12.18		**TLM1**			
3.	Energy sources, Resources and Development of Power in India.	1	12.12.18		**TLM1**	CO1	T1,T2	
4.	Steam power plant: Plant Layout, Working of Different circuits, factors to be considered for the selection of the plant	1	13.12.18		**TLM1**	CO1	T1	
5.	Types of Coal-Fuel handling systems-	1	14.12.18		**TLM1**	CO1	T1	
6.	Coal handling, choice of coal handling equipment, Coal Storage	1	17.12.18		**TLM1, TLM2**	CO1	T1, T2	
7.	Ash handling systems	2	18.12.18, 19.12.18		**TLM1**	CO1	T1, T2	
8.	Overfeed and underfeed stokers	1	20.12.18		**TLM1, TLM2**	CO1	T1	
9.	Traveling grate stokers, Spreader stokers, Retort stokers	1	21.12.18		**TLM1, TLM2**	CO1	T1	
10.	Pulverized fuel burning system and, its components	2	24.12.18, 26.12.18		**TLM1**	CO1	T1	
11.	Draught system, Cyclone furnace	1	27.12.18		**TLM1**	CO1	T1	
12.	Design and construction, Dust collectors,	1	28.12.18		**TLM1**	CO1	T1	
13.	Dust collectors, Electrostatic precipitator	1	31.12.18		**TLM1**	CO1	T1	
14.	Cooling towers and heat rejection	2	02.01.19 03.01.19		**TLM1, TLM2**	CO1	T1, T2	
15.	TUTORIAL-1	1	04.01.19		**TLM3**	CO1		
No. of classes required to complete UNIT-I		18			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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
16.	Plant layout with auxiliaries-Fuel storage	1	07.01.19		**TLM1**	CO2	T1	
17.	Fuel supply system-Air supply system-Exhaust system	1	08.01.19		**TLM1**	CO2	T1	
18.	Water cooling system-Lubrication system	1	09.01.19		**TLM1**	CO2	T1	
19.	Starting system-Supercharging	1	10.01.19		**TLM1**	CO2	T1	
20.	Advantages and Disadvantages of Diesel plants over Thermal plants	1	11.01.19		**TLM1**	CO2	T1	
21.	TUTORIAL-2	1	18.01.19		**TLM3**	CO2		
22.	Introduction-Classification-Layout with auxiliaries	1	21.01.19		**TLM1**	CO2	T1	
23.	Principles of working of Closed and Open cycle gas turbines	1	22.01.19		**TLM1**	CO2	T1	
24.	Combined cycle power plants and comparison	1	23.01.19		**TLM1, TLM2**	CO2	T1, T2	
25.	TUTORIAL-3	1	24.01.19		**TLM3**	CO2		
No. of classes required to complete UNIT-II		10			No. of classes taken:			

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

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
26.	Hydrology-Hydrological cycle	1	25.01.19		**TLM1**	CO3	T1	
27.	Rainfall- Run off Hydrograph	1	31.01.19		**TLM1**	CO3	T1	
28.	Flow duration curve- Mass curve	1	01.02.19		**TLM1**	CO3	T1, T2	
29.	Site selection of hydro plant- Typical layout	1	04.02.19		**TLM1**	CO3	T1	
30.	Different types of hydro plants	2	05.02.19, 06.02.19		**TLM1**	CO3	T1	
31.	TUTORIAL-4	1	07.02.19		**TLM3**	CO3		
32.	Nuclear Fission and Fusion	1	08.02.19		**TLM1**	CO3	T1,R2	

	- Nuclear Fuels-							
33.	Breeding- Components of Reactor	1	11.02.19		**TLM1**	CO3	T1,R2	
34.	Types of Nuclear Reactors- Pressurized water reactor(PWR)-	1	12.02.19		**TLM1**	CO3	T1, T2	
35.	Boiling water reactor (BWR)	1	13.02.19		**TLM1**	CO3	T1, T2	
36.	CANDU reactor-Gas cooled reactor	1	14.02.19		**TLM1**	CO3	T1	
37.	Liquid metal cooled reactor-Fast Breeder Reactor	1	15.02.19		**TLM1**	CO3	T1	
38.	Nuclear waste and its Disposal	1	18.02.19		**TLM1**	CO3	T1	
39.	TUTORIAL-5	1	19.02.19		**TLM3**	CO3		
No. of classes required to complete UNIT-III		15			No. of classes taken:			

UNIT-IV : POWER FROM NON-CONVENTIONAL SOURCES 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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
40.	Solar power plants- Utilization of Solar collectors.	1	20.02.19		**TLM1**	CO4	T1	
41.	Different types of solar collectors.	1	21.02.19		**TLM1, TLM2**	CO4	T1	
42.	Principle of working of Wind energy-Types	1	22.02.19		**TLM1**	CO4	T1	
43.	Tidal Energy	1	25.02.19		**TLM1**	CO4	T1	
44.	TUTORIAL-6	1	26.02.19		**TLM3**	CO4		
45.	Solar cell- Fuel cell	1	27.02.19		**TLM1**	CO4	T1, T2	
46.	Thermo Electric and Thermo ionic conversion system	1	28.02.19		**TLM1**	CO4	T1, T2	
47.	MHD power generation	2	01.03.19, 04.03.19		**TLM1**	CO4	T1, T2	
48.	TUTORIAL-7	1	06.03.19		**TLM3**	CO4		
No. of classes required to complete UNIT-IV		9			No. of classes taken:			

UNIT-V : 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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
49.	Fixed cost-Operating cost.- Fluctuating loads	1	07.03.19		**TLM1**	CO5	T1	
50.	General arrangement of Power Distribution-Load curves	1	08.03.19		**TLM1**	CO5	T1, T2	
51.	Load duration curve and its problems	1	11.03.19		**TLM1**	CO5	T1, T2	
52.	Various load factors in power plants	1	12.03.19		**TLM1**	CO5	T1, T2	
53.	TUTORIAL-8	1	13.03.19		**TLM3**	CO5		
54.	Particulate and gaseous pollutants	1	14.03.19		**TLM1**	CO5	T1	
55.	Air and Water pollution by Thermal plants	1	15.03.19		**TLM1**	CO5	T1	
56.	Acid rains -Methods to control pollution	1	18.03.19		**TLM1**	CO5	T1	
57.	Numerical Problems on economics of power generation	3	19.03.19, 20.03.19, 22.03.19		**TLM1**	CO5	T1, T2	
58.	TUTORIAL-9	1	25.03.19		**TLM3**			
No. of classes required to complete UNIT-V		12			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
59.	Fluidized bed combustion	1	26.03.19		**TLM1**	CO1	T1,T2	
60.	Heat generation in nuclear fuel rods	1	27.03.19		**TLM1**	CO3	T1,T2	
61.	Pros and Cons of Direct Energy Conversion systems	1	28.03.19		**TLM1**	CO4	T1,T2	
62.	Different tariff systems in power plants	1	29.03.19		**TLM1**	CO5	T1,T2	
63.	Revision	1	01.04.19		**TLM1**			
64.	Revision	1	02.03.19		**TLM1**			
65.	Revision	1	03.03.19		**TLM1**			

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:

Evaluation Task	COs	Marks
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	2	A2=5
I-Mid Examination	1,2	B1=20
Assignment/Quiz – 3	3	A3=5
Assignment/Quiz – 4	4	A4=5
Assignment/Quiz – 5	5	A5=5
II-Mid Examination	3,4,5	B2=20
Evaluation of Assignment/Quiz Marks: A=(A1+A2+A3+A4+A5)/5	1,2,3,4,5	A=5
Evaluation of Mid Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	1,2,3,4,5	B=20
Cumulative Internal Examination : A+B	**1,2,3,4,5**	**A+B=25**
Semester End Examinations	**1,2,3,4,5**	**C=75**
Total Marks: A+B+C	**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 modeling 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 multidisciplinaryenvironments.
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.

PSOs

1. To apply the principles of thermal sciences to design and develop various thermal systems.
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.
3. To apply the basic principles of mechanical engineering design or 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

LAKKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

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NAAC Accredited with 'B++' grade, Accredited by NBA, Certified by ISO 9001:2015)
L B Reddy Nagar, Mylavaram-521 230, Krishna District, Andhra Pradesh.

COURSE HANDOUT

PROGRAM	**: B.Tech. - VIII-Sem. - Mechanical Engineering –A Section**
ACADEMIC YEAR	**:** 2018-19
COURSE NAME & CODE	**: Production Planning and Control - S 353**
L-T-P STRUCTURE	**:** 4-0-0
COURSE CREDITS	**:** 3
COURSE INSTRUCTOR	**: J.Subba Reddy, Associate Professor**
COURSE COORDINATOR	**: J.Subba Reddy, Associate Professor**
PRE-REQUISITE	**: Industrial Management & Operational Research**

Prerequisite Subject: Industrial Management and Operation Research

COURSE EDUCATIONAL OBJECTIVES:

The objectives of the course are to understand the basic concepts of production planning and control, familiarize with different forecasting techniques, familiarize the concepts of inventory management, understand the concepts of routing and scheduling and acquire basic knowledge in aggregate planning, expediting and follow up.

COURSE OUTCOMES:

After completion of the course student will be able to:

CO1: Exhibit the ability in developing production planning for operating economy, effectiveness and cost control.

CO2: Apply the forecasting techniques in estimating the number of products.

CO3: Use the inventory management techniques to determine the optimum quantity of material.

CO4: To develop the route sheet required for a production process/activities.

CO5: To decide the dispatch procedure required for a production processes and other activities.

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	1	1	1	2							2	1		3	
CO2	1	2	2	1								1		3	
CO3	1	2	1	2	2							1		3	
CO4	1	1	2	2								1		3	
CO5	1	1	1	1	2							1		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 R.Pannerselavn, Production and Operations Management, 2nd Edition, PHI,2007.

T2 P.Rama Murthy, Production and Operations Management, New Age Internationa, 2ndEdition, 2005

BOS APPROVED REFERENCE BOOKS:

R1 S.N.Chary, Production and Operations Management, TMcH, 4th Edition 2010.

R2 SamuelEilon, Elements of Production Planning and Control, Universal Publishing Corporation, 2004

R3 Seetharama L.N, Production Planning and Inventory Control, PHI, 2nd Edition1995

COURSE DELIVERY PLAN (LESSON PLAN): PPC [Program Elective – IV]

UNIT-I: INTRODUCTION TO PRODUCTION PLANNING AND CONTROL (PPC)

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 Production Planning and Control	1	10-12-2018		**TLM2**	CO1	R1, R2	
2.	CEOs, Course Outcomes, POs and PSOs	1	11-12-2018		**TLM2**	CO1	R1, R2	
3.	**UNIT-I** Introduction to PPC	1	12-12-2018		**TLM2**	CO1	R1, R2	
4.	Definition-Objectives of PPC	1	13-12-2018		**TLM2**	CO1	R1, R2	
5.	Functions of production planning and control	1	14-12-2018		**TLM2**	CO1	R1, R2	
6.	Elements of production control	1	17-12-2018		**TLM2**	CO1	R1, R2	
7.	Types of production	1	18-12-2018		**TLM2**	CO1	R1, R2	
8.	Process chart	1	19-12-2018		**TLM2**	CO1	R1, R2	
9.	**Tutorial-I**	1	20-12-2018		**TLM3**	CO1	R1, R2	
10.	Product life cycle	1	21-12-2018		**TLM2**	CO1	R1, R2	
11.	Design of product	1	24-12-2018		**TLM2**	CO1	R1, R2	
12.	Product Analysis	1	26-12-2018		**TLM2**	CO1	R1, R2	
13.	Org. Chart for PPC	1	27-12-2018		**TLM2**	CO1	R1, R2	
14.	**Tutorial-II**	1	28-12-2018		**TLM3**	CO1	R1, R2	
No. of classes required to complete UNIT-I:		**14**			**No. of classes taken:**			

UNIT-II: FORECASTING

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
15.	**UNIT-II** Introduction to Forecasting	1	31-12-2018		**TLM2**	CO2	T1,R1	
16.	Importance of forecasting – sales forecasting				**TLM2**	CO2	T1,R1	
17.	Types of forecasting	1	01-01-2019		**TLM2**	CO2	T1,R1	
18.	Qualitative methods	1	02-01-2019		**TLM2**	CO2	T1,R1	
19.	Quantities methods – Introduction	1	03-01-2019		**TLM2**	CO2	T1,R1	
20.	**Tutorial-III**	1	04-01-2019		**TLM3**	CO2	T1,R1	
21.	Moving Avg. method	1	07-01-2019		**TLM1**	CO2	T1,R1	
22.	weighted MAM				**TLM1**	CO2	T1,R1	
23.	Exponential smoothing method	1	08-01-2019		**TLM1**	CO2	T1,R1	
24.	Errors in Forecasting	1	09-01-2019		**TLM1**	CO2	T1,R1	
25.	MAD, MAE, MAPE etc	1	10-01-2019		**TLM1**	CO2	T1,R1	
26.	Correlation and Regression Analysis	1	11-01-2019		**TLM1**	CO2	T1,R1	
27.	Delphi Method -Problems	1	17-01-2019		**TLM2**	CO2	T1,R1	
28.	**Tutorial-IV**	1	18-01-2019		**TLM3**	CO2	T1,R1	
No. of classes required to complete UNIT-II		**14**		**No. of classes taken:**				

UNIT-III: INVENTORY MANAGEMENT

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
29.	**UNIT-III** Inventory of management – introduction	1	21-01-2019		**TLM2**	CO3	T1,R1	
30.	Types of Inventories				**TLM2**	CO3	T1,R1	
31.	Functions of inventory management	1	22-01-2019		**TLM2**	CO3	T1,R1	
32.	Cost Associated with Inventories	1	23-01-2019		**TLM2**	CO3	T1,R1	
33.	EOQ model – Problem	1	24-01-2019		**TLM1**	CO3	T1,R1	
34.	**Tutorial-V**	1	25-01-2019		**TLM3**	CO3	T1,R1	
35.	Selective Control of Inventories	1	31-01-2019		**TLM2**	CO3	T1,R1	
36.	ABC analysis, VED analysis	1	01-02-2019		**TLM2**	CO3	T1,R1	
37.	HMI Analysis etc.	1	04-02-2019		**TLM2**	CO3	T1,R1	
38.	Inventory control systems	1	05-02-2019		**TLM2**	CO3	T1,R1	
39.	P-Systems	1	06-02-2019		**TLM2**	CO3	T1,R1	
40.	Q-Systems				**TLM2**	CO3	T1,R1	
41.	Numericals	1	07-02-2019		**TLM1**	CO3	T1,R1	
42.	Introduction to MRP	1	08-02-2019		**TLM2**	CO3	T1,R1	
43.	objective of MRP				**TLM2**	CO3	T1,R1	
44.	Inputs of MRP	1	11-02-2019		**TLM2**	CO3	T1,R1	
45.	Bill of Materials	1	12-02-2019		**TLM2**	CO3	T1,R1	
46.	Introduction to JIT inventory	1	13-02-2019		**TLM2**	CO3	T1,R1	
47.	Element of JIT				**TLM2**	CO3	T1,R1	
48.	Japanese concepts	1	14-02-2019		**TLM2**	CO3	T1,R1	
49.	Kanban system				**TLM2**	CO3	T1,R1	
50.	**Tutorial-VI**	1	15-02-2019		**TLM3**	CO3	T1,R1	

No. of classes required to complete UNIT-III	22			No. of classes taken:

UNIT-IV: ROUTING

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
51.	**Unit-IV-** Routing, Routing procedure	1	18-02-2019		**TLM2**	CO4	T1,R1	
52.	Route sheets				**TLM2**	CO4	T1,R1	
53.	Maintenance sheet	1	19-02-2019		**TLM2**	CO4	T1,R1	
54.	Factors affecting routing procedure	1	20-02-2019		**TLM2**	CO4	T1,R1	
55.	Schedule	1	21-02-2019		**TLM2**	CO4	T1,R1	
56.	Definition of Scheduling	1	22-02-2019		**TLM2**	CO4	T1,R1	
57.	Forward and Backward Scheduling	1	25-02-2019		**TLM2**	CO4	T1,R1	
58.	Johnsons Rules	1	26-02-2019		**TLM1**	CO4	T1,R1	
59.	**Tutorial-VII**	1	27-02-2019		**TLM3**	CO4	T1,R1	
60.	Difference between loading & scheduling	1	28-02-2019		**TLM2**	CO4	T1,R1	
61.	Scheduling Policies	1	01-03-2019		**TLM2**	CO4	T1,R1	
62.	Techniques- Gant Chart	1	05-03-2019		**TLM1**	CO4	T1,R1	
63.	Gant Chart Symbols				**TLM1**	CO4	T1,R1	
64.	Scheduling Methods	1	06-03-2019		**TLM2**	CO4	T1,R1	
65.	**Tutorial-VIII**	1	07-03-2019		**TLM3**	CO4	T1,R1	
No. of classes required to complete UNIT-IV		**15**			**No. of classes taken:**			

UNIT-V: AGGREGATE PLANNING

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
66.	Aggregate Planning	1	08-03-2019		**TLM2**	CO5	T1,R1	
67.	Stage of Aggregate Planning				**TLM2**	CO5	T1,R1	
68.	Chase Planning	1	11-03-2019		**TLM2**	CO5	T1,R1	
69.	Expanding & Controlling Accepts				**TLM2**	CO5	T1,R1	
70.	**Tutorial-IX**	1	12-03-2019		**TLM3**	CO5	T1,R1	
71.	Introduction to Dispatching	1	13-03-2019		**TLM2**	CO5	T1,R1	
72.	Activities of Dispatcher	1	14-03-2019		**TLM2**	CO5	T1,R1	
73.	Dispatching Procedure	1	15-03-2019		**TLM2**	CO5	T1,R1	
74.	Follow up definition	1	18-03-2019		**TLM2**	CO5	T1,R1	
75.	Reasons for existence of functions	1	19-03-2019		**TLM2**	CO5	T1,R1	
76.	Types of Follow up	1	20-03-2019		**TLM2**	CO5	T1,R1	
77.	Applications of computer in PPC	1	21-03-2019		**TLM2**	CO5	T1,R1	
78.	**Tutorial-X**	1	22-03-2019		**TLM3**	CO5	T1,R1	
79.	ERP Systems	1	25-03-2019		**TLM2**	CO5	T1,R1	
80.	ERP Modules	1	26-03-2019		**TLM2**	CO5	T1,R1	
81.	Basics of MRP-II	1	27-03-2019		**TLM2**	CO5	T1,R1	
82.	**Revision of Unit I**	1	28-03-2019		**TLM2**	CO1	R1, R2, T1, T2, T3	
83.	**Revision of Unit II**	1	29-03-2019		**TLM2**	CO2		
84.	**Revision of Unit III**	1	01-04-2019		**TLM2**	CO3		
85.	**Revision of Unit IV**	1	02-04-2019		**TLM2**	CO4		
86.	**Revision of Unit V**	1	03-04-2019		**TLM2**	CO5		
No. of classes required to complete UNIT-V		**16**			**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/Assignment/Quiz

ACADEMIC CALENDER:

Commencement of Class work		**10-12-2018**	
I Phase of Instructions	10-12-2018	26-01-2019	7 Weeks
I Mid Examinations	28-01-2018	30-01-2019	½ Week
II Phase of Instructions	31-01-2019	03-04-2019	7 Weeks
II Mid Examinations	04-04-2019	06-04-2019	½ Week
Preparation and Practicals	08-04-2019	13-04-2019	1 Week
Semester End Examinations	15-04-2019	19-04-2019	1 Week

EVALUATION PROCESS:

Evaluation Task	**COs**	**Marks**
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	2	A2=5
I-Mid Examination	1,2	B1=20
Assignment/Quiz – 3	3	A3=5
Assignment/Quiz – 4	4	A4=5
Assignment/Quiz – 5	5	A5=5
II-Mid Examination	3,4,5	B2=20
Evaluation of Assignment/Quiz Marks: A=(A1+A2+A3+A4+A5)/5	1,2,3,4,5	A=5
Evaluation of Mid Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	1,2,3,4,5	B=20
Cumulative Internal Examination : A+B	**1,2,3,4,5**	**A+B=25**
Semester End Examinations	**1,2,3,4,5**	**C=75**
Total Marks: A+B+C	**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 modeling 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):

1. To apply the principles of thermal sciences to design and develop various thermal systems.
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.
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	**P.Sandeep Kumar**	**J.Subba Reddy**	**J.Subba Reddy**	**Dr. S. Pichi Reddy**
Designation	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**HOD**
Signature				

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

COURSE HANDOUT

PROGRAM : **B.Tech** ME VIII-Semester. **(I&E SPECIALIZATION)**
ACADEMIC YEAR : 2018-19
COURSE NAME & CODE : MANAGING INNOVATION AND ENTREPRENEURSHIP (S296)
L-T-P STRUCTURE : 4-1-0
COURSE CREDITS : 3
COURSE INSTRUCTOR : **N.SAMBASIVA RAO**
COURSE COORDINATOR : **K.RAVI KIRAN YASASWI**
PRE-REQUISITE: Nil

COURSE OBJECTIVES:

1. To understand the nature of entrepreneurship.
2. To motivate the Entrepreneurial instincts.
3. To give a clear picture about the process and involved in setting up and small scale industrial settings and bigger settings.
4. To make the potential entrepreneurs know about the possible risks and failures of the product make them learn how to overcome these problems

COURSE OUTCOMES (CO's):

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

CO 1	Develop strategies for implementing innovations in industries
CO 2	Comprehend the role of an entrepreneur in the society
CO 3	Evaluate the strengths and weaknesses using various management techniques
CO 4	Apply concepts of business and financial planning to start an industry
CO 5	Use various marketing management techniques for effective running of an industry.

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

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	3		2						3		3	
CO2		3	2	3								3			
CO3	3		3	3								3			
CO4	3	3	3	3										3	
CO5	3	2	3	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:Hisrich:Entrepreneurship,TMH,New Delhi,2009.
T2: "Managing innovation and entrepreneurship in technology based firm",by Martin M.J.1994,John Wiley.

BOS APPROVED REFERENCE BOOKS:

R1: Vasanth Desai Entrepreneurship ,TMH,New Delhi,2009

R2: Rajeev Roy: Entrepreneurship,Oxford University Press,New Delhi,2010.
R3: V.Gangadhar,Narsimha Chary: Entreprenuership Development,Kalyani Publishers,New Delhi,2007
R4: P.Narayana Reddy: Entrepreneurship,Cengage Learning,New Delhi,2010.

COURSE DELIVERY PLAN (LESSON PLAN): Section-Elective

UNIT-I: Introduction: Creativity and Innovation

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 the topic	01	10-12-2018		TLM1	CO1	T1,R1	
2.	Creativity and Innovation concepts,Shifting	01	11-12-2018		TLM2	CO1	T1,R1	
3.	Composition of the economy	01	12-12-2018		TLM1	CO1	T1	
4.	Purposeful innovation and seven sources of innovative	01	13-12-2018		TLM1	CO1	T1	
5.	Purposeful innovation and seven sources of innovative	01	14-12-2018		TLM1	CO1	T1	
6.	Innovation Process	01	17-12-2018		TLM1	CO1	T1	
7.	Innovation Strategies	01	18-12-2018		TLM1	CO1	T1	
8.	Innovation Strategies	01	19-12-2018		TLM1	CO1	T1	
9.	Tutorial-1	01	20-12-2018		TLM3	CO1	T1	
10.	Strategies that aim at Introducing an innovation	01	21-12-2018		TLM1	CO1	T1	
11.	Strategies that aim at Introducing an innovation	01	24-12-2018		TLM1	CO1	T1	
12.	Innovation and Entrepreneurship:can they work together Planning	01	26-12-2018		TLM2	CO1	T1	
13.	Incompatible with innovation and entrepreneurship	01	27-12-2018		TLM1	CO1	T1	
14.	Innovation and Entrepreneurship	01	28-12-2018		TLM1	CO1	T1	
15.	Assignment –I	01	31-12-2018		TLM6	CO1	T1	
No. of classes required to complete UNIT-I		15			No. of classes taken:			

UNIT-II : Introduction to Entrepreneurship

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
16.	Introduction to Entrepreneurship,Definition of Entrepreneurship	01	02-01-2019		TLM1	CO2	T1	
17.	Entrepreneurial Traits	01	03-01-2019		TLM1	CO2	T1	
18.	Traditional Entrepreneurship vs.Modern Entrepreneurship	01	04-01-2019		TLM2	CO2	T1	
19.	Entrepreneur vs.Intrapreneur	01	07-01-2019		TLM1	CO2	T1	
20.	The Entrepreneurial decision process	01	08-01-2019		TLM1	CO2	T1	
21.	Role of Entrepreneurship in Economic development,Ethical	01	09-01-2019		TLM2	CO2	T1	
22.	Environmental challenges and Social responsibility of Entrpreneurs	01	10-01-2019		TLM1	CO2	T1	
23.	Environmental challenges and Social responsibility of Entrpreneurs	01	11-01-2019		TLM1	CO2	T1	
24.	Opportunities for Entrepreneurs in India and abroad, Woman as Entrepreneur	01	16-01-2019		TLM1	CO2	T1	
25.	Assignment-II	01	17-01-2019		TLM3	CO2	T1	
26.	Tutorial II,	01	18-01-2019		TLM6	CO2	T1	
No. of classes required to complete UNIT II		11			No. of classes taken:			

UNIT-III : Creating and Starting the Venture

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
27.	Introduction to Creating and starting the venture,	01	21-01-2019		TLM2	CO3	T1	
28.	Introduction to Creating and starting the venture,	01	22-01-2019		TLM1	CO3	T1	
29.	Sources of new ideas	01	23-01-2019		TLM1	CO3	T1	
30.	Generation of new entry Opportunity	01	24-01-2019		TLM1	CO3	T1	
31.	Opportunity Analysis, Creating Problem Solving	01	25-01-2019		TLM1	CO3	T1	
32.	Product Planning and development process	01	31-01-2019		TLM1	CO3	T1	
33.	SWOT analysis	01	01-02-2019		TLM2	CO3	T1	
34.	First mover advantages and disadvantages	01	04-02-2019		TLM1	CO3	T1	
35.	First mover advantages and disadvantages	01	05-02-2019		TLM1	CO3	T1	
36.	Types of business organizations	01	06-02-2019		TLM1	CO3	T1	

37.	Types of business organizations	01	07-02-2019		TLM1	CO3	T1	
38.	Features and evaluation of joint ventures	01	08-02-2019		TLM1	CO3	T1	
39.	Features and evaluation of joint ventures	01	11-02-2019		TLM1	CO3	T1	
40.	Acquisitions	01	12-02-2019		TLM2	CO3	T1	
41.	Merges	01	13-02-2019		TLM1	CO3	T1	
42.	Merges	01	14-02-2019		TLM1	CO3	T1	
43.	Franchising	01	15-02-2019		TLM1	CO3	T1	
44.	Tutorial III,	01	18-02-2019		TLM3	CO3	T1	
45.	Assignment-III	01	19-02-2019		TLM6	CO3	T1	
No. of classes required to complete UNIT-III		19			No. of classes taken:			

UNIT-IV : The Business plan, Financing and Managing

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
46.	Nature and Scope of Business Plan	01	20-02-2019		TLM1	CO4	T1	
47.	Writing Business Plan	01	21-02-2019		TLM1	CO4	T1	
48.	Evaluating Business plans	01	22-02-2019		TLM1	CO4	T1	
49.	Using and implementing business plans ,Marketing plan	01	25-02-2019		TLM2	CO4	T1	
50.	Introduction to financial plan and the organizational Launching formalities	01	26-02-2019		TLM2	CO4	T1	
51.	Survival and Success , Sources of capital	01	27-02-2019		TLM1	CO4	T1	
52.	Record keeping , Recruitment	01	28-02-2019		TLM1	CO4	T1	
53.	Motivating and Leading teams	01	01-03-2019		TLM1	CO4	T1	
54.	Financial controls, Tutorial IV	01	05-03-2019		TLM1	CO4	T1	
55.	Marketing and sales Controls	01	06-03-2019		TLM1	CO4	T1	
56.	Ecommerce in Entrepreneurship, Internet advertising	01	07-03-2019		TLM1	CO4	T1	
57.	Tutorial-IV	01	08-03-2019		TLM3	CO4	T1	
58.	Assignment-4	01	11-03-2019		TLM6	CO4	T1	
No. of classes required to complete UNIT IV		13			No. of classes taken:			

UNIT-V : Production and Marketing Management

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.	Thrust of production management	01	12-03-2019		TLM2	CO5	T1	
60.	Selection of production techniques	01	13-03-2019		TLM1	CO5	T1	
61.	Selection of production techniques	01	14-03-2019		TLM1	CO5	T1	
62.	Plant utilization and maintenance	01	15-03-2019		TLM1	CO5	T1	
63.	Requirements at work place	01	18-03-2019		TLM1	CO5	T1	
64.	Requirements at work place	01	19-03-2019		TLM1	CO5	T1	
65.	Materials management, Marketing Functions	01	20-03-2019		TLM1	CO5	T1	
66.	Market segmentation	01	22-03-2019		TLM1	CO5	T1	
67.	Market research and channels and channels of distribution	01	25-03-2019		TLM1	CO5	T1	
68.	Sales Promotion and Product pricing,	01	26-03-2019		TLM1	CO5	T1	
69.	Sales Promotion and Product pricing,	01	27-03-2019		TLM1	CO5	T1	
70.	Tutorial –V	01	28-03-2019		TLM3	CO5	T1	
71.	Assignment-V	01	29-03-2019		TLM6	CO5	T1	
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 Weekly
72.	Red bus and Future group business strategy	01	12-12-2018		TLM2	CO5	T1	
73.	Reliance Jio business strategy	01	06-03-2019		TLM2	CO2	T1	

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 CALENDAR:

Description	From	To	Weeks
Commencement of Next semesters Class Work 11-12-2017			
I Phase of Instructions-1	10-12-2018	26-01-2019	7
I Mid Examinations	28-01-2018	30-01-2018	1/2
II Phase of Instructions	31-01-2019	03-04-2019	9
II Mid Examinations	04-04-2019	06-04-2019	½
Preparation and Practical's	08-04-2019	13-04-2019	1
Semester End Examinations	15-04-2019	19-04-2018	1

EVALUATION PROCESS:

Evaluation Task	COs	Marks
I-Mid Examination (Descriptive) =**A**	1,2	A=20
II-Mid Examination (Descriptive) =**B**	3,4,5	B=20
Evaluation of Mid Marks: **A+B** =75% of Max(A,B)+25% of Min(A,B)	1,2,3,4,5	A+B=20
Evaluation of assignments /quiz =**C**	1,2,3,4,5	C=5
Cumulative Internal Examination : A+B+C	**1,2,3,4,5**	**A+B+C=25**
Semester End Examinations =D	**1,2,3,4,5**	**D=75**
Total Marks: A+B+C+D	**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 modeling 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):

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

(N.SAMBASIVA RAO) (K.Ravi Kiran Yasaswi) (Dr.V.V.Narsi reddy) (Dr.A.Adisesha Reddy)

Course Instructor Course Coordinator Module Coordinator HOD

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L B Reddy Nagar, Mylavaram-521 230, Krishna District, Andhra Pradesh.

COURSE HANDOUT

PROGRAM : B.Tech. VIII-Sem, Mechanical Engineering

ACADEMIC YEAR : 2018-19

COURSE NAME & CODE : Total Quality Management- S409

L-T-P STRUCTURE : 4-1-0

COURSE CREDITS : 3

COURSE INSTRUCTOR : **Mr. K Narayana**

COURSE COORDINATOR : **Mr.K.Narayana**

PRE-REQUISITE: Production Planning and Control

COURSE OBJECTIVE :
To introduce concepts and core values of Total Quality Management (TQM).

COURSE OUTCOMES(CO)
CO1: Apply the principles of quality control.
CO2: Use quality management methods for analyzing and solving problems of organization.
CO3: Design efficient systems.
CO4: Apply the principles of Taguchi techniques to the industrial needs.
CO5: Implement quality system standards in the organization

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	**3**	**2**	**1**		**3**							**3**			
CO2	**3**	**2**	**1**		**3**							**3**			
CO3	**3**	**2**	**1**		**3**							**3**			
CO4	**3**	**2**	**1**		**3**							**3**			
CO5	**3**	**2**	**1**		**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 APPROVED TEXT BOOKS:

T1 Dale H. Besterfiled, et al., Total Quality Management, PHI learning Pvt. Ltd, 1975, 11th Reprint

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.

COURSE DELIVERY PLAN (LESSON PLAN): Section-(Elective)

UNIT-I : Introduction to Total Quality Management

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** : Introduction to Quality Management		10-12-2018		**TLM 1**	**CO 1**		
2.	Evolution of total quality management		11-12-18		**TLM 1 and TLM 9**	**CO 1**		
3.	Definition of Quality		12-12-18		**TLM 1**	**CO 1**		
4.	Quality costs		13-12-18		**TLM 1**	**CO 1**		
5.	**Tutorial I**		14-12-18		**TLM 1**	**CO 1**		
6.	Quality Council		17-12-18		**TLM 1**	**CO 1**		
7.	Strategic Planning		18-12-18		**TLM 1**	**CO 1**		
8.	Deming Philosophy		19-12-18		**TLM 1**	**CO 1**		
9.	Deming Philosophy		20-12-18		**TLM 1 and TLM 9**	**CO 1**		
10.	Barriers to TQM implementation		21-12-18		**TLM 1**	**CO 1**		
11.	**Tutorial II**		24-12-18		**TLM 1**	**CO 1**		
12.	Assignment/Quiz-1		26-12-18		**TLM 1**	**CO 1**		
No. of classes required to complete UNIT-I					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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
13.	Introduction to UNIT-II		27-12-18		**TLM 1 and TLM 9**	**CO 2**		
14.	TQM Principles		28-12-18		**TLM 1**	**CO 2**		
15.	Types of Customers, Customer satisfaction		31-12-18		**TLM 1**	**CO 2**		
16.	Customer supply chain and customer perception of quality		02-01-19		**TLM 1**	**CO 2**		
17.	Customer feedback, retention and service quality		03-01-19		**TLM 1**	**CO 2**		
18.	TUTORIAL-3		04-01-19		**TLM 1**	**CO 2**		
19.	Employee Involvement, motivation, Maslow's Hierarchy		07-01-19		**TLM 1 and TLM 9**	**CO 2**		
20.	Herzberg theory		08-01-19		**TLM 1**	**CO 2**		

21.	Performance appraisal and benefits		09-01-19		**TLM 1**	**CO 2**		
22.	Juran Trilogy		10-01-19		**TLM 1**	**CO 2**		
23.	Tutorial-4		10-01-19		**TLM 1**	**CO 2**		
24.	PDSA cycle		11-01-19		**TLM 1**	**CO 2**		
25.	5S, Kaizen		17-01-19		**TLM 1 and TLM 9**	**CO 2**		
26.	Performance Measures-Concepts, Strategy		18-01-19		**TLM 1**	**CO 2**		
27.	Performance Measure		19-01-19		**TLM 1**	**CO 2**		
28.	Tutorial-5		21-01-19		**TLM 1**	**CO 2**		
29.	Assignment/Quiz-2		22-01-19		**TLM 1**	**CO 2**		
No. of classes required to complete UNIT-II					No. of classes taken:			

UNIT-III: Statistical Process Control

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
30.	Introduction to UNIT-III		23-01-19		**TLM 1 and TLM 9**	**CO 3**		
31.	Seven Tools of quality		24-01-19		**TLM 1**	**CO 3**		
32.	Statistical Fundamentals		25-01-19		**TLM 1**	**CO 3**		
33.	Population and Samples		31-01-19		**TLM 1**	**CO 3**		
34.	TUTORIAL-6		01-02-19		**TLM 1**	**CO 3**		
35.	Normal Curve		04-02-19		**TLM 1**	**CO 3**		
36.	Control charts for variables		05-02-19		**TLM 1**	**CO 3**		
37.	Control charts for attributes		06-02-19		**TLM 1**	**CO 3**		
38.	Process capability		08-02-19		**TLM 1**	**CO 3**		
39.	TUTORIAL-7		11-02-19		**TLM 1**	**CO 3**		
40.	Concepts of Six Sigma		12-02-19		**TLM 1**	**CO 3**		
41.	New Seven Management tools		13-02-19		**TLM 1 and TLM 9**	**CO 3**		
42.	TUTORIAL-8		14-02-19		**TLM 1**	**CO 3**		
43.	Assignment/Quiz-3		15-02-19		**TLM 1**	**CO 3**		
No. of classes required to complete UNIT-III					No. of classes taken:			

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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
44.	Introduction to UNIT-IV		19-02-19		**TLM 1**	**CO 4**		
45.	Benchmarking		21-02-19		**TLM 1**	**CO 4**		
46.	Benchmarking Process		22-02-19		**TLM 1**	**CO 4**		
47.	Quality Function Deployment (QFD)		23-02-19		**TLM 1**	**CO 4**		
48.	House of Quality		25-02-19		**TLM 1 and TLM 9**	**CO 4**		
49.	TUTORIAL-9		01-03-19		**TLM 1**	**CO 4**		
50.	QFD Process		04-03-19		**TLM 1**	**CO 4**		
51.	Taguchi Quality loss function		05-03-19		**TLM 1**	**CO 4**		
52.	Total Productive Maintenance-Concept		07-03-19		**TLM 1**	**CO 4**		
53.	Improvement needs		08-03-19		**TLM 1**	**CO 4**		
54.	FMEA-Stages		11-03-19		**TLM 1 and TLM 9**	**CO 4**		
55.	TUTORIAL-10		12-03-19		**TLM 1**	**CO 4**		
56.	Assignment/Quiz-4		13-03-19		**TLM 1**	**CO 4**		
No. of classes required to complete UNIT-IV					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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
57.	Introduction to UNIT-V		14-03-19		**TLM 1 and TLM 9**	**CO 5**		
58.	Need for ISO 9000 and other Quality Systems		15-03-19		**TLM 1**	**CO 5**		
59.	ISO 9000:2000 Quality system		18-03-19		**TLM 1**	**CO 5**		
60.	ISO 9000:2000 Quality system		20-03-19		**TLM 1**	**CO 5**		
61.	Implementation of Quality System, Documentation		21-03-19		**TLM 1**	**CO 5**		
62.	TUTORIAL-11		22-03-19		**TLM 6**	**CO 5**		
63.	Quality Auditing		25-03-19		**TLM 1**	**CO 5**		
64.	TS 16949, ISO 14000-concepts		26-03-19		**TLM 1**	**CO 5**		
65.	TUTORIAL-12		27-03-19		**TLM 6**	**CO 5**		

66.	Assignment/Quiz-5		28-03-19		**TLM 1**	**CO 5**		
67.	Revison		29-03-19		**TLM 6**	**CO3,CO4**		
68.	Revison		01-04-19		**TLM 1**	**CO4,CO5**		
No. of classes required to complete UNIT-V					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
69.	Lean Manufacturing		02-04-2019		**TLM 2 and TLM 9**			
70.	Six Sigma		03-04-2019		**TLM 2 and TLM 9**			

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 CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1	10-12-2018	26-01-2019	7W
I Mid Examinations	28-01-2019	30-01-2019	1/2W
II Phase of Instructions	31-01-2019	03-04-2019	9W
II Mid Examinations	04-04-2019	06-04-2019	1/2W
Preparation and Practicals	08-04-2019	13-04-2019	1W
Semester End Examinations	15-04-2019	19-04-2019	1W

EVALUATION PROCESS:

Evaluation Task	COs	Marks
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	2	A2=5
I-Mid Examination	1,2	B1=20
Assignment/Quiz – 3	3	A3=5
Assignment/Quiz – 4	4	A4=5
Assignment/Quiz – 5	5	A5=5
II-Mid Examination	3,4,5	B2=20
Evaluation of Assignment/Quiz Marks: A=(A1+A2+A3+A4+A5)/5	1,2,3,4,5	A=5
Evaluation of Mid Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	1,2,3,4,5	B=20
Cumulative Internal Examination : A+B	**1,2,3,4,5**	**A+B=25**
Semester End Examinations	**1,2,3,4,5**	**C=75**
Total Marks: A+B+C	**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 modeling 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

multidisciplinaryenvironments.

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.

PSOs

1. To apply the principles of thermal sciences to design and develop various thermal systems.
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.
3. To apply the basic principles of mechanical engineering design or evaluation of performance of various systems relating to transmission of motion and power, conservation of energy and other process equipment.

Mr K. Narayana	**Mr J.Subba Reddy**	**Mr J.Subba Reddy**	**Dr S.Pichi Reddy**
Course Instructor	**Course Coordinator**	**Module Coordinator**	**HOD**

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

COURSE HANDOUT

Part-A

PROGRAM : B.Tech., VIII-Sem., B/S, ME

ACADEMIC YEAR : 2018-19

COURSE NAME & CODE : **Power Plant Engineering** - S 343

L-T-P STRUCTURE : 4-1-0

COURSE CREDITS : 3

COURSE INSTRUCTOR : **Mr.** P.Tharun sai

COURSE COORDINATOR : **Mr.** K.Lakshmi Prasad

PRE-REQUISITES: TD, TE

COURSE EDUCATIONAL OBJECTIVES (CEOs): To study the various power plant potentials and its working principles.

COURSE OUTCOMES (COs)

After completion of the course, the student will be able to

CO1: Understand the basics of various energy sources and components of steam power plant.

CO2: Comprehend Diesel and Gas Turbine power plants.

CO3: Compare salient features of Hydroelectric and Nuclear power plants.

CO4: Distinguish non-conventional sources and direct energy conversion systems.

CO5: Analyze economics and pollution issues related to power plants.

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	2	1	1	1	1	1	-	1	2	1	1	1	-	1
CO2	3	3	2	2	2	1	2	-	1	2	2	1	3	-	1
CO3	2	3	2	1	2	1	3	-	1	2	2	1	3	-	1
CO4	3	2	1	2	1	1	2	-	1	2	2	1	3	-	1
CO5	2	2	2	3	2	1	3	-	1	2	3	1	3	-	1

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 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,

BOS APPROVED REFERENCE BOOKS:

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

R2 M.M.ElWakil, Power plant technology, 3rd Edition 2010 TMH.

Part-B

COURSE DELIVERY PLAN (LESSON PLAN): Section-B

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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
1.	Introduction to Subject	1	10.12.18		**TLM1**			
2.	Course Outcomes	1	11.12.18		**TLM1**			
3.	Energy sources, Resources and Development of Power in India.	1	12.12.18		**TLM1**	CO1	T1,T2	
4.	Steam power plant: Plant Layout, Working of Different circuits, factors to be considered for the selection of the plant	1	13.12.18		**TLM1**	CO1	T1	
5.	Types of Coal-Fuel handling systems-	1	14.12.18		**TLM1**	CO1	T1	
6.	Coal handling, choice of coal handling equipment, Coal Storage	1	17.12.18		**TLM1, TLM2**	CO1	T1, T2	
7.	Ash handling systems	2	18.12.18, 19.12.18		**TLM1**	CO1	T1, T2	
8.	Overfeed and underfeed stokers	1	20.12.18		**TLM1, TLM2**	CO1	T1	
9.	Traveling grate stokers, Spreader stokers, Retort stokers	1	21.12.18		**TLM1, TLM2**	CO1	T1	
10.	Pulverized fuel burning system and, its components	2	24.12.18, 26.12.18		**TLM1**	CO1	T1	
11.	Draught system, Cyclone furnace	1	27.12.18		**TLM1**	CO1	T1	
12.	Design and construction, Dust collectors,	1	28.12.18		**TLM1**	CO1	T1	
13.	Dust collectors, Electrostatic precipitator	1	31.12.18		**TLM1**	CO1	T1	
14.	Cooling towers and heat rejection	2	02.01.19 03.01.19		**TLM1, TLM2**	CO1	T1, T2	
15.	TUTORIAL-1	1	04.01.19		**TLM3**	CO1		
No. of classes required to complete UNIT-I		18			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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
16.	Plant layout with auxiliaries-Fuel storage	1	07.01.19		**TLM1**	CO2	T1	
17.	Fuel supply system-Air supply system-Exhaust system	1	08.01.19		**TLM1**	CO2	T1	
18.	Water cooling system-Lubrication system	1	09.01.19		**TLM1**	CO2	T1	
19.	Starting system-Supercharging	1	10.01.19		**TLM1**	CO2	T1	
20.	Advantages and Disadvantages of Diesel plants over Thermal plants	1	11.01.19		**TLM1**	CO2	T1	
21.	TUTORIAL-2	1	18.01.19		**TLM3**	CO2		
22.	Introduction-Classification-Layout with auxiliaries	1	21.01.19		**TLM1**	CO2	T1	
23.	Principles of working of Closed and Open cycle gas turbines	1	22.01.19		**TLM1**	CO2	T1	
24.	Combined cycle power plants and comparison	1	23.01.19		**TLM1, TLM2**	CO2	T1, T2	
25.	TUTORIAL-3	1	24.01.19		**TLM3**	CO2		
No. of classes required to complete UNIT-II		10			No. of classes taken:			

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

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
26	Hydrology-Hydrological cycle	1	25.01.19		**TLM1**	CO3	T1	
27	Rainfall- Run off Hydrograph	1	31.01.19		**TLM1**	CO3	T1	
28	Flow duration curve-Mass curve	1	01.02.19		**TLM1**	CO3	T1, T2	
29	Site selection of hydro plant- Typical layout	1	04.02.19		**TLM1**	CO3	T1	
30	Different types of hydro plants	2	05.02.19, 06.02.19		**TLM1**	CO3	T1	
31	TUTORIAL-4	1	07.02.19		**TLM3**	CO3		

32	Nuclear Fission and Fusion - Nuclear Fuels-	1	08.02.19		**TLM1**	CO3	T1,R2	
33	Breeding- Components of Reactor	1	11.02.19		**TLM1**	CO3	T1,R2	
34	Types of Nuclear Reactors- Pressurized water reactor(PWR)-	1	12.02.19		**TLM1**	CO3	T1, T2	
35	Boiling water reactor (BWR)	1	13.02.19		**TLM1**	CO3	T1, T2	
36	CANDU reactor-Gas cooled reactor	1	14.02.19		**TLM1**	CO3	T1	
37	Liquid metal cooled reactor-Fast Breeder Reactor	1	15.02.19		**TLM1**	CO3	T1	
38	Nuclear waste and its Disposal	1	18.02.19		**TLM1**	CO3	T1	
39	TUTORIAL-5	1	19.02.19		**TLM3**	CO3		
No. of classes required to complete UNIT-III		15			No. of classes taken:			

UNIT-IV : POWER FROM NON-CONVENTIONAL SOURCES 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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
40.	Solar power plants- Utilization of Solar collectors.	1	20.02.19		**TLM1**	CO4	T1	
41.	Different types of solar collectors.	1	21.02.19		**TLM1, TLM2**	CO4	T1	
42.	Principle of working of Wind energy-Types	1	22.02.19		**TLM1**	CO4	T1	
43.	Tidal Energy	1	25.02.19		**TLM1**	CO4	T1	
44.	TUTORIAL-6	1	26.02.19		**TLM3**	CO4		
45.	Solar cell- Fuel cell	1	27.02.19		**TLM1**	CO4	T1, T2	
46.	Thermo Electric and Thermo ionic conversion system	1	28.02.19		**TLM1**	CO4	T1, T2	
47.	MHD power generation	2	01.03.19, 04.03.19		**TLM1**	CO4	T1, T2	
48.	TUTORIAL-7	1	06.03.19		**TLM3**	CO4		
No. of classes required to complete UNIT-IV		9			No. of classes taken:			

UNIT-V : 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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
49.	Fixed cost-Operating cost.- Fluctuating loads	1	07.03.19		**TLM1**	CO5	T1	
50.	General arrangement of Power Distribution-Load curves	1	08.03.19		**TLM1**	CO5	T1, T2	
51.	Load duration curve and its problems	1	11.03.19		**TLM1**	CO5	T1, T2	
52.	Various load factors in power plants	1	12.03.19		**TLM1**	CO5	T1, T2	
53.	TUTORIAL-8	1	13.03.19		**TLM3**	CO5		
54.	Particulate and gaseous pollutants	1	14.03.19		**TLM1**	CO5	T1	
55.	Air and Water pollution by Thermal plants	1	15.03.19		**TLM1**	CO5	T1	
56.	Acid rains -Methods to control pollution	1	18.03.19		**TLM1**	CO5	T1	
57.	Numerical Problems on economics of power generation	3	19.03.19, 20.03.19, 22.03.19		**TLM1**	CO5	T1, T2	
58.	TUTORIAL-9	1	25.03.19		**TLM3**			
No. of classes required to complete UNIT-V		12			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
59.	Fluidized bed combustion	1	26.03.19		**TLM1**	CO1	T1,T2	
60.	Heat generation in nuclear fuel rods	1	27.03.19		**TLM1**	CO3	T1,T2	
61.	Pros and Cons of Direct Energy Conversion systems	1	28.03.19		**TLM1**	CO4	T1,T2	
62.	Different tariff systems in power plants	1	29.03.19		**TLM1**	CO5	T1,T2	
63.	Revision	1	01.04.19		**TLM1**			
64.	Revision	1	02.03.19		**TLM1**			
65.	Revision	1	03.03.19		**TLM1**			

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:

Evaluation Task	COs	Marks
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	2	A2=5
I-Mid Examination	1,2	B1=20
Assignment/Quiz – 3	3	A3=5
Assignment/Quiz – 4	4	A4=5
Assignment/Quiz – 5	5	A5=5
II-Mid Examination	3,4,5	B2=20
Evaluation of Assignment/Quiz Marks: A=(A1+A2+A3+A4+A5)/5	1,2,3,4,5	A=5
Evaluation of Mid Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	1,2,3,4,5	B=20
Cumulative Internal Examination : A+B	**1,2,3,4,5**	**A+B=25**
Semester End Examinations	**1,2,3,4,5**	**C=75**
Total Marks: A+B+C	**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 modeling 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 multidisciplinaryenvironments.
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.

PSOs

1. To apply the principles of thermal sciences to design and develop various thermal systems.
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.
3. To apply the basic principles of mechanical engineering design or 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

LAKKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)

DEPARTMENT OF MECHANICAL ENGINEERING (Accredited by NBA – Tier I)

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

COURSE HANDOUT

PROGRAM	**: B.Tech. - VIII-Sem. - Mechanical Engineering –B Section**
ACADEMIC YEAR	**:** 2018-19
COURSE NAME & CODE	**: Production Planning and Control - S 353**
L-T-P STRUCTURE	**:** 4-0-0
COURSE CREDITS	**:** 3
COURSE INSTRUCTOR	**: P.Sandeep kumar, Assistant Professor**
COURSE COORDINATOR	**: J.Subba Reddy, Associate Professor**
PRE-REQUISITE	**: Industrial Management & Operational Research**

Prerequisite Subject: Industrial Management and Operation Research

COURSE EDUCATIONAL OBJECTIVES:

The objectives of the course are to understand the basic concepts of production planning and control, familiarize with different forecasting techniques, familiarize the concepts of inventory management, understand the concepts of routing and scheduling and acquire basic knowledge in aggregate planning, expediting and follow up.

COURSE OUTCOMES:

After completion of the course student will be able to:

CO1: Exhibit the ability in developing production planning for operating economy, effectiveness and cost control.

CO2: Apply the forecasting techniques in estimating the number of products.

CO3: Use the inventory management techniques to determine the optimum quantity of material.

CO4: To develop the route sheet required for a production process/activities.

CO5: To decide the dispatch procedure required for a production processes and other activities.

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	1	1	1	2							2	1		3	
CO2	1	2	2	1								1		3	
CO3	1	2	1	2	2							1		3	
CO4	1	1	2	2								1		3	
CO5	1	1	1	1	2							1		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 R.Pannerselavn, Production and Operations Management, 2nd Edition, PHI,2007.

T2 P.Rama Murthy, Production and Operations Management, New Age Internationa, 2ndEdition, 2005

BOS APPROVED REFERENCE BOOKS:

R1 S.N.Chary, Production and Operations Management, TMcH, 4th Edition 2010.

R2 SamuelEilon, Elements of Production Planning and Control, Universal Publishing Corporation, 2004

R3 Seetharama L.N, Production Planning and Inventory Control, PHI, 2nd Edition1995

COURSE DELIVERY PLAN (LESSON PLAN): PPC [Program Elective – IV]

UNIT-I: INTRODUCTION TO PRODUCTION PLANNING AND CONTROL (PPC)

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 Production Planning and Control	1	10-12-2018		**TLM2**	CO1	R1, R2	
2.	CEOs, Course Outcomes, POs and PSOs	1	11-12-2018		**TLM2**	CO1	R1, R2	
3.	**UNIT-I** Introduction to PPC	1	12-12-2018		**TLM2**	CO1	R1, R2	
4.	Definition-Objectives of PPC	1	13-12-2018		**TLM2**	CO1	R1, R2	
5.	Functions of production planning and control	1	14-12-2018		**TLM2**	CO1	R1, R2	
6.	Elements of production control	1	17-12-2018		**TLM2**	CO1	R1, R2	
7.	Types of production	1	18-12-2018		**TLM2**	CO1	R1, R2	
8.	Process chart	1	19-12-2018		**TLM2**	CO1	R1, R2	
9.	**Tutorial-I**	1	20-12-2018		**TLM3**	CO1	R1, R2	
10.	Product life cycle	1	21-12-2018		**TLM2**	CO1	R1, R2	
11.	Design of product	1	24-12-2018		**TLM2**	CO1	R1, R2	
12.	Product Analysis	1	26-12-2018		**TLM2**	CO1	R1, R2	
13.	Org. Chart for PPC	1	27-12-2018		**TLM2**	CO1	R1, R2	
14.	**Tutorial-II**	1	28-12-2018		**TLM3**	CO1	R1, R2	
No. of classes required to complete UNIT-I:		**14**			**No. of classes taken:**			

UNIT-II: FORECASTING

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
15.	**UNIT-II** Introduction to Forecasting	1	31-12-2018		**TLM2**	CO2	T1,R1	
16.	Importance of forecasting – sales forecasting				**TLM2**	CO2	T1,R1	
17.	Types of forecasting	1	01-01-2019		**TLM2**	CO2	T1,R1	
18.	Qualitative methods	1	02-01-2019		**TLM2**	CO2	T1,R1	
19.	Quantities methods – Introduction	1	03-01-2019		**TLM2**	CO2	T1,R1	
20.	**Tutorial-III**	1	04-01-2019		**TLM3**	CO2	T1,R1	
21.	Moving Avg. method	1	07-01-2019		**TLM1**	CO2	T1,R1	
22.	weighted MAM				**TLM1**	CO2	T1,R1	
23.	Exponential smoothing method	1	08-01-2019		**TLM1**	CO2	T1,R1	
24.	Errors in Forecasting	1	09-01-2019		**TLM1**	CO2	T1,R1	
25.	MAD, MAE, MAPE etc	1	10-01-2019		**TLM1**	CO2	T1,R1	
26.	Correlation and Regression Analysis	1	11-01-2019		**TLM1**	CO2	T1,R1	
27.	Delphi Method -Problems	1	17-01-2019		**TLM2**	CO2	T1,R1	
28.	**Tutorial-IV**	1	18-01-2019		**TLM3**	CO2	T1,R1	
No. of classes required to complete UNIT-II		**14**		**No. of classes taken:**				

UNIT-III: INVENTORY MANAGEMENT

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
29.	**UNIT-III** Inventory of management – introduction	1	21-01-2019		**TLM2**	CO3	T1,R1	
30.	Types of Inventories				**TLM2**	CO3	T1,R1	
31.	Functions of inventory management	1	22-01-2019		**TLM2**	CO3	T1,R1	
32.	Cost Associated with Inventories	1	23-01-2019		**TLM2**	CO3	T1,R1	
33.	EOQ model – Problem	1	24-01-2019		**TLM1**	CO3	T1,R1	
34.	**Tutorial-V**	1	25-01-2019		**TLM3**	CO3	T1,R1	
35.	Selective Control of Inventories	1	31-01-2019		**TLM2**	CO3	T1,R1	
36.	ABC analysis, VED analysis	1	01-02-2019		**TLM2**	CO3	T1,R1	
37.	HMI Analysis etc.	1	04-02-2019		**TLM2**	CO3	T1,R1	
38.	Inventory control systems	1	05-02-2019		**TLM2**	CO3	T1,R1	
39.	P-Systems	1	06-02-2019		**TLM2**	CO3	T1,R1	
40.	Q-Systems				**TLM2**	CO3	T1,R1	
41.	Numericals	1	07-02-2019		**TLM1**	CO3	T1,R1	
42.	Introduction to MRP	1	08-02-2019		**TLM2**	CO3	T1,R1	
43.	objective of MRP				**TLM2**	CO3	T1,R1	
44.	Inputs of MRP	1	11-02-2019		**TLM2**	CO3	T1,R1	
45.	Bill of Materials	1	12-02-2019		**TLM2**	CO3	T1,R1	
46.	Introduction to JIT inventory	1	13-02-2019		**TLM2**	CO3	T1,R1	
47.	Element of JIT				**TLM2**	CO3	T1,R1	
48.	Japanese concepts	1	14-02-2019		**TLM2**	CO3	T1,R1	
49.	Kanban system				**TLM2**	CO3	T1,R1	
50.	**Tutorial-VI**	1	15-02-2019		**TLM3**	CO3	T1,R1	
No. of classes required to complete UNIT-III		**22**			**No. of classes taken:**			

UNIT-IV: ROUTING

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
51.	**Unit-IV-** Routing, Routing procedure	1	18-02-2019		**TLM2**	CO4	T1,R1	
52.	Route sheets				**TLM2**	CO4	T1,R1	
53.	Maintenance sheet	1	19-02-2019		**TLM2**	CO4	T1,R1	
54.	Factors affecting routing procedure	1	20-02-2019		**TLM2**	CO4	T1,R1	
55.	Schedule	1	21-02-2019		**TLM2**	CO4	T1,R1	
56.	Definition of Scheduling	1	22-02-2019		**TLM2**	CO4	T1,R1	
57.	Forward and Backward Scheduling	1	25-02-2019		**TLM2**	CO4	T1,R1	
58.	Johnsons Rules	1	26-02-2019		**TLM1**	CO4	T1,R1	
59.	**Tutorial-VII**	1	27-02-2019		**TLM3**	CO4	T1,R1	
60.	Difference between loading & scheduling	1	28-02-2019		**TLM2**	CO4	T1,R1	
61.	Scheduling Policies	1	01-03-2019		**TLM2**	CO4	T1,R1	
62.	Techniques- Gant Chart	1	05-03-2019		**TLM1**	CO4	T1,R1	
63.	Gant Chart Symbols				**TLM1**	CO4	T1,R1	
64.	Scheduling Methods	1	06-03-2019		**TLM2**	CO4	T1,R1	
65.	**Tutorial-VIII**	1	07-03-2019		**TLM3**	CO4	T1,R1	
No. of classes required to complete UNIT-IV		**15**			**No. of classes taken:**			

UNIT-V: AGGREGATE PLANNING

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
66.	Aggregate Planning	1	08-03-2019		**TLM2**	CO5	T1,R1	
67.	Stage of Aggregate Planning				**TLM2**	CO5	T1,R1	
68.	Chase Planning	1	11-03-2019		**TLM2**	CO5	T1,R1	
69.	Expanding & Controlling Accepts				**TLM2**	CO5	T1,R1	
70.	**Tutorial-IX**	1	12-03-2019		**TLM3**	CO5	T1,R1	
71.	Introduction to Dispatching	1	13-03-2019		**TLM2**	CO5	T1,R1	
72.	Activities of Dispatcher	1	14-03-2019		**TLM2**	CO5	T1,R1	
73.	Dispatching Procedure	1	15-03-2019		**TLM2**	CO5	T1,R1	
74.	Follow up definition	1	18-03-2019		**TLM2**	CO5	T1,R1	
75.	Reasons for existence of functions	1	19-03-2019		**TLM2**	CO5	T1,R1	
76.	Types of Follow up	1	20-03-2019		**TLM2**	CO5	T1,R1	
77.	Applications of computer in PPC	1	21-03-2019		**TLM2**	CO5	T1,R1	
78.	**Tutorial-X**	1	22-03-2019		**TLM3**	CO5	T1,R1	
79.	ERP Systems	1	25-03-2019		**TLM2**	CO5	T1,R1	
80.	ERP Modules	1	26-03-2019		**TLM2**	CO5	T1,R1	
81.	Basics of MRP-II	1	27-03-2019		**TLM2**	CO5	T1,R1	
82.	**Revision of Unit I**	1	28-03-2019		**TLM2**	CO1	R1, R2, T1, T2, T3	
83.	**Revision of Unit II**	1	29-03-2019		**TLM2**	CO2		
84.	**Revision of Unit III**	1	01-04-2019		**TLM2**	CO3		
85.	**Revision of Unit IV**	1	02-04-2019		**TLM2**	CO4		
86.	**Revision of Unit V**	1	03-04-2019		**TLM2**	CO5		
No. of classes required to complete UNIT-V		**16**			**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/Assignment/Quiz

ACADEMIC CALENDER:

Commencement of Class work		**10-12-2018**	
I Phase of Instructions	10-12-2018	26-01-2019	7 Weeks
I Mid Examinations	28-01-2018	30-01-2019	½ Week
II Phase of Instructions	31-01-2019	03-04-2019	7 Weeks
II Mid Examinations	04-04-2019	06-04-2019	½ Week
Preparation and Practicals	08-04-2019	13-04-2019	1 Week
Semester End Examinations	15-04-2019	19-04-2019	1 Week

EVALUATION PROCESS:

Evaluation Task	**COs**	**Marks**
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	2	A2=5
I-Mid Examination	1,2	B1=20
Assignment/Quiz – 3	3	A3=5
Assignment/Quiz – 4	4	A4=5
Assignment/Quiz – 5	5	A5=5
II-Mid Examination	3,4,5	B2=20
Evaluation of Assignment/Quiz Marks: A=(A1+A2+A3+A4+A5)/5	1,2,3,4,5	A=5
Evaluation of Mid Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	1,2,3,4,5	B=20
Cumulative Internal Examination : A+B	**1,2,3,4,5**	**A+B=25**
Semester End Examinations	**1,2,3,4,5**	**C=75**
Total Marks: A+B+C	**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 modeling 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):

1. To apply the principles of thermal sciences to design and develop various thermal systems.
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.
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	**P.Sandeep Kumar**	**J.Subba Reddy**	**J.Subba Reddy**	**Dr. S. Pichi Reddy**
Designation	**Course Instructor**	**Course Coordinator**	**Module Coordinator**	**HOD**
Signature				

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L B Reddy Nagar, Mylavaram-521 230, Krishna District, Andhra Pradesh.

COURSE HANDOUT

PROGRAM : **B.Tech** ME VIII-Semester. **(I&E SPECIALIZATION)**
ACADEMIC YEAR : 2018-19
COURSE NAME & CODE : MANAGING INNOVATION AND ENTREPRENEURSHIP (S296)
L-T-P STRUCTURE : 4-1-0
COURSE CREDITS : 3
COURSE INSTRUCTOR : **N.SAMBASIVA RAO**
COURSE COORDINATOR : **K.RAVI KIRAN YASASWI**
PRE-REQUISITE: Nil

COURSE OBJECTIVES:

1. To understand the nature of entrepreneurship.
2. To motivate the Entrepreneurial instincts.
3. To give a clear picture about the process and involved in setting up and small scale industrial settings and bigger settings.
4. To make the potential entrepreneurs know about the possible risks and failures of the product make them learn how to overcome these problems

COURSE OUTCOMES (CO's):

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

CO 1	Develop strategies for implementing innovations in industries
CO 2	Comprehend the role of an entrepreneur in the society
CO 3	Evaluate the strengths and weaknesses using various management techniques
CO 4	Apply concepts of business and financial planning to start an industry
CO 5	Use various marketing management techniques for effective running of an industry.

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

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	3		2						3		3	
CO2		3	2	3								3			
CO3	3		3	3								3			
CO4	3	3	3	3										3	
CO5	3	2	3	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:Hisrich:Entrepreneurship,TMH,New Delhi,2009.
T2: "Managing innovation and entrepreneurship in technology based firm",by Martin M.J.1994,John Wiley.

BOS APPROVED REFERENCE BOOKS:

R1: Vasanth Desai Entrepreneurship ,TMH,New Delhi,2009

R2: Rajeev Roy: Entrepreneurship,Oxford University Press,New Delhi,2010.
R3: V.Gangadhar,Narsimha Chary: Entreprenuership Development,Kalyani Publishers,New Delhi,2007
R4: P.Narayana Reddy: Entrepreneurship,Cengage Learning,New Delhi,2010.

COURSE DELIVERY PLAN (LESSON PLAN): Section-Elective

UNIT-I: Introduction: Creativity and Innovation

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 the topic	01	10-12-2018		TLM1	CO1	T1,R1	
2.	Creativity and Innovation concepts,Shifting	01	11-12-2018		TLM2	CO1	T1,R1	
3.	Composition of the economy	01	12-12-2018		TLM1	CO1	T1	
4.	Purposeful innovation and seven sources of innovative	01	13-12-2018		TLM1	CO1	T1	
5.	Purposeful innovation and seven sources of innovative	01	14-12-2018		TLM1	CO1	T1	
6.	Innovation Process	01	17-12-2018		TLM1	CO1	T1	
7.	Innovation Strategies	01	18-12-2018		TLM1	CO1	T1	
8.	Innovation Strategies	01	19-12-2018		TLM1	CO1	T1	
9.	Tutorial-1	01	20-12-2018		TLM3	CO1	T1	
10.	Strategies that aim at Introducing an innovation	01	21-12-2018		TLM1	CO1	T1	
11.	Strategies that aim at Introducing an innovation	01	24-12-2018		TLM1	CO1	T1	
12.	Innovation and Entrepreneurship:can they work together Planning	01	26-12-2018		TLM2	CO1	T1	
13.	Incompatible with innovation and entrepreneurship	01	27-12-2018		TLM1	CO1	T1	
14.	Innovation and Entrepreneurship	01	28-12-2018		TLM1	CO1	T1	
15.	Assignment –I	01	31-12-2018		TLM6	CO1	T1	
No. of classes required to complete UNIT-I		15			No. of classes taken:			

UNIT-II : Introduction to Entrepreneurship

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
16.	Introduction to Entrepreneurship,Definition of Entrepreneurship	01	02-01-2019		TLM1	CO2	T1	
17.	Entrepreneurial Traits	01	03-01-2019		TLM1	CO2	T1	
18.	Traditional Entrepreneurship vs.Modern Entrepreneurship	01	04-01-2019		TLM2	CO2	T1	
19.	Entrepreneur vs.Intrapreneur	01	07-01-2019		TLM1	CO2	T1	
20.	The Entrepreneurial decision process	01	08-01-2019		TLM1	CO2	T1	
21.	Role of Entrepreneurship in Economic development,Ethical	01	09-01-2019		TLM2	CO2	T1	
22.	Environmental challenges and Social responsibility of Entrpreneurs	01	10-01-2019		TLM1	CO2	T1	
23.	Environmental challenges and Social responsibility of Entrpreneurs	01	11-01-2019		TLM1	CO2	T1	
24.	Opportunities for Entrepreneurs in India and abroad, Woman as Entrepreneur	01	16-01-2019		TLM1	CO2	T1	
25.	Assignment-II	01	17-01-2019		TLM3	CO2	T1	
26.	Tutorial II,	01	18-01-2019		TLM6	CO2	T1	
No. of classes required to complete UNIT II		11			No. of classes taken:			

UNIT-III : Creating and Starting the Venture

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
27.	Introduction to Creating and starting the venture,	01	21-01-2019		TLM2	CO3	T1	
28.	Introduction to Creating and starting the venture,	01	22-01-2019		TLM1	CO3	T1	
29.	Sources of new ideas	01	23-01-2019		TLM1	CO3	T1	
30.	Generation of new entry Opportunity	01	24-01-2019		TLM1	CO3	T1	
31.	Opportunity Analysis, Creating Problem Solving	01	25-01-2019		TLM1	CO3	T1	
32.	Product Planning and development process	01	31-01-2019		TLM1	CO3	T1	
33.	SWOT analysis	01	01-02-2019		TLM2	CO3	T1	
34.	First mover advantages and disadvantages	01	04-02-2019		TLM1	CO3	T1	
35.	First mover advantages and disadvantages	01	05-02-2019		TLM1	CO3	T1	
36.	Types of business organizations	01	06-02-2019		TLM1	CO3	T1	

37.	Types of business organizations	01	07-02-2019		TLM1	CO3	T1	
38.	Features and evaluation of joint ventures	01	08-02-2019		TLM1	CO3	T1	
39.	Features and evaluation of joint ventures	01	11-02-2019		TLM1	CO3	T1	
40.	Acquisitions	01	12-02-2019		TLM2	CO3	T1	
41.	Merges	01	13-02-2019		TLM1	CO3	T1	
42.	Merges	01	14-02-2019		TLM1	CO3	T1	
43.	Franchising	01	15-02-2019		TLM1	CO3	T1	
44.	Tutorial III,	01	18-02-2019		TLM3	CO3	T1	
45.	Assignment-III	01	19-02-2019		TLM6	CO3	T1	
No. of classes required to complete UNIT-III		19			No. of classes taken:			

UNIT-IV : The Business plan, Financing and Managing

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
46.	Nature and Scope of Business Plan	01	20-02-2019		TLM1	CO4	T1	
47.	Writing Business Plan	01	21-02-2019		TLM1	CO4	T1	
48.	Evaluating Business plans	01	22-02-2019		TLM1	CO4	T1	
49.	Using and implementing business plans ,Marketing plan	01	25-02-2019		TLM2	CO4	T1	
50.	Introduction to financial plan and the organizational Launching formalities	01	26-02-2019		TLM2	CO4	T1	
51.	Survival and Success , Sources of capital	01	27-02-2019		TLM1	CO4	T1	
52.	Record keeping , Recruitment	01	28-02-2019		TLM1	CO4	T1	
53.	Motivating and Leading teams	01	01-03-2019		TLM1	CO4	T1	
54.	Financial controls, Tutorial IV	01	05-03-2019		TLM1	CO4	T1	
55.	Marketing and sales Controls	01	06-03-2019		TLM1	CO4	T1	
56.	Ecommerce in Entrepreneurship, Internet advertising	01	07-03-2019		TLM1	CO4	T1	
57.	Tutorial-IV	01	08-03-2019		TLM3	CO4	T1	
58.	Assignment-4	01	11-03-2019		TLM6	CO4	T1	
No. of classes required to complete UNIT IV		13			No. of classes taken:			

UNIT-V : Production and Marketing Management

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.	Thrust of production management	01	12-03-2019		TLM2	CO5	T1	
60.	Selection of production techniques	01	13-03-2019		TLM1	CO5	T1	
61.	Selection of production techniques	01	14-03-2019		TLM1	CO5	T1	
62.	Plant utilization and maintenance	01	15-03-2019		TLM1	CO5	T1	
63.	Requirements at work place	01	18-03-2019		TLM1	CO5	T1	
64.	Requirements at work place	01	19-03-2019		TLM1	CO5	T1	
65.	Materials management, Marketing Functions	01	20-03-2019		TLM1	CO5	T1	
66.	Market segmentation	01	22-03-2019		TLM1	CO5	T1	
67.	Market research and channels and channels of distribution	01	25-03-2019		TLM1	CO5	T1	
68.	Sales Promotion and Product pricing,	01	26-03-2019		TLM1	CO5	T1	
69.	Sales Promotion and Product pricing,	01	27-03-2019		TLM1	CO5	T1	
70.	Tutorial –V	01	28-03-2019		TLM3	CO5	T1	
71.	Assignment-V	01	29-03-2019		TLM6	CO5	T1	
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 Weekly
72.	Red bus and Future group business strategy	01	12-12-2018		TLM2	CO5	T1	
73.	Reliance Jio business strategy	01	06-03-2019		TLM2	CO2	T1	

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 CALENDAR:

Description	From	To	Weeks
Commencement of Next semesters Class Work 11-12-2017			
I Phase of Instructions-1	10-12-2018	26-01-2019	7
I Mid Examinations	28-01-2018	30-01-2018	1/2
II Phase of Instructions	31-01-2019	03-04-2019	9
II Mid Examinations	04-04-2019	06-04-2019	½
Preparation and Practical's	08-04-2019	13-04-2019	1
Semester End Examinations	15-04-2019	19-04-2018	1

EVALUATION PROCESS:

Evaluation Task	COs	Marks
I-Mid Examination (Descriptive) =**A**	1,2	A=20
II-Mid Examination (Descriptive) =**B**	3,4,5	B=20
Evaluation of Mid Marks: **A+B** =75% of Max(A,B)+25% of Min(A,B)	1,2,3,4,5	A+B=20
Evaluation of assignments /quiz =**C**	1,2,3,4,5	C=5
Cumulative Internal Examination : A+B+C	**1,2,3,4,5**	**A+B+C=25**
Semester End Examinations =D	**1,2,3,4,5**	**D=75**
Total Marks: A+B+C+D	**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 modeling 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):

4. To apply the principles of thermal sciences to design and develop various thermal systems.
5. 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.
6. 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.

(N.SAMBASIVA RAO) (K.Ravi Kiran Yasaswi) (Dr.V.V.Narsi reddy) (Dr.A.Adisesha Reddy)

Course Instructor Course Coordinator Module Coordinator HOD

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

COURSE HANDOUT

PROGRAM : B.Tech. VIII-Sem, Mechanical Engineering

ACADEMIC YEAR : 2018-19

COURSE NAME & CODE : Total Quality Management- S409

L-T-P STRUCTURE : 4-1-0

COURSE CREDITS : 3

COURSE INSTRUCTOR : **Mr. K Narayana**

COURSE COORDINATOR : **Mr.K.Narayana**

PRE-REQUISITE: Production Planning and Control

COURSE OBJECTIVE :
To introduce concepts and core values of Total Quality Management (TQM).

COURSE OUTCOMES(CO)
CO1: Apply the principles of quality control.
CO2: Use quality management methods for analyzing and solving problems of organization.
CO3: Design efficient systems.
CO4: Apply the principles of Taguchi techniques to the industrial needs.
CO5: Implement quality system standards in the organization

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	**3**	**2**	**1**		**3**							**3**			
CO2	**3**	**2**	**1**		**3**							**3**			
CO3	**3**	**2**	**1**		**3**							**3**			
CO4	**3**	**2**	**1**		**3**							**3**			
CO5	**3**	**2**	**1**		**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 APPROVED TEXT BOOKS:

T1 Dale H. Besterfiled, et al., Total Quality Management, PHI learning Pvt. Ltd, 1975, 11th Reprint

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.

COURSE DELIVERY PLAN (LESSON PLAN): Section-(Elective)

UNIT-I : Introduction to Total Quality Management

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** : Introduction to Quality Management		10-12-2018		**TLM 1**	**CO 1**		
2.	Evolution of total quality management		11-12-18		**TLM 1 and TLM 9**	**CO 1**		
3.	Definition of Quality		12-12-18		**TLM 1**	**CO 1**		
4.	Quality costs		13-12-18		**TLM 1**	**CO 1**		
5.	**Tutorial I**		14-12-18		**TLM 1**	**CO 1**		
6.	Quality Council		17-12-18		**TLM 1**	**CO 1**		
7.	Strategic Planning		18-12-18		**TLM 1**	**CO 1**		
8.	Deming Philosophy		19-12-18		**TLM 1**	**CO 1**		
9.	Deming Philosophy		20-12-18		**TLM 1 and TLM 9**	**CO 1**		
10.	Barriers to TQM implementation		21-12-18		**TLM 1**	**CO 1**		
11.	**Tutorial II**		24-12-18		**TLM 1**	**CO 1**		
12.	Assignment/Quiz-1		26-12-18		**TLM 1**	**CO 1**		
No. of classes required to complete UNIT-I					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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
13.	Introduction to UNIT-II		27-12-18		**TLM 1 and TLM 9**	**CO 2**		
14.	TQM Principles		28-12-18		**TLM 1**	**CO 2**		
15.	Types of Customers, Customer satisfaction		31-12-18		**TLM 1**	**CO 2**		
16.	Customer supply chain and customer perception of quality		02-01-19		**TLM 1**	**CO 2**		
17.	Customer feedback, retention and service quality		03-01-19		**TLM 1**	**CO 2**		
18.	TUTORIAL-3		04-01-19		**TLM 1**	**CO 2**		
19.	Employee Involvement, motivation, Maslow's Hierarchy		07-01-19		**TLM 1 and TLM 9**	**CO 2**		
20.	Herzberg theory		08-01-19		**TLM 1**	**CO 2**		

21.	Performance appraisal and benefits		09-01-19		**TLM 1**	**CO 2**		
22.	Juran Trilogy		10-01-19		**TLM 1**	**CO 2**		
23.	Tutorial-4		10-01-19		**TLM 1**	**CO 2**		
24.	PDSA cycle		11-01-19		**TLM 1**	**CO 2**		
25.	5S, Kaizen		17-01-19		**TLM 1 and TLM 9**	**CO 2**		
26.	Performance Measures-Concepts, Strategy		18-01-19		**TLM 1**	**CO 2**		
27.	Performance Measure		19-01-19		**TLM 1**	**CO 2**		
28.	Tutorial-5		21-01-19		**TLM 1**	**CO 2**		
29.	Assignment/Quiz-2		22-01-19		**TLM 1**	**CO 2**		
No. of classes required to complete UNIT-II					No. of classes taken:			

UNIT-III: Statistical Process Control

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
30.	Introduction to UNIT-III		23-01-19		**TLM 1 and TLM 9**	**CO 3**		
31.	Seven Tools of quality		24-01-19		**TLM 1**	**CO 3**		
32.	Statistical Fundamentals		25-01-19		**TLM 1**	**CO 3**		
33.	Population and Samples		31-01-19		**TLM 1**	**CO 3**		
34.	TUTORIAL-6		01-02-19		**TLM 1**	**CO 3**		
35.	Normal Curve		04-02-19		**TLM 1**	**CO 3**		
36.	Control charts for variables		05-02-19		**TLM 1**	**CO 3**		
37.	Control charts for attributes		06-02-19		**TLM 1**	**CO 3**		
38.	Process capability		08-02-19		**TLM 1**	**CO 3**		
39.	TUTORIAL-7		11-02-19		**TLM 1**	**CO 3**		
40.	Concepts of Six Sigma		12-02-19		**TLM 1**	**CO 3**		
41.	New Seven Management tools		13-02-19		**TLM 1 and TLM 9**	**CO 3**		
42.	TUTORIAL-8		14-02-19		**TLM 1**	**CO 3**		
43.	Assignment/Quiz-3		15-02-19		**TLM 1**	**CO 3**		
No. of classes required to complete UNIT-III					No. of classes taken:			

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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
44.	Introduction to UNIT-IV		19-02-19		**TLM 1**	**CO 4**		
45.	Benchmarking		21-02-19		**TLM 1**	**CO 4**		
46.	Benchmarking Process		22-02-19		**TLM 1**	**CO 4**		
47.	Quality Function Deployment (QFD)		23-02-19		**TLM 1**	**CO 4**		
48.	House of Quality		25-02-19		**TLM 1 and TLM 9**	**CO 4**		
49.	TUTORIAL-9		01-03-19		**TLM 1**	**CO 4**		
50.	QFD Process		04-03-19		**TLM 1**	**CO 4**		
51.	Taguchi Quality loss function		05-03-19		**TLM 1**	**CO 4**		
52.	Total Productive Maintenance-Concept		07-03-19		**TLM 1**	**CO 4**		
53.	Improvement needs		08-03-19		**TLM 1**	**CO 4**		
54.	FMEA-Stages		11-03-19		**TLM 1 and TLM 9**	**CO 4**		
55.	TUTORIAL-10		12-03-19		**TLM 1**	**CO 4**		
56.	Assignment/Quiz-4		13-03-19		**TLM 1**	**CO 4**		
No. of classes required to complete UNIT-IV					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	Learning Outcome COs	Text Book followed	HOD Sign Weekly
57.	Introduction to UNIT-V		14-03-19		**TLM 1 and TLM 9**	**CO 5**		
58.	Need for ISO 9000 and other Quality Systems		15-03-19		**TLM 1**	**CO 5**		
59.	ISO 9000:2000 Quality system		18-03-19		**TLM 1**	**CO 5**		
60.	ISO 9000:2000 Quality system		20-03-19		**TLM 1**	**CO 5**		
61.	Implementation of Quality System, Documentation		21-03-19		**TLM 1**	**CO 5**		
62.	TUTORIAL-11		22-03-19		**TLM 6**	**CO 5**		
63.	Quality Auditing		25-03-19		**TLM 1**	**CO 5**		
64.	TS 16949, ISO 14000-concepts		26-03-19		**TLM 1**	**CO 5**		
65.	TUTORIAL-12		27-03-19		**TLM 6**	**CO 5**		

66.	Assignment/Quiz-5		28-03-19		**TLM 1**	**CO 5**		
67.	Revison		29-03-19		**TLM 6**	**CO3,CO4**		
68.	Revison		01-04-19		**TLM 1**	**CO4,CO5**		
No. of classes required to complete UNIT-V					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
69.	Lean Manufacturing		02-04-2019		**TLM 2 and TLM 9**			
70.	Six Sigma		03-04-2019		**TLM 2 and TLM 9**			

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 CALENDAR:

Description	From	To	Weeks
I Phase of Instructions-1	10-12-2018	26-01-2019	7W
I Mid Examinations	28-01-2019	30-01-2019	1/2W
II Phase of Instructions	31-01-2019	03-04-2019	9W
II Mid Examinations	04-04-2019	06-04-2019	1/2W
Preparation and Practicals	08-04-2019	13-04-2019	1W
Semester End Examinations	15-04-2019	19-04-2019	1W

EVALUATION PROCESS:

Evaluation Task	COs	Marks
Assignment/Quiz – 1	1	A1=5
Assignment/Quiz – 2	2	A2=5
I-Mid Examination	1,2	B1=20
Assignment/Quiz – 3	3	A3=5
Assignment/Quiz – 4	4	A4=5
Assignment/Quiz – 5	5	A5=5
II-Mid Examination	3,4,5	B2=20
Evaluation of Assignment/Quiz Marks: A=(A1+A2+A3+A4+A5)/5	1,2,3,4,5	A=5
Evaluation of Mid Marks: B=75% of Max(B1,B2)+25% of Min(B1,B2)	1,2,3,4,5	B=20
Cumulative Internal Examination : A+B	**1,2,3,4,5**	**A+B=25**
Semester End Examinations	**1,2,3,4,5**	**C=75**
Total Marks: A+B+C	**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 modeling 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.
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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.

PSOs

1. To apply the principles of thermal sciences to design and develop various thermal systems.
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.
3. To apply the basic principles of mechanical engineering design or evaluation of performance of various systems relating to transmission of motion and power, conservation of energy and other process equipment.

Mr K. Narayana	**Mr J.Subba Reddy**	**Mr J.Subba Reddy**	**Dr S.Pichi Reddy**
Course Instructor	**Course Coordinator**	**Module Coordinator**	**HOD**