LESSON PLAN

Course Code& Course Name: - S-203 - DYNAMICS OF MACHINES **SEM:** V

Programme: B .Tech –A-SECTION **Department:** MECH

Name of faculty : CH. SIVA SANKARA BABU A.Y:2016-17

S No.	Tentative Date	Topics to be covered	Actual Date	Num. of classes	Content Delivery Methods
UNIT- I : CLUTCHES, BRAKES, DYNAMOMETERS AND PRECESSION					
1.	15-07-2016	Introduction to Dynamics of machines - Course Educational Objectives (CEO's) and Course Outcomes (CO's).		1	**DM1**
2.	16-07-2016	Introduction to clutches- Single Plate Clutch andMulti plate clutch working		1	**DM1, DM6**
3.	18-07-2016	Derivation for friction torque by Uniform pressure and Uniform wear conditions		1	**DM1**
4.	19-07-2016	Cone clutch and Centrifugal clutch		1	**DM1, DM6**
5.	20-07-2016	Problems on single and multi-plate clutches		1	**DM1**
6.	22-07-2016	Problems on single and multi-plate clutches		1	**DM1**
7.	23-07-2016	Tutorial-1		1	**DM2**
8.	25-07-2016	Brakes: Simple block brakes& problem		1	**DM1, DM6**
9.	26-07-2016	Band brake of a vehicle& problem		1	**DM1**
10.	27-07-2016	Band and block brakes		1	**DM1, DM6**
11.	29-07-2016	Problems on Band and block brakes		1	**DM1**
12.	30-07-2016	Tutorial-2		1	**DM2**
13.	01-08-2016	Internal expanding brakes		1	**DM1, DM6**
14.	02-08-2016	Dynamometers-absorption type method &operation		1	**DM1**
15.	03-08-2016	Transmission type method & operation		1	**DM1**
16.	05-08-2016	Problems		1	**DM1**
17.	06-08-2016	Precession: Gyroscopes and introduction		1	**DM1, DM6**
18.	08-08-2016	Effect of precession on Aero planes		1	**DM1, DM5**
19.	09-08-2016	Tutorial-3		1	**DM2**
20.	10-08-2016	Effect of precession on ships		1	**DM1, DM6**
21.	12-08-2016	Problems		1	
22.	16-08-2016	Effect of precession on the stability of motor car (four wheeler)		1	**DM1, DM6**
23.	17-08-2016	Effect of precession on the stability of motor cycle (two wheeler)		1	**DM1, DM6**
24.	19-08-2016	Tutorial-4		1	**DM2**
25.	20-08-2016	Assignment/Quiz -1		1	**DM3, DM4**
UNIT-II : TURNING MOMENT DIAGRAM & FLY WHEELS					
26.	22-08-2016	Introduction about Turning moment		1	**DM1**
27.	23-08-2016	Angular velocity and acceleration piston-piston effort		1	**DM1**
28.	24-08-2016	Angular velocity and acceleration of connecting rod-crank effort		1	**DM1**
29.	26-08-2016	Problems		1	**DM1**
30.	27-08-2016	Introduction to turning moment diagrams		1	**DM1**
31.	29-08-2016	Tutorial-5		1	**DM2**
32.	30-08-2016	Problems on single cylinder engines		1	**DM1**

33.	31-08-2016	Problems on multi cylinder engines		1	**DM1**
34.	02-09-2016	Fluctuation of energy- Problems		1	**DM1**
35.	03-09-2016	Problems on Fluctuation of energy		1	**DM1**
36.	06-09-2016	Fly wheels and their design		1	**DM1**
37.	07-09-2016	Tutorial-6		1	**DM2**
38.	09-09-2016	Assignment/Quiz -2		1	**DM3, DM4**
39.	13-09-2016	Problems		1	**DM1**
40.	14-09-2016	Assignment Problems explanation		1	**DM1**
UNIT-III : GOVERNORS					
41.	20-09-2016	Introduction, Watt governor		1	**DM1, DM6**
42.	21-09-2016	Porter governor working & derivation		1	**DM1, DM5**
43.	23-09-2016	Porter governor Problems		1	**DM1**
44.	24-09-2016	Proell governor working & derivation		1	**DM1**
45.	26-09-2016	Tutorial-7		1	**DM2**
46.	27-09-2016	Proell governor Problems		1	**DM1**
47.	28-09-2016	Hartnell governor working & derivation		1	**DM1**
48.	30-09-2016	Hartnell governor Problems		1	**DM1**
49.	01-10-2016	Sensitiveness, Isochronisms and hunting		1	**DM1**
50.	03-10-2016	Tutorial-8		1	**DM2**
51.	04-10-2016	Assignment/Quiz -3		1	**DM3, DM4**
UNIT-IV : BALANCING					
52.	05-10-2016	Introduction to Balancing - Balancing of rotating masses		1	**DM1, DM6**
53.	07-10-2016	Balancing of Single revolving mass		1	**DM1, DM5**
54.	17-10-2016	Balancing of several masses rotating in different planes		1	**DM1**
55.	18-10-2016	Analytical and graphical methods		1	**DM1**
56.	19-10-2016	Tutorial-9		1	**DM2**
57.	21-10-2016	Balancing of reciprocating masses		1	**DM1, DM5**
58.	22-10-2016	Problems		1	**DM1**
59.	24-10-2016	Unbalanced forces and couples		1	**DM1**
60.	25-10-2016	Primary, secondary balancing of reciprocating masses.		1	**DM1**
61.	26-10-2016	Locomotive balancing		1	**DM1**
62.	28-10-2016	Tutorial-10		1	**DM2**
63.	29-10-2016	Examination of 'V' multi cylinder in line and radial engines for primary and secondary balancing		1	**DM1**
64.	31-10-2016	Problems		1	**DM1**
65.	01-11-2016	Hammer blow, swaying couple and tractive efforts		1	**DM1**
66.	02-11-2016	Assignment/Quiz -4		1	**DM3, DM4**
UNIT-V : VIBRATIONS					
67.	04-11-2016	Introduction & Types of Vibrations		1	**DM1, DM6**
68.	05-11-2016	Degree of freedom- free longitudinal vibrations		1	**DM1, DM5**
69.	07-11-2016	Inertia effect of the mass of spring		1	**DM1**
70.	08-11-2016	Derivations & problems		1	**DM1**
71.	09-11-2016	Displacement, velocity & acceleration of		1	**DM1**

		body due to inertia force			
72.	11-11-2016	Tutorial-11		1	**DM2**
73.	14-11-2016	Forced vibrations without damping		1	**DM1, DM5**
74.	15-11-2016	Forced damped vibrations		1	**DM1, DM5**
75.	16-11-2016	Problems on forced vibrations		1	**DM1**
76.	18-11-2016	Vibration isolation and transmissibility		1	**DM1, DM5**
77.	19-11-2016	Whirling speed of shafts- problems		1	**DM1**
78.	21-11-2016	Tutorial-12		1	**DM2**
79.	22-11-2016	Assignment/Quiz -5		1	**DM3, DM4**
80.	23-11-2016	Beyond Syllabus – vibration measuring instruments		1	**DM1**
81.	25-11-2016	Beyond Syllabus – Transverse vibrations of beams		1	**DM1**
82.	26-11-2016	Revision		1	**DM1**
Total number of classes required to complete the syllabus				**62**	
Total number of classes available as per Schedule				**82**	

NOTE:

DELIVERY METHODS:

DM1:Lecture interspersed with discussions/BB, **DM2:** Tutorial,
DM3: Lecture with a quiz, **DM4**: Assignment/Test, **DM5**: Demonstration (laboratory, field visit),
DM6: Presentations/PPT

Course Objective:

To understand the force motion relationship in components subjected to external forces and analysis of standard mechanisms used for speed control and stability control & the effect of dynamics of undesirable vibrations and unbalance.

COURSE OUTCOMES:

After completion this course, student will be able to

CO1: Solve the practical problems on clutches and brakes by applying the concept contact forces due to of friction and observe the gyroscopic effect due to precession of rotating bodies.

CO2: Analyze the energy storage in the flywheels and cyclic energy of equalization process

CO3: Analyze the speed regulations of various governors under varying loads.

CO4: Analyze the balancing process of the moving parts (rotating& reciprocating) statically and dynamically.

CO5: Analyze the basic concepts of vibrations and take measures to minimize vibration and noise.

Signatures					
	Course Instructor	**Course Co-ordinator**	**Module Co-ordinator**	**Program co-ordinator**	**HOD**
	Ch. Siva	**J. Leela Krishna**	**B.Sudheer Kumar**		

LESSON PLAN

Course Code& Course Name: - S-203 - DYNAMICS OF MACHINES **SEM:** V

Programme: B .Tech –A-SECTION **Department:** MECH

Name of faculty : CH. SIVA SANKARA BABU A.Y:2016-17

	SankaraBabu			**Dr. S. Pichi Reddy**	**Dr. K.AppaRao**

LESSON PLAN

Course Code& Course Name: T216-Internal Combustion engines and Gas Turbines

Programme: B.Tech **Department:** MECHANICAL

Name of the Faculty: V.Dhana Raju **SEM:V (A/S)**

S No.	Tentative Date	Topics to be covered	Actual Date	Num. of classes	Content Delivery Methods
UNIT-I: Introduction and Engine systems					
1.	16/07/2016	Introduction to I.C. Engines		1	DM1,DM6
2.	18/07/2016	Classification of I.C. Engines		1	DM1
3.	19/07/2016	Basic Engine components and Nomenclature		1	DM1
4.	20/07/2016	Working principle of four stroke SI and CI engines		1	DM1
5.	21/07/2016	Tutorial-1		1	DM2
6.	23/07/2016	Working principle of two stroke SI and CI engines		1	DM1
7.	25/07/2016	Valve timing diagram for four stroke engines		1	DM1
8.	26/07/2016	Port timing diagram for two stroke engines		1	DM2
9.	27/07/2016	Applications of I.C. Engines		1	DM1
10.	28/07/2016	Layout of fuel system in SI engines and Carburetion		1	DM1,DM6
11.	30/07/2016	Tutorial-2		1	DM1
12.	01/08/2016	Simple Carburettor		1	DM2
13.	02/08/2016	Defects of simple carburettor		1	DM1
14.	03/08/2016	Fuel supply systems in CI engines and types of fuel Injection		1	DM2
15.	04/08/2016	Cooling systems, air cooling, water cooling and its comparison		1	DM1
16.	06/08/2016	Lubrication systems, Mist, wet sump and dry sump lubrication system		1	DM1
17.	08/08/2016	Ignition systems		1	DM2
18.	09/08/2016	Tutorial-3		1	DM4
UNIT-II: Air standard cycles, Fuel air cycles and Actual cycles					
19	10/08/2016	Air standard cycles: Carnot cycle, Otto cycle and its analysis		1	DM1
20	11/08/2016	Diesel cycle ,Dual cycle and its analysis		1	DM1
21	23/08/2016	Atkinson, Stirling and Ericson cycles		1	DM1
22	24/08/2016	Brayton cycle and its analysis		1	DM2
23	27/08/2016	Tutorial-4		1	DM1
24	29/08/2016	Problem on Otto, diesel and Dual cycle		1	DM1
25	30/08/2016	Problem on Brayton cycle		1	DM2
26	31/08/2016	Fuel air cycle and their significance		1	DM1
27	01/09/2016	Composition of cylinder gases, Dissociation		1	DM1
28	03/09/2016	Comparison of Air standard and Fuel air cycles		1	DM1
29	06/09/2016	Tutorial-5		1	DM1

30	07/09/2016	Actual cycles and their analysis		1	DM2
31	08/09/2016	Time loss factor, heat loss factor		1	DM1
32		Exhaust blow down, Loss due to Rubbing friction		1	DM1
33	13/09/2016	Test-II		1	DM4
34	14/09/2016			1	DM4
35	15/09/2016	I Mid Exam		1	DM4
36	20/09/2016	I Mid Exam		1	DM4
UNIT-III: Combustion in SI and CI Engines					
37	21/09/2016	Homogeneous and Heterogeneous Mixture		1	DM1
38	22/09/2016	Flame front propagation, Factors influencing Flame speed		1	DM1
39	23/09/2016	Stages of Combustion in SI engines			
40	24/09/2016	Abnormal Combustion , Phenomenon of Knock in SI engines		1	DM1
41	26/09/2016	Effect of engine variables on Knocking		1	DM2
42	27/09/2016	Tutorial		1	DM2
43	28/09/2016	Combustion Chambers for SI engines		1	DM1
44	29/09/2016	Fuel requirement and Fuel rating in SI engines		1	DM1
45	01/10/2016	Stages of Combustion in CI engines		1	DM1
46	03/10/2016	Delay period, Detonation		1	DM2
47	04/10/2016	Factors effecting delay period and Detonation		1	DM1
48	05/10/2016	Tutorial		1	DM2
49	06/10/2016	Comparison of Knock in SI and CI engines		1	DM1
50	17/10/2016	Combustion Chambers for CI engines		1	DM1
51	18/10/2016	Fuel requirement and Rating in CI engines		1	DM1
52	19/10/2016	Test-III		1	DM4
UNIT-IV: Engine Testing and Performance					
53	20/10/2016	Parameters of performance		1	DM1
54	22/10/2016	Measurement of fuel consumption and Air Intake		1	DM1
55	24/10/2016	Measurement of Brake power		1	DM2
56	25/10/2016	Determination of Frictional power		1	DM1
57	26/10/2016	Problems		1	DM1
58	27/10/2016	Measurement of Indicated power		1	DM1
59	29/10/2016	Performance tests		1	DM1
60	31/10/2016	Performance Characteristic curves		1	DM1
61	01/11/2016	Heat balance sheet and chart		1	DM1
62	02/11/2016	Problems on Heat balance sheet		1	DM1
63	05/11/2016	Tutorial		1	DM2
UNIT-V: Gas Turbines and Jet propulsion systems					
64	07/11/2016	Gas turbines components and types		1	DM2
65	08/11/2016	Analysis of Closed and open cycle		1	DM1

		gas turbine plants			
66	09/11/2016	Methods of improving performance-Intercooler		1	DM1
67	10/11/2016	Methods of improving performance-Regeneration, Reheating		1	DM1
68	15/11/2016	Tutorial		1	DM2
69	16/11/2016	Jet propulsion systems- Turbojet, Turbofan		1	DM1
70	17/11/2016	Turbo propeller and Ram Jet		1	DM1
71	19/11/2016	Test-IV		1	DM4
72	21/11/2016	Beyond syllabus		1	DM1
73	22/11/2016	REVISION		1	DM6
74	23/11/2016	REVISION		1	DM6
75	24/11/2016	II Mid Exam		1	DM4
76	26/11/2016	II Mid Exam		1	DM4
			Total	75	
Total number of classes required to complete the syllabus					**65**
Total number of classes available as per Schedule					**75**

NOTE: DELIVERY METHODS : **DM1**: Lecture interspersed with discussions/BB, **DM2:** Tutorial, **DM3:** Lecture with a quiz, **DM4**: Assignment/Test, **DM5**: Demonstration (laboratory, field visit), **DM6:** Presentations/PPT

At the End of the course, students attained the **Course Outcomes:CO1,CO2,CO3,CO4,CO5** & sample proofs are enclosed in Course file.

Signature			
	Name of the Faculty	**Name of Course Co-ordinator**	**HOD**
	V.DHANA RAJU	Dr P V Chandrasekhar Rao	Dr K Appa Rao

LESSON PLAN

Course Code& Course Name: T221-INDUSTRIAL MANAGEMENT **SEM:** V

Programme: B.Tech **Department: ME**

SEC-A

S No.	Tentative Date	Topics to be covered	Actual date	No of classes	Content Delivery Methods
UNIT-I INTRODUCTION OF MANAGEMENT					
1.	15-07-16	Management Introduction		1	DM1
2.	16-07-16	Definition, Nature		1	DM1
3.	19-07-16	Importance of management		1	DM1
4.	20-07-16	Functions		1	DM1
5.	21-07-16	Taylor's scientific management theory		1	DM1
6.	22-07-16	Fayal's principles of management		1	DM2
7.	23-07-16	Tutorials		1	DM1
8.	26-07-16	Contribution of Elton mayo		1	DM1
9.	27-07-16	MASLOW theory		1	DM1
10.	28-07-16	Herzberg, douglas, MC Gregor, basic concepts of Orgn.		1	DM1
11.	29-07-16	tutorials		1	DM2
12.	30-07-16	Basic concept of organization :Authority Responsibility		1	DM1
13.	02-08-16	Delegation of Authority and span of control		1	DM1
14.	03-08-16	Departmentation and Decentralization		1	DM1
15.	04-08-16	tutorials		1	DM2
16.	05-08-16	Orgn.structure Line and staff organization		1	DM1
17.	06-08-16	Line and staff organization		1	DM1
18.	06-08-16	Functional organization		1	DM1
19.	09-08-16	Committee Matrix organization		1	DM1
20.	10-08-16	Tutorials		1	DM2
UNIT II: Operations Management					
21.	13-08-16	Operations Management introduction		1	DM1
22.	16-08-16	Plant location Factors influencing location		1	DM1
23.	17-08-16	Principles and types of plant layouts		1	DM1
24.	18-08-16	Methods of production : job batch and mass production		1	DM1
25.	19-08-16	Work study		1	DM1
26.	20-08-16	Basic procedure involved in method study		1	DM1
27.	23-08-16	Work measurement		1	DM1
28.	24-08-16	tutorial		1	DM2
UNIT III:QUALITY AND MATERIAL MANAGEMENT					
29.	27-08-16	quality and materials management		1	DM1
30.	30-08-16	Statistical quality control Meaning		1	DM1
31.	31-08-16	Variables and attributes		1	DM1

LESSON PLAN

Course Code& Course Name: T221-INDUSTRIAL MANAGEMENT **SEM:** V

Programme: B.Tech **Department: ME**

SEC-A

32.	01-09-16	X chart R Chart		1	DM1
33.	02-09-16	problems		1	DM1
34.	02-09-16	C Chart PC hart		1	DM1
35.	03-09-16	problems		1	DM1
36.	06-09-16	Acceptance sampling Sampling plans		1	DM1
37.	07-09-16	Deming's contribution to quality		1	DM1
38.	08-09-16	Materials management : objectives		1	DM1
39.	09-09-16	Need for inventory control		1	DM1
40.	10-09-16	Tutorials		1	DM2
41.	13-09-16	Purchase procedure		1	DM1
42.	14-09-16	Store records		1	DM1
43.	15-09-16	EOQ		1	DM1
44.	20-09-16	problems		1	DM1
45.	21-09-16	ABC analysis		1	DM1
46.	22-09-16	Stock levels		1	DM1
47.	23-09-16	Stock level problems		1	DM1
UNIT IV: HUMAN RESOURCES MANAGEMNT					
48.	27-09-16	Concepts of HRM		1	DM1
49.	28-09-16	Concept of hrm		1	DM1
50.	29-09-16	Basic functions of HR manager		1	DM1
51.		Basic functions of HR manager		1	DM1
52.	30-09-16	Man power planning		1	DM1
53.	01-10-16	Selection		1	DM1
54.	04-10-16	Recruitment		1	DM1
55.	05-10-16	Training and development Placement		1	DM1
56.	06-10-16	Wage and salary admn		1	DM1
57.	07-10-16	Promotion		1	DM1
58.	08-10-16	Transfers Separation performance. Appraisal		1	DM1
59.	18-10-16	Job evaluation		1	DM1
60.	19-10-16	merit ranking Tutorials		1	DM1
61.	20-10-16	Tutorials		1	DM2
UNIT V:PROJECT MANAGEMENT					
62.	22-10-16	Early techniques in project management		1	DM1
63.	25-10-16	Network analysis Programme evaluation and review technique (PERT)		1	DM1
64.	26-10-16	Critical path method		1	DM1
65.	27-10-16	Identifying critical path		1	DM1
66.	28-10-16	Problems		1	DM1
67.	29-10-16	Tutorial		1	DM2
68.	01-11-16	Probability of completing project within time		1	DM1
69.	02-11-16	problems		1	DM1
70.	03-11-16	problems		1	DM1
71.	04-11-16	Project crashing		1	DM1
72.	04-11-16	Problems		1	DM1
73.	05-11-16	Problems		1	DM1

74.	08-11-16	Problems		1	DM1
75.	09-11-16	Revision		1	DM1
76.	10-11-16	Revison		1	
77.	11-11-16	II MID EXAM		1	
			Total	77	
Total number of classes required to complete the syllabus					68
Total number of classes available as per Schedule					77

NOTE: DELIVERY METHODS (DM):

DM1: Lecture interspersed with discussions/BB,
DM2: Tutorial'
DM3: Lecture with a quiz,
DM4: Assignment/Test,
DM5: Demonstration (laboratory, fieldvisit),
DM6: Presentations/PPT

At the End of the course, students attained the **Course Outcomes: CO1, CO2, CO3, CO4, CO5** & sample proofs are enclosed in Course file.

CO1: Apply management principles to the particle situations to be in a position to know which type of business organization structure suits
CO2: Able to make decision making relating to the problems in operations and production activities there by improving the productivity by proper utilisation input factors by designing the better working methods and with better work study techniques.
CO3: Able to improve quality of working through SQC techniques and also in a position to reduce the investment in materials through better control of inventory
CO4: Able to manage people in working environment with the practices of HRM across corporate businesses
CO5:Able to use PERT & CPM techniques in effective project management to identify critical path and try to complete projects on time as well as reducing the project durations if need arises.

Signature			
	Name of the Faculty	**Name of Course Co-ordinator**	**HOD**
	U.RAMBABU	V.KISHORE REDDY	Dr.V.SREEHARI

LAKIREDDY BALIREDDY COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF MECHANICAL ENGINEERING
LESSON PLAN

Course Name: S308 – Metal Cutting and Machine Tools **Programme: UG**
CLASS: B. Tech **SEM: V (Section – A)** **Branch: Mechanical Engineering**

S No.	Tentative Date	Topics to be covered	Actual Date	No. of classes	Content Delivery Methods
UNIT-I: INTRODUCTION TO ENGINEERING MECHANICS					
1	16-07-2016	**UNIT I: ELEMENTARY TREATMENT OF METAL CUTTING THEORY** Introduction, COs of MC & MT and POs, PEOs		1	DM1/DM6
2	18-07-2016	Elements of cutting process		1	DM1/DM6
3	19-07-2016	Methods of Metal Cutting		1	DM1/DM6
4	21-07-2016	Classification of Cutting Tools		1	DM1/DM6
5	23-07-2016	Geometry of Single Point Cutting Tool		1	DM1/DM6
6	30-07-2016	Numericals		1	DM1/DM6
7	03-08-2016	Numericals		1	DM1/DM6
8	04-08-2016	Chip formation		1	DM1/DM6
9	06-08-2016	**Tutorial - I**		1	DM2 / DM4
10	07-08-2016	mechanism and types of chips		1	DM1/DM6
11	08-08-2016	chip breakers		1	DM1/DM6
12	09-08-2016	Merchant's Force diagram		1	DM1/DM6
13	09-08-2016	measurement of cutting forces		1	DM1/DM6
14	10-08-2016	work done in cutting. Metal cutting theories		1	DM1/DM6 & DM3
15	11-08-2016	**Tutorial – II, Quiz – I, Assignment - I**		1	DM2 / DM4
16	13-08-2016	Numericals		1	DM1/DM6
17	16-08-2016	Numericals		1	DM1/DM6
18	17-08-2016	Machining parameters - Tool Life		1	DM1/DM6
19	18-08-2016	Tool Failure		1	DM1/DM6
20	20-08-2016	Cutting Tool Materials		1	DM1/DM6
21	22-08-2016	Cutting Fluids		1	DM1/DM6 & DM3
22	23-08-2016	**Tutorial - III, Quiz – II, Assignment - II**		1	DM2 / DM4
23	24-08-2016	**UNIT – II: ENGINE LATHE** Introduction		1	DM1/DM6
24	25-08-2016	Principle of working and specification of lathe		1	DM1/DM6
25	27-08-2016	Types of lathes		1	DM1/DM6
26	29-08-2016	Work holders		1	DM1/DM6
27	30-08-2016	tool holders		1	DM1/DM6
28	31-08-2016	Lathe accessories		1	DM1/DM6 & DM3
29	01-09-2016	**Tutorial - IV**		1	DM2 / DM4
30	03-09-2016	Lathe accessories		1	DM1/DM6
31	05-09-2016	Operations on Lathe		1	DM1/DM6
32	06-09-2016	Operations on Lathe		1	DM1/DM6
33	07-09-2016	Taper turning methods, Thread turning methodology		1	DM1/DM6
34	08-09-2016	lathe attachments		1	DM1/DM6
35	10-09-2016	**Tutorial V, Quiz –III, Assignment - III**		1	DM1/DM6 & DM3
36	12-09-2016	**UNIT – II: Turret and Capstan Lathes:** Introduction			DM2 / DM4
37	13-09-2016	Principle of working -Collet chucks		1	DM1/DM6
38	14-09-2016	Other work and tool holding devices		1	DM1/DM6
39	15-09-2016	Box and tool layout		1	DM1/DM6
-	16-09-2016 to 19-09-2016	**I MID EXAMINATIONS**		1	DM1/DM6

40	20-09-2016	**UNIT – III : SHAPING, SLOTTING AND PLANING MACHINES : Introduction**	-	-	-
41	21-09-2016	Introduction to Shaping machine, slotting machine		1	DM1/DM6 & DM3
42	22-09-2016	Introduction to planning machine		1	DM2 / DM4
43	24-09-2016	Principles of working – Principal parts		1	DM1/DM6
44	26-09-2016	Specification		1	DM1/DM6
45	27-09-2016	classification		1	DM1/DM6
46	28-09-2016	Operations performed		1	DM1/DM6
47	29-09-2016	Machining time calculations, Numericals		1	DM1/DM6
48	01-10-2016	**Tutorial - VII**		1	DM2 / DM4
49	03-10-2016	**Drilling and Boring Machines** : Introduction		1	DM1/DM6
50	04-10-2016	Principles of working		1	DM1/DM6
51	05-10-2016	specifications		1	DM1/DM6
52	06-10-2016	Types of drilling machines, boring machines		1	DM1/DM6
53	08-10-2016	operations performed		1	DM1/DM6
54	10-10-2016	**Tutorial - VIII**		1	DM2 / DM4
55	11-10-2016	Tool holding devices		1	DM1/DM6
56	12-10-2016	Twist drill		1	DM1/DM6
57	13-10-2016	Boring machines		1	DM1/DM6
58	15-10-2016	Fine boring machines		1	DM1/DM6
59	17-10-2016	Jig Boring machine		1	DM1/DM6
60	18-10-2016	Deep hole drilling machine		1	DM2 / DM4
61	19-10-2016	**Tutorial IX, Quiz – IV, Assignment - IV**		1	DM1/DM6
62	20-10-2016	**UNIT IV : MILLING MACHINES** Principle of working – Specifications		1	DM1/DM6
63	22-10-2016	Classifications of milling machines		1	DM1/DM6
64	24-10-2016	Principal features of horizontal, vertical and universal milling machines		1	DM1/DM6
65	25-10-2016	Machining operations		1	DM1/DM6
66	26-10-2016	**Tutorial - X**		1	DM2 / DM4
67	27-10-2016	Types		1	DM1/DM6 & DM3
68	28-10-2016	Geometry of milling cutters		1	DM1/DM6
69	31-10-2016	Milling cutters		1	DM1/DM6
70	01-11-2016	**Tutorial - XI, Quiz – V, Assignment - V**		1	DM2 / DM4
71	02-11-2016	Methods of indexing – Accessories to milling machines		1	DM1/DM6
72	03-11-2016	Numericals		1	DM1/DM6 & DM3
73	05-11-2016	**Grinding Machines:** Introduction		1	DM1/DM6
74	07-11-2016	Fundamentals – Theory of grinding		1	DM1/DM6
75	08-11-2016	**Tutorial – XII,** Classification of grinding machine		1	DM2 / DM4
76	09-11-2016	Cylindrical and surface grinding machine		1	DM1/DM6
77	10-11-2016	Tool and cutter grinding machine		1	DM1/DM6
78	12-11-2016	special types of grinding machines		1	DM1/DM6
79	14-11-2016	**UNIT – V LAPPING, HONING AND BROACHING MACHINES:** Introduction		1	DM1/DM6
80	15-11-2016	Comparison to grinding – lapping and honing		1	DM1/DM6
81	16-11-2016	Constructional features of speed and feed units		1	DM1/DM6
82	17-11-2016	**Tutorial - XIII , Quiz – VI, Assignment - VI**		1	DM2 / DM4
83	19-11-2016	machining time calculations		1	DM1/DM6
84	21-11-2016	**Jigs and Fixtures:** Introduction		1	DM1/DM6
85	22-11-2016	Principles of design of Jigs and fixtures and uses		1	DM1/DM6

86	23-11-2016	Classification of Jigs & Fixtures		1	DM1/DM6
87	24-11-2016	Principles of location and clamping		1	DM1/DM6
88	26-11-2016	Types of clamping & work holding devices. Typical examples of jigs and fixtures**, Tutorial - XIV , Quiz – V, Assignment - V**		1	DM2 / DM4
-	28-11-2016 to 30-11-2016	**II MID EXAMINATIONS**			
-	01-12-2016 to 07-12-2016	**PRACTICAL EXAMINATIONS AND PREPARATION**			
-	08-12-2016 to 21-12-2016	**END EXAMINATIONS**			
Total				88	
Total number of classes required to complete the syllabus				**88**	
Total number of classes available as per Schedule				**88**	

NOTE: DELIVERY METHODS (DM):
DM1: Lecture interspersed with discussions/BB
DM2: Tutorial
DM3: Lecture with a Quiz
DM4: Assignment/Test
DM5: Demonstration (laboratory, field visit)
DM6: Presentations/PPT

The main objective of this course is to provide overview of metal cutting theory and machine tools.
At the End of the course, students attain the **Course Outcomes CO1, CO2, CO3, CO4 &CO5** and sample proofs are enclosed in Course file.

CO1: Comprehend the basic principles of metal cutting and analyze the forces in machining.

CO2: Understand detailed working and applications of lathe

CO3: Comprehend the detailed working principle and applications on shaper, slotter, planar, drilling and boring machines

CO4: Relate the knowledge of milling and grinding operations with manufacturing industry

CO5: Identify various kinds of finishing processes and different kinds of holding and guiding mechanisms.

TEXT BOOKS

1. R.K. Jain and S.C. Gupta, Production Technology, Khanna publication, 17th edition, 2012**.**
2. H.M.T. (Hindustan Machine Tools), Production Technology, Tata MeGraw Hill, 2009.

REFERENCE BOOKS

1. B.S.Raghu Vamshi ,Workshop Technology, Dhanpat Rai & Co, 10th edition, 2009.
2. Gosh and Malik , Manufacturing Science, East west press Pv.t Ltd., 2nd EDITION, 2011.
3. Kalpakjain S, Manufacturing Engineering & Technology, Pearson Education, 4TH edition 2001.
4. J.P.Kaushish, Manufacturing Processes, PHI, Second Edition, 2010.

Signature					
	Instructor	**Course Co-ordinator**	**Module Co-ordinator**	**Program Co-ordinator**	**HOD**
	Mr. J. Subba Reddy	Dr. S. Pichi Reddy	Mr. J. Subba Reddy	Dr. S. Pichi Reddy	Dr. K. Appa Rao

LESSON PLAN

Course Code& Course Name: S291 - MACHINE DESIGN - I

DEPARTMENTOF MECHANICAL ENGINEERING

SEM: V (Section A) **Programme:** B.Tech

S No.	Tentative Date	Topics to be covered	Actual Date	Num. of classes	Content Delivery Methods
UNIT-I					
1.	**15-07-16**	Introduction to design-prerequisites and syllabus		1	DM-1
2.	**16-07-16**	Stress strain relations, elastic constants and, Machine Design-Introduction & types of design, Definitions		1	DM-1
3.	**18-07-16**	Machine element, Basic Procedure of Design of Machine Elements		1	DM-1
4.	**19-07-16**	Requirements of machine elements, Design analysis-Design synthesis		1	DM-1
5.	**20-07-16**	Introduction to Indian standards-advantages of standardization		1	DM-1
6.	**22-07-16**	Preferred sizes, basic and derived series and problems		1	DM-1
7.	**23-07-16**	Modes of failure – Factor of safety-Stress-strain relationship, Shear stress and shear strain		1	DM-1
8.	**25-07-16**	Relation between E, G, K., Stresses due to bending moment, Stresses due to Torsional moment		1	DM-1
9.	**26-07-16**	Eccentric axial loading		1	DM-1
10.	**27-07-16**	Problems		1	DM-1
11.	**29-07-16**	**Quiz-1**		1	DM-3
		Assignment-I			
12.	**30-07-16**	Determination of principle stresses and strains Theories of elastic failure– Introduction		1	DM-1
13.	**01-08-16**	Maximum principal stress theory		1	DM-1
14.	**02-08-16**	Maximum shear stress theory		1	DM-1
15.	**03-08-16**	Distortion energy theory		1	DM-1
16.	**05-08-16**	Distortion energy theory			DM-1
17.	**06-08-16**	Problems on Theories of failure		1	DM-1
18.	**08-08-16**	**Tutorial-1**		1	DM-2
		Assignment-2			
UNIT-II					
19.	**09-08-16**	Stress concentration & Stress concentration factors		1	DM-1 DM-6
20.	**10-08-16**	Reduction of stress concentration		1	DM-1 DM-6
21.	**16-08-16**	Reduction of stress concentration and fluctuating stresses		1	DM-1 DM-6
22.	**17-08-16**	Fatigue failure and endurance limit – rotating beam experiment		1	DM-1 DM-6
23.	**19-08-16**	Fatigue failure and endurance limit and notch sensitivity		1	DM-1 DM-6
24.	**20-08-16**	Endurance limit- notch sensitivity		1	DM-1 DM-6

25.	**22-08-16**	Approximate estimation- Factors in approximate estimation-		1	DM-1 DM-6
26.	**23-08-16**	Soderberg line -Goodman line		1	DM-1 DM-6
27.	**24-08-16**	Modified Goodman line, Problems on Soderberg line -Goodman line and modified Goodman line		1	DM-1
28.	**26-08-16**	Problems on Soderberg line - Goodman line and modified Goodman line		1	DM-1
29.	**27-08-16**	Reversed stresses and design for finite and infinite life		1	DM-1,DM-6
30.	**29-08-16**	Problems & Quiz-2		1	DM-1,DM-4
31.	**30-08-16**	**Tutorial-2**		1	DM-2
		Assignment-3			
UNIT-III					
32.	**31-08-16**	Types of riveted joints and introduction-Terminology		1	DM-1 DM-6
33.	**02-09-16**	Types of failures and strength equation		1	DM-1 DM-6
34.	**03-09-16**	Efficiency of riveted joint		1	DM-1
35.	**06-09-16**	Problems		1	DM-1
36.	**07-09-16**	Eccentric loading of riveted joints		1	DM-1
37.	**09-09-16**	**Tutorial-3**		1	DM-2
		Assignment-4		1	
38.	**13-09-16**	Introduction to welded joints, types and stress relieving-butt welds		1	DM-1 DM-6
39.	**14-09-16**	Fillet welds-Strength of butt welds		1	DM-1
40.	**20-09-16**	Problems on butt welds		1	DM-1
41.	**21-09-16**	Strength of parallel fillet welds			DM-1
42.	**23-09-16**	Strength of transverse fillet welds		1	DM-1
43.	**24-09-16**	**Quiz-3**			DM-3
44.	**26-09-16**	Maximum shear stress in parallel fillet welds		1	DM-1
45.	**27-09-16**	Maximum shear stress in transversefillet welds		1	DM-1
46.	**28-09-16**	Axially loaded unsymmetrical Welded joints		1	DM-1, DM-6
47.	**30-09-16**	Problems on Axially loaded unsymmetrical Welded joints		1	DM-1
48.	**01-10-16**	Welded joint subjected to bending moment		1	DM-1
49.	**03-10-16**	Problems on Welded joint subjected to bending moment		1	DM-1
50.	**04-10-16**	**Tutorial-4**		1	DM-2
		Assignment-5			
UNIT-IV					
51.	**05-10-16**	Threaded joints –Introduction-terminology-types of nuts and bolts-screw threads		1	DM-1, DM-6
52.	**07-10-16**	Bolted joints and simple analysis of		1	DM-1, DM-6

		bolted joints and problems			
53.	**17-10-16**	Bolts of uniform strength		1	DM-1, DM-6
54.	**18-10-16**	Problems		1	
55.	**19-10-16**	Eccentrically loaded bolted joints in shear		1	DM-1, DM-6
56.	**21-10-16**	Problems		1	DM-1
57.	**22-10-16**	Eccentrically loaded bolted joints perpendicular to the axis		1	DM-1, DM-6
58.	**24-10-16**	Problems			DM-1
59.	**25-10-16**	**Tutorial-5**		1	DM-2
		Assignment-6			
60.	**26-10-16**	Introduction to keys, types of keys, design of square keys		1	DM-1, DM-6
61.	**28-10-16**	Design of flat keys-problems on square keys and flat keys		1	DM-1, DM-6
62.	**29-10-16**	Design of Cotter joints-problem		1	DM-1, DM-6
63.	**31-10-16**	Design of Socket and Spigot cotter joint-problem		1	DM-1, DM-6
64.	**01-11-16**	Design of Knuckle joint-Failures		1	DM-1, DM-6
65.	**02-11-16**	Problems & Quiz-4		1	DM-1,DM-3
66.	**04-11-16**	**Tutorial-6**		1	DM-2
		Assignment-7			
UNIT-V					
67.	**05-11-16**	Introduction to transmission shafts; Shaft design on strength basis		1	DM-1, DM-6
68.	**07-11-16**	Maximum principle stress theory and, maximum shear stress theory-problems, Shaft design on Torsion basis		1	DM-1
69.	**08-11-16**	ASME CODE-Shaft design on Torsional and strength basis-fluctuating stresses		1	DM-1
70.	**09-11-16**	Problems		1	DM-1
71.	**11-11-16**	**Tutorial-7**		1	DM-2
		Assignment-8			
72.	**15-11-16**	Design of hollow shaft on strength and Torsional rigidity basis		1	DM-1
73.	**16-11-16**	Design of hollow shaft on strength and Torsional rigidity basis		1	DM-1
74.	**18-11-16**	Muff coupling		1	DM-1,DM-6
75.	**19-11-16**	Clamp coupling		1	DM-1,DM-6
76.	**21-11-16**	Flange coupling		1	DM-1,DM-6
77.	**22-11-16**	Bushed pin flexible coupling		1	DM-1,DM-6
78.	**23-11-16**	**Tutorial -8**		1	DM-2
		Assignment-9			
79.	**25-11-16**	Summary on failure theories-A brief introduction to theories of fatigue failure		1	DM-1,DM-6
80.	**26-11-16**	Fatigue design under combined stresses.		1	DM-1,DM-6

Beyond the syllabus: Topic 1: A brief introduction to theories of fatigue failure. Topic 2: fatigue design under combined stresses.	
Total number of classes required to complete the syllabus	**80**
Total number of classes available as per Schedule	**80**

NOTE: DELIVERY METHODS: **DM1**: Lecture interspersed with discussions/BB, **DM2:** Tutorial, **DM3:** Lecture with a quiz, **DM4**: Assignment/Test, **DM5**: Demonstration (laboratory, field visit), **DM6:** Presentations/PPT

At the End of the course, students attained the **Course Outcomes: CO1, CO2, CO3, CO4, CO5**& sample proofs are enclosed in Course file.

CO1: Formulate and analyze stresses and strains in machine elements and structures subjected to different loads.
CO2: Evaluate the stress distribution and analyze the failure criterion of mechanical parts under fatigue loads.
CO3: Comprehend the design of permanent joints.
CO4: Analyze the bolts and nuts subjected to axial and eccentric loads.
CO5: Design shaft and shaft couplings for various engineering applications.

Signature					
	Course Instructor	**Course Coordinator**	**Module Coordinator**	**Program Coordinator**	**HOD**
	G. kartheek	K.V.Viswanadh	B Sudheer Kumar	Dr. S. Pichi Reddy	Dr. K. AppaRao

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF MECHANICAL ENGINEERING
(Accredited by NBA under Tier – I)

Laboratory Code	**: L 156**	**Lab:**	**Machine Tools LAB**
Class	**: B. Tech – V Semester (Section – A)**	**A.Y.**	**: 2016-17 (Mech Engg)**
Lab/Practicals	**: 3 hrs/ Week**	**Continuous Internal Assessment**	**: 25**
Credits	**: 02**	**Semester End Examination**	**: 75**
Name of the Faculty	**:** J. Subba Reddy (Associate Professor) /	P. Tagore Kumar (Assistant Professor)	

CEOs and COs

Course Educational Objectives (CEOs):

The main objective of this course is to impart practical exposure on various machine tools used in industry.

Course Outcomes (Cos):

After completion of the course students will be able to:

1. Exhibit the ability in developing sequence of machining operations required for to prepare a machine element.
2. Capable of manufacturing components according to given drawings on various machine tools.

Faculty in charge **HOD**

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Laboratory Code	**: L 156**	**Lab:**	**Machine Tools LAB**
Class	**: B. Tech – V Semester (Section – A)**	**A.Y.**	**: 2016-17 (Mech Engg)**
Lab/Practicals	**: 3 hrs/ Week**	**Continuous Internal Assessment**	**: 25**
Credits	**: 02**	**Semester End Examination**	**: 75**
Name of the Faculty	**:** J. Subba Reddy (Associate Professor) / P. Tagore Kumar (Assistant Professor)		

LIST OF EXPERIMENTS

At least 06 experiments are to be conducted:

LIST OF EXPERIMENTS:

1. To perform the step turning operation and taper turning operation on a given M.S. work piece
2. To perform knurling operation and threading operation on a given M.S. work piece
3. To form and grind the given work piece (square rod) into single point cutting tool
4. To cut spur gear on a given M.S.Round blank using milling machine.
5. To cut a rectangular groove (or key way) with given dimensions on work piece using Shaping machine.
6. To perform drilling and tapping operations on a given M.S. plate using universal drilling machine.
7. To prepare a smooth flat surface on M.S.flat using surface Grinding machine.

STUDY EXPERIMENTS:

1. Study the principal parts and specifications of Lathe Machine.
2. Study the principal parts and specifications of Capstan and Torrent Lathe Machine
3. Study the principal parts and specifications of Universal Drilling Machine
4. Study the principal parts and specifications of Horizontal Milling Machine
5. Study the principal parts and specifications of Shaper Machine
6. Study the principal parts and specifications of Planar Machine
7. Study the principal parts and specifications of Slotter Machine
8. Study the principal parts and specifications of Surface Grinding Machine
9. Study the principal parts and specifications of Tool Cutter
10. Study the principal parts and specifications of CNC Turing Machine
11. Study the principal parts and specifications of CNC Milling Machine

REFERENCES

Lab Manual

Faculty in charge **HOD**

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)
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Laboratory Code	**: L 156**	**Lab:**	**Machine Tools LAB**
Class	**: B. Tech – V Semester (Section – A)**	**A.Y.**	**: 2016-17 (Mech Engg)**
Lab/Practicals	**: 3 hrs/ Week**	**Continuous Internal Assessment**	**: 25**
Credits	**: 02**	**Semester End Examination**	**: 75**
Name of the Faculty	**:** J. Subba Reddy (Associate Professor) / P. Tagore Kumar (Assistant Professor)		

Batches (Section – A)

Total No. of students	**: 14761A0301 – 305, 308 – 355, 357 – 360, 15765A0301 – 314, 13761A0312, 13761A0352**	**=**	**73**
Batch A1	**: 14761A0301 – 305, 308 – 320**	**=**	**18**
Batch A2	**: 14761A0321 – 338**	**=**	**18**
Batch A3	**: 14761A0339 – 355, 357**	**=**	**18**
Batch A4	**: 14761A0358 – 360, 15765A0301 – 314, 13761A0312, 13761A0352**	**=**	**19**

Sub Batches of A1:

S. No	Batch	Registered Nos	Total
1	A11	14761A0301 – 303	03
2	A12	14761A0304 – 305, 308	03
3	A13	14761A0309 – 311	03
4	A14	14761A0312 – 314	03
5	A15	14761A0315 – 317	03
6	A16	14761A0318 – 320	03
Total (A1)			18

Sub Batches of A2:

S. No	Batch	Registered Nos	Total
1	A21	14761A0321 – 323	03
2	A22	14761A0324 – 326	03
3	A23	14761A0327 – 329	03
4	A24	14761A0330 – 332	03
5	A25	14761A0333 – 335	03
6	A26	14761A0336 – 338	03
Total (A2)			18

Sub Batches of A3:

S. No	Batch	Registered Nos	Total
1	A31	14761A0339 – 341	03
2	A32	14761A0342 – 344	03
3	A33	14761A0345 – 347	03
4	A34	14761A0348 – 350	03
5	A35	14761A0351 – 353	03
6	A36	14761A0354 – 355, 357	03
Total (A3)			18

Sub Batches of A4:

S. No	Batch	Registered Nos	Total
1	A41	14761A0358 – 360	03
2	A42	15765A0301 – 303	03
3	A43	15765A0304 – 306	03
4	A44	15765A0307 – 309	03
5	A45	15765A0310 – 312	03
6	A46	15765A0313 – 314, 13761A0312, 13761A0352	04
Total (A4)			18

Faculty in charge **HOD**

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Laboratory Code	**: L 156**	**Lab:**	**Machine Tools LAB**
Class	**: B. Tech – V Semester (Section – A)**	**A.Y.**	**: 2016-17 (Mech Engg)**
Lab/Practicals	**: 3 hrs/ Week**	**Continuous Internal Assessment**	**: 25**
Credits	**: 02**	**Semester End Examination**	**: 75**
Name of the Faculty	**:** J. Subba Reddy (Associate Professor) / P. Tagore Kumar (Assistant Professor)		

Notification of Cycles (Section – A)

Cycle – I:

1. To perform the step turning operation and taper turning operation on a given M.S. work piece **(Ex – 1)**
2. To perform knurling operation and threading operation on a given M.S. work piece **(Ex – 2)**
3. To form and grind the given work piece (square rod) into single point cutting tool **(Ex – 3)**

Cycle – II:

4. To cut spur gear on a given M.S.Round blank using milling machine **(Ex – 4)**
5. To cut a rectangular groove (or key way) with given dimensions on work piece using Shaping machine **(Ex – 5)**
6. To perform drilling and tapping operations on a given M.S. plate using universal drilling machine **(Ex – 6)**
7. To prepare a smooth flat surface on M.S.flat using surface Grinding machine **(Ex – 6)**

Cycle – III:

STUDY EXPERIMENTS:

1. Study the principal parts and specifications of Lathe Machine. **(SE – 1)**
2. Study the principal parts and specifications of Capstan and Torrent Lathe Machine. **(SE – 2)**
3. Study the principal parts and specifications of Universal Drilling Machine **(SE – 3)**
4. Study the principal parts and specifications of Horizontal Milling Machine **(SE – 4)**
5. Study the principal parts and specifications of Shaper Machine **(SE – 5)**
6. Study the principal parts and specifications of Planar Machine **(SE – 6)**
7. Study the principal parts and specifications of Slotter Machine **(SE – 7)**
8. Study the principal parts and specifications of Surface Grinding Machine **(SE – 8)**
9. Study the principal parts and specifications of Tool Cutter **(SE – 9)**
10. Study the principal parts and specifications of CNC Turing Machine **(SE – 10)**
11. Study the principal parts and specifications of CNC Milling Machine **(SE – 11)**

Faculty in charge **HOD**

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)
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Laboratory Code	**: L 156**	**Lab:**	**Machine Tools LAB**
Class	**: B. Tech – V Semester (Section – A)**	**A.Y.**	**: 2016-17 (Mech Engg)**
Lab/Practicals	**: 3 hrs/ Week**	**Continuous Internal Assessment**	**: 25**
Credits	**: 02**	**Semester End Examination**	**: 75**
Name of the Faculty	**:** J. Subba Reddy (Associate Professor) / P. Tagore Kumar (Assistant Professor)		

Lab Time Table (Section – A)

Time→ Day ↓	1 09.00 to 09.50	2 09.50 to 10.40	10.40 to 10.50	3 10.50 to 11.40	11.40 to 12.20	4 12.20 to 01.10	5 01.10 to 02.00	6 02.00 to 02.50	7 02.50 to 03.40
Monday			Tea Break		LUNCH BREAK		MT Lab – V Sem – ME (A/S) B_1		
Tuesday							MT Lab – V Sem – ME (B/S) B_1		
Wednesday									
Thursday	MT Lab – V Sem – ME (A/S) B_2								
Friday	MT Lab – V Sem – ME (B/S) B_2								
Saturday			Tea Break						

Faculty in charge **HOD**

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)
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Laboratory Code	**: L 156**	**Lab:**	**Machine Tools LAB**
Class	**: B. Tech – V Semester (Section – A)**	**A.Y.**	**: 2016-17 (Mech Engg)**
Lab/Practicals	**: 3 hrs/ Week**	**Continuous Internal Assessment**	**: 25**
Credits	**: 02**	**Semester End Examination**	**: 75**

Name of the Faculty : J. Subba Reddy (Associate Professor) / P. Tagore Kumar (Assistant Professor)

Schedule of Experiments (Section – A)

(Batch – A1) - 14761A0301 – 305, 308 – 320 (= 18):

Date	Experiment (Batch)					
	Ex - 1	Ex – 2	Ex – 3	Ex – 4	Ex – 5	Ex – 6
18-07-2016	Demonstration of all experiments, CEOs and COs of the Laboratory (SE – 1 to 11)					
25-07-2016	A11	A12	A13	A14	A15	A16
01-08-2016	A13	A11	A12	A16	A14	A15
08-08-2016	A12	A13	A11	A15	A16	A14
29-08-2016	A14	A15	A16	A11	A12	A13
19-09-2016	A16	A14	A15	A13	A11	A12
26-09-2016	A15	A16	A14	A12	A13	A11
21-11-2016	INTERNAL EXAMINATION					

(Batch – A2) - 14761A0321 – 338 (= 18):

Date	Experiment (Batch)					
	Ex - 1	Ex – 2	Ex – 3	Ex – 4	Ex – 5	Ex – 6
18-07-2016	Demonstration of all experiments, CEOs and COs of the Laboratory					
03-10-2016	A21	A22	A23	A24	A25	A26
10-10-2016	A23	A21	A22	A26	A24	A25
17-10-2016	A22	A23	A21	A25	A26	A24
24-10-2016	A24	A25	A26	A21	A22	A23
07-11-2016	A26	A24	A25	A23	A21	A22
14-11-2016	A25	A26	A24	A22	A23	A21
21-11-2016	INTERNAL EXAMINATION					

Faculty in charge **HOD**

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF MECHANICAL ENGINEERING
(Accredited by NBA under Tier – I)

Laboratory Code	**: L 156**	**Lab:**	**Machine Tools LAB**
Class	**: B. Tech – V Semester (Section – A)**	**A.Y.**	**: 2016-17 (Mech Engg)**
Lab/Practicals	**: 3 hrs/ Week**	**Continuous Internal Assessment**	**: 25**
Credits	**: 02**	**Semester End Examination**	**: 75**

Name of the Faculty : J. Subba Reddy (Associate Professor) / P. Tagore Kumar (Assistant Professor)

Schedule of Experiments (Section – A)

(Batch – A3) - 14761A0339 – 355, 357 (= 18):

Date	Experiment (Batch)					
	Ex - 1	Ex – 2	Ex – 3	Ex – 4	Ex – 5	Ex – 6
14-07-2016	Demonstration of all experiments, CEOs and COs of the Laboratory (SE – 1 to 11)					
21-07-2016	A31	A32	A33	A34	A35	A36
28-07-2016	A33	A31	A32	A36	A34	A35
04-08-2016	A32	A33	A31	A35	A36	A34
11-08-2016	A34	A35	A36	A31	A32	A33
01-09-2016	A36	A34	A35	A33	A31	A32
08-09-2016	A35	A36	A34	A32	A33	A31
24-11-2016	INTERNAL EXAMINATION					

(Batch – A4) - 14761A0358 – 360, 15765A0301 – 314, 13761A0312, 13761A0352 (= 19):

Date	Experiment (Batch)					
	Ex - 1	Ex – 2	Ex – 3	Ex – 4	Ex – 5	Ex – 6
14-07-2016	Demonstration of all experiments, CEOs and COs of the Laboratory					
22-09-2016	A41	A42	A43	A44	A45	A46
29-09-2016	A43	A41	A42	A46	A44	A45
06-10-2016	A42	A43	A41	A45	A46	A44
13-10-2016	A44	A45	A46	A41	A42	A43
20-10-2016	A46	A44	A45	A43	A41	A42
27-10-2016	A45	A46	A44	A42	A43	A41
03-11-2016						
10-11-2016						
17-11-2016						
24-11-2016	INTERNAL EXAMINATION					

Faculty in charge **HOD**

LESSON PLAN

Course Name: OPERATIONS RESEARCH (S329) **Programme: B.Tech (Section – B)**
SEM: V **Department: Mechanical Engineering**

AY: 2016 - 17

Sl. No.	Tentative Date	Topics to be covered	Actual Date	No. of classes	Content Delivery Methods
UNIT-I: INTRODUCTION					
1	16-07-2016	Introduction to Operations Research		1	DM1
2	18-07-2016	operations research models, applications.		1	DM1
3	19-07-2016	Linear Programming Problem Formulation for Maximization		1	DM1/DM4
4	20-07-2016	Linear Programming Problem Formulation for Minimization		1	DM1
5	21-07-2016	**Tutorial - I**		1	DM2
6	23-07-2016	Graphical solution for Maximization		1	DM1/DM3
7	25-07-2016	Graphical solution for Minimization		1	DM1
8	26-07-2016	Graphical solution for Special Cases		1	DM1
9	27-07-2016	Simplex method – I		1	DM1
10	28-07-2016	**Tutorial – II**		1	DM2
11	30-07-2016	Simplex method - II		1	DM1
12	01-08-2016	Two–phase method		1	DM1
13	02-08-2016	Big-M method		1	DM1/DM4
14	03-08-2016	Artificial variables techniques		1	DM1
15	04-08-2016	**Tutorial - III**		1	DM2
UNIT-II: TRANSPORTATION PROBLEM					
16	06-08-2016	Introduction		1	DM1/DM6
17	08-08-2016	Transportation Problem Formulation		1	DM1
18	09-08-2016	Transportation Problem Optimal solution		1	DM1
19	10-08-2016	unbalanced transportation problem		1	DM1/DM4
20	11-08-2016	**Tutorial - IV**		1	DM2
21	13-08-2016	Degeneracy in transportation problem		1	DM1
22	16-08-2016	Assignment problem (Model -I)		1	DM1
23	17-08-2016	Assignment problem (Model -II)		1	DM1/DM4
24	18-08-2016	Assignment problem optimal solution		1	DM1
25	20-08-2016	**Tutorial - V**		1	DM2
26	22-08-2016	Variants of Assignment Problem		1	DM1/DM3
27	23-08-2016	unbalanced transportation problem - I		1	DM1
28	24-08-2016	unbalanced transportation problem - II		1	DM1
29	25-08-2016	Traveling Salesman problem		1	DM1/DM4
30	27-08-2016	**Tutorial - VI**		1	DM2
UNIT-III: THEORY OF GAMES & INVENTORY CONTROL					
31	29-08-2016	Introduction		1	DM1
32	30-08-2016	Minimax (maximin) Criterion		1	DM1/ DM4
33	31-08-2016	optimal strategy		1	DM1
34	01-09-2016	**Tutorial - VII**		1	DM2
35	03-09-2016	Solution of games with saddle points		1	DM1
36	05-09-2016	Rectangular games without saddle points		1	DM1/DM3
37	06-09-2016	2 X 2 games – dominance principle		1	DM1
38	07-09-2016	m X 2 & 2 X n games		1	DM1
39	08-09-2016	**Tutorial – VIII**		1	DM2
40	10-09-2016	Graphical method		1	DM1
41	12-09-2016	**Inventory control:** Introduction		1	DM1/DM6
42	13-09-2016	EOQ model		1	DM1
43	14-09-2016	Shortages not allowed		1	DM1/DM4
44	15-09-2016	Deterministic models		1	DM1
	16-09-2016 To 19-09-2016	**I Mid Examinations**			

45	20-09-2016	**Tutorial – IX**		1	DM2
46	21-09-2016	Probabilistic models		1	DM1
47	22-09-2016	Price breaks		1	DM1
UNIT – IV THEORY OF REPLACEMENT & WAITING LINES					
48	24-09-2016	Introduction		1	DM1/DM6
49	26-09-2016	Replacement of Equipment that Deteriorates Gradually		1	DM1
50	27-09-2016	Replacement of Equipment that fails suddenly		1	DM1/DM4
51	28-09-2016	Group Replacement		1	DM1/DM3
52	29-09-2016	**Tutorial – X**		1	DM2
53	01-10-2016	**Waiting Lines:** Introduction		1	DM1/DM4
54	03-10-2016	Single Channel		1	DM1
55	04-10-2016	Poisson arrivals		1	DM1
56	05-10-2016	exponential service times		1	DM1/DM3
57	06-10-2016	Exponential service times with infinite population		1	DM1
58	08-10-2016	**Tutorial – XI**		1	DM2
	10-10-2016 To 15-10-2016	**Vijaya Dasami Holidays**			
59	17-10-2016	Problems		1	DM1/DM4
60	18-10-2016	Exponential service times with finite population		1	DM2/DM3
61	19-10-2016	Problems		1	DM1
62	20-10-2016	Poisson arrivals		1	DM1/DM4
63	22-10-2016	**Tutorial – XII**		1	DM2
64	24-10-2016	Single channel Poisson arrivals		1	DM1/DM4
65	25-10-2016	Problems		1	DM1
66	26-10-2016	Multichannel Poisson arrivals		1	DM2/DM3
67	27-10-2016	Problems		1	DM1
UNIT- V DYNAMIC PROGRAMMING & INTRODUCTION TO OPTIMIZATION					
68	29-10-2016	**Dynamic Programming:** Introduction		1	DM1/DM6
69	31-10-2016	Bellman's Principle of optimality		1	DM1
70	01-11-2016	Applications of dynamic programming		1	DM2/DM3
71	02-11-2016	capital budgeting problem		1	DM1
72	03-11-2016	**Tutorial – XIII**		1	DM2
73	05-11-2016	shortest path problem		1	DM1
74	07-11-2016	linear programming problem.		1	DM1/ DM4
75	08-11-2016	**Introduction to optimization:** Introduction		1	DM1
76	09-11-2016	Engineering Applications of Optimization		1	DM2/DM3
77	10-11-2016	Problem Statement		1	DM1
78	12-11-2016	**Tutorial – XIV**		1	DM2
79	14-11-2016	Design Vector, Design Constraints		1	DM1
80	15-11-2016	Constraint surface		1	DM1/DM4
81	16-11-2016	Objective function		1	DM2/DM3
82	17-11-2016	Objective function Surfaces		1	DM1
83	19-11-2016	Classification of optimization problems		1	DM1
84	21-11-2016	**Tutorial – XV**		1	DM2
85	22-11-2016	Optimization Techniques – Introduction		1	DM1
86	23-11-2016	Single-variable Optimization.		1	DM1
87	24-11-2016	**Beyond syllabus**		1	DM1
88	26-11-2016	**Revision**		1	DM1/DM6

	28-11-2016 To 30-11-2016	**II Mid Examinations**
	01-12-2016 To 07-12-2016	**Preparation and Practicals**
	08-12-2016 To 21-12-2016	**End Examinations**

Total	88
Total number of classes required to complete the syllabus	**80**
Total number of classes available as per Schedule	**88**

NOTE: DELIVERY METHODS (DM):
DM1: Lecture interspersed with discussions/BB
DM2: Tutorial
DM3: Lecture with a Quiz
DM4: Assignment/Test
DM5: Demonstration (laboratory, field visit)
DM6: Presentations/PPT

At the End of the course, students attained the **Course Outcomes: CO1, CO2, CO3, CO4, CO5** & sample proofs are enclosed in Course file.
CO1: Develop mathematical models for real engineering problems.
CO2: Demonstrate the familiarity in identifying the key parameters influencing the production cost.
CO3: Exhibit knowledge in solving inventory control problems.
CO4: Choose optimal strategy using OR techniques.

TEXT BOOKS

1. Kantiswarup. P.K.Gupta, Man Mohan, Operations Research, Sultan Chand& Sons, Educational Publications, New Delhi, 14th Edition, 2008.

2. Hiller & Libermann, Introduction to O.R (TMH), 9thEdition, 2009

REFERENCES

1. Singiresu S Rao, Engineering Optimization: Theory and Practice, A Wiley-Interscience Publication, 4th edition,2009.

2. A.M.Natarajan, P.Balasubramani, A. Tamilarasi,Operations Research, Pearson Education, 2nd edition, 2014.

3. Taha, Introduction to O.R .PHI, 9th edition, 2010.

Signature					
	Course Instructor	**Course Coordinator**	**Module Coordinator**	**Programme Coordinator**	**HOD**
	V. Sankararao		**J. Subba Reddy**	**Dr. S. Pichi Reddy**	**Dr. K. Appa Rao**

Thermal Engineering Lab

Thermal Engineering Lab Objectives:

The main objective of this laboratory is to familiarize the basic principles and its recent advancements in the area of Internal Combustion engines for Graduates and Post graduates. To study and analyze the various performance parameters such as fuel consumption, frictional power, mechanical efficiency etc. The graduates are empowered with principles of working and its performance analysis on Refrigerator, Air Conditioner, Air compressor, solar concentrator and fuel testing apparatus. It also focuses on to measure the amount of exhaust emissions coming from the engines and creating awareness among the graduates about its impact on the global environment.

COURSE OUTCOMES:

After the completion of the course, students should be able to

CO 1: Identify the various apparatus for fuel characterization through experimentation

CO 2: Analyze the performance characteristics of an internal combustion engines

CO 3: Evaluate the performance parameters of refrigeration systems

CO4: Analyze the air compressor characteristics

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING

MYLAVARAM-521230

DEPARTMENT OF MECHANICAL ENGINEERING

THERMAL ENGINEERING LABORATORY

CLASS : B.Tech(V-A/S) **A.Y: 2016-17**

I Cycle Schedule: BATCH-A (MONDAY)

Date Exp	I	II	III	IV	V	VI
18/07/16	Demo	Demo	Demo	Demo	Demo	Demo
25/07/16	A_1	A_2	A_3	A_4	A_5	A_6
08/08/16	A_6	A_1	A_2	A_3	A_4	A_5
29/08/16	A_5	A_6	A_1	A_2	A_3	A_4
12/09/16	A_4	A_5	A_6	A_1	A_2	A_3
26/09/16	A_3	A_4	A_5	A_6	A_1	A_2
26/09/16	A_2	A_3	A_4	A_5	A_6	A_1

I Cycle Schedule: BATCH-B (THURSDAY)

Date Exp	I	II	III	IV	V	VI
19/07/16	Demo	Demo	Demo	Demo	Demo	Demo
26/07/16	B_1	B_2	B_3	B_4	B_5	B_6
07/08/16	B_6	B_1	B_2	B_3	B_4	B_5
09/08/16	B_5	B_6	B_1	B_2	B_3	B_4
16/08/16	B_4	B_5	B_6	B_1	B_2	B_3
13/09/16	B_3	B_4	B_5	B_6	B_1	B_2
20/09/16	B_2	B_3	B_4	B_5	B_6	B_1

Lab-Incharge

II Cycle Schedule: BATCH-A (MONDAY)

Date Exp	I	II	III	IV	V	VI
04/10/16	Demo	Demo	Demo	Demo	Demo	Demo
11/10/16	A_1	A_2	A_3	A_4	A_5	A_6
18/10/16	A_6	A_1	A_2	A_3	A_4	A_5
25/10/16	A_5	A_6	A_1	A_2	A_3	A_4
25/10/16	A_4	A_5	A_6	A_1	A_2	A_3
01/11/16	A_3	A_4	A_5	A_6	A_1	A_2
09/11/16	A_2	A_3	A_4	A_5	A_6	A_1

II Cycle Schedule: BATCH-B (THURSDAY)

Date Exp	I	II	III	IV	V	VI
10/10/16	Demo	Demo	Demo	Demo	Demo	Demo
17/10/16	B_1	B_2	B_3	B_4	B_5	B_6
23/10/16	B_6	B_1	B_2	B_3	B_4	B_5
31/10/16	B_5	B_6	B_1	B_2	B_3	B_4
07/11/16	B_4	B_5	B_6	B_1	B_2	B_3
07/11/16	B_3	B_4	B_5	B_6	B_1	B_2
14/11/16	B_2	B_3	B_4	B_5	B_6	B_1

Lab-Incharge

Department: Mechanical **Lab: TE Lab**

Course : V SEM (A/S) **A.Y: 2016-17**

BATCH:A (MONDAY)	BATCH:B(THURSDAY)
A_1 -----**14761A0301 to 14761A0306**	B_1 ----**14761A0337 to 14761A0342**
A_2 -----**14761A0307 to 14761A0312**	B_2 ---- **14761A0343 to 14761A0348**
A_3 -----**14761A0313 to 14761A0318**	B_3 ---- **14761A0349 to 14761A0356**
A_4 ----- **14761A0319 to 14761A0324**	B_4 ---- **14761A0357 to 15765A0302**
A_5 ----- **14761A0325 to 14761A0330**	B_5 ----**15765A0303 to 15765A0308**
A_6---------**14761A0331 to 14761A0336**	B_6----------**15765A0309 to 15765A0315**

LAKIREDDY BALIREDDY COLLEGE OF ENGINEERING

MYLAVARAM

LAB TIMETABLE

Department : Mechanical **Lab: Thermal Engineering**

Course : V Sem (A/S) **A.Y: 2016-17**

Day	FN	AN
Monday		V Sem Batch- A
Tuesday		
Wednesday		
Thursday	V Sem Batch- B	
Friday		
Saturday		

Lab-Incharge

LESSON PLAN

Course Code& Course Name: - S-203 - DYNAMICS OF MACHINES **SEM:** V

Programme: B .Tech –B-SECTION **Department:** MECH

Name of faculty : CH. SIVA SANKARA BABU A.Y:2016-17

S No.	Tentative Date	Topics to be covered	Actual Date	No. of classes	Content Delivery Methods
UNIT- I : CLUTCHES, BRAKES, DYNAMOMETERS AND PRECESSION					
1.	16-07-2016	Introduction to Dynamics of Machines - Course Educational Objectives (CEO's) and Course Outcomes (CO's).		1	**DM1**
2.	18-07-2016	Introduction to clutches- Single Plate Clutch andMulti plate clutch working		1	**DM1, DM6**
3.	19-07-2016	Derivation for friction torque by Uniform pressure and Uniform wear conditions		1	**DM1**
4.	20-07-2016	Cone clutch and Centrifugal clutch		1	**DM1, DM6**
5.	21-07-2016	Problems on single and multi-plate clutches		1	**DM1**
6.	23-07-2016	Problems on single and multi-plate clutches		1	**DM1**
7.	25-07-2016	Tutorial-1		1	**DM2**
8.	26-07-2016	Brakes: Simple block brakes& problem		1	**DM1, DM6**
9.	27-07-2016	Band brake of a vehicle& problem		1	**DM1**
10.	28-07-2016	Band and block brakes		1	**DM1, DM6**
11.	30-07-2016	Problems on Band and block brakes		1	
12.	01-08-2016	Internal expanding brakes		1	**DM1, DM6**
13.	02-08-2016	Tutorial-2		1	**DM2**
14.	03-08-2016	Dynamometers-absorption type method &operation		1	**DM1**
15.	04-08-2016	Transmission type method & operation		1	**DM1**
16.	06-08-2016	Problems		1	**DM1**
17.	08-08-2016	Precession: Gyroscopes and introduction		1	**DM1, DM6**
18.	09-08-2016	Effect of precession on Aero planes		1	**DM1, DM5**
19.	10-08-2016	Tutorial-3		1	**DM2**
20.	11-08-2016	Effect of precession on ships		1	**DM1, DM6**
21.	16-08-2016	Problems		1	**DM1**
22.	17-08-2016	Effect of precession on the stability of motor car (four wheeler)		1	**DM1, DM6**
23.	18-08-2016	Effect of precession on the stability of motor cycle (two wheeler)		1	**DM1, DM6**
24.	20-08-2016	Tutorial-4		1	**DM2**
25.	22-08-2016	Problems		1	**DM1**
26.	23-08-2016	Assignment/Quiz -1		1	**DM3, DM4**
UNIT-II : TURNING MOMENT DIAGRAM & FLY WHEELS					
27.	24-08-2016	Introduction about Turning moment		1	**DM1**
28.	27-08-2016	Angular velocity and acceleration piston-piston effort		1	**DM1**
29.	29-08-2016	Angular velocity and acceleration of connecting rod-crank effort		1	**DM1**
30.	30-08-2016	Introduction to turning moment diagrams		1	**DM1**
31.	31-08-2016	Problems on single cylinder engines		1	**DM1**
32.	01-09-2016	Tutorial-5		1	**DM2**

33.	03-09-2016	Problems on multi cylinder engines		1	**DM1**
34.	06-09-2016	Fluctuation of energy- Problems		1	**DM1**
35.	07-09-2016	Fly wheels and their design		1	**DM1**
36.	08-09-2016	Problems			**DM1**
37.	13-09-2016	Tutorial-6		1	**DM2**
38.	14-09-2016	Assignment/Quiz -2		1	**DM3, DM4**
39.	15-09-2016	Assignment Problems explanations			**DM1**
UNIT-III : GOVERNORS					
40.	20-09-2016	Introduction, Watt governor		1	**DM1, DM6**
41.	21-09-2016	Porter governor working & derivation		1	**DM1, DM5**
42.	22-09-2016	Porter governor Problems		1	**DM1**
43.	24-09-2016	Proell governor working & derivation		1	**DM1**
44.	26-09-2016	Proell governor Problems		1	**DM1**
45.	27-09-2016	Tutorial-7		1	**DM2**
46.	28-09-2016	Hartnell governor working & derivation		1	**DM1**
47.	29-09-2016	Hartnell governor Problems		1	**DM1**
48.	01-10-2016	Sensitiveness, Isochronisms and hunting		1	**DM1**
49.	03-10-2016	Problems		1	**DM1**
50.	04-10-2016	Tutorial-8		1	**DM2**
51.	05-10-2016	Assignment/Quiz -3		1	**DM3, DM4**
UNIT-IV : BALANCING					
52.	06-10-2016	Introduction to Balancing - Balancing of rotating masses		1	**DM1, DM6**
53.	17-10-2016	Balancing of Single revolving mass		1	**DM1, DM5**
54.	18-10-2016	Balancing of several masses rotating in different planes		1	**DM1**
55.	19-10-2016	Analytical and graphical methods		1	**DM1**
56.	20-10-2016	Tutorial-9		1	**DM2**
57.	22-10-2016	Problems		1	**DM1**
58.	24-10-2016	Balancing of reciprocating masses		1	**DM1, DM5**
59.	25-10-2016	Unbalanced forces and couples		1	**DM1**
60.	26-10-2016	Primary, secondary balancing of reciprocating masses.		1	**DM1**
61.	27-10-2016	Locomotive balancing		1	**DM1**
62.	29-10-2016	Tutorial-10		1	**DM2**
63.	31-10-2016	Examination of 'V' multi cylinder in line and radial engines for primary and secondary balancing		1	**DM1**
64.	01-11-2016	Hammer blow, swaying couple and tractive efforts		1	**DM1**
65.	02-11-2016	Assignment/Quiz -4		1	**DM3, DM4**
UNIT-V : VIBRATIONS					
66.	03-11-2016	Introduction & Types of Vibrations		1	**DM1, DM6**
67.	05-11-2016	Degree of freedom- free longitudinal vibrations		1	**DM1, DM5**
68.	07-11-2016	Inertia effect of the mass of spring		1	**DM1**
69.	08-11-2016	Derivations & problems		1	**DM1**
70.	09-11-2016	Displacement, velocity & acceleration of body due to inertia force		1	**DM1**

71.	10-11-2016	Tutorial-11		1	**DM2**
72.	14-11-2016	Forced vibrations without damping		1	**DM1, DM5**
73.	15-11-2016	Forced damped vibrations		1	**DM1, DM5**
74.	16-11-2016	Problems on forced vibrations		1	**DM1**
75.	17-11-2016	Vibration isolation and transmissibility		1	**DM1, DM5**
76.	19-11-2016	Whirling speed of shafts- problems		1	**DM1**
77.	21-11-2016	Tutorial-12		1	**DM2**
78.	22-11-2016	Assignment/Quiz -5		1	**DM3, DM4**
79.	23-11-2016	Beyond Syllabus – Transverse vibrations of beams		1	**DM1**
80.	24-11-2016	Beyond Syllabus – vibration measuring instruments		1	**DM1**
81.	26-11-2016	Revision		1	**DM1**
Total number of classes required to complete the syllabus				**62**	
Total number of classes available as per Schedule				**81**	

NOTE:

DELIVERY METHODS:

DM1: Lecture interspersed with discussions/BB, **DM2:** Tutorial,
DM3: Lecture with a quiz, **DM4**: Assignment/Test, **DM5**: Demonstration (laboratory, field visit),
DM6: Presentations/PPT

Course Objective:

To understand the force motion relationship in components subjected to external forces and analysis of standard mechanisms used for speed control and stability control & the effect of dynamics of undesirable vibrations and unbalance.

COURSE OUTCOMES:

After completion this course, student will be able to

CO1: Solve the practical problems on clutches and brakes by applying the concept contact forces due to of friction and observe the gyroscopic effect due to precession of rotating bodies.
CO2: Analyze the energy storage in the flywheels and cyclic energy of equalization process
CO3: Analyze the speed regulations of various governors under varying loads.
CO4: Analyze the balancing process of the moving parts (rotating& reciprocating) statically and dynamically.
CO5: Analyze the basic concepts of vibrations and take measures to minimize vibration and noise.

Signatures					
	Course Instructor	**Course Co-ordinator**	**Module Co-ordinator**	**Program co-ordinator**	**HOD**
	Ch. Siva SankaraBabu	**J. Leela Krishna**	**B.Sudheer Kumar**	**Dr. S. Pichi Reddy**	**Dr. K.AppaRao**

LESSON PLAN

Course Code& Course Name: T216-Internal Combustion engines and Gas Turbines

Programme: B.Tech **Department:** MECHANICAL

Name of the Faculty: Dr.P.Vijay Kumar **SEM: V (B/S)**

S No.	Tentative Date	Topics to be covered	Actual Date	Num. of classes	Content Delivery Methods
UNIT-I: Introduction and Engine systems					
1.	16/07/2016	Introduction to I.C. Engines		1	DM1,DM6
2.	18/07/2016	Classification of I.C. Engines		1	DM1
3.	19/07/2016	Basic Engine components and Nomenclature		1	DM1
4.	20/07/2016	Working principle of four stroke SI and CI engines		1	DM1/DM6
5.	21/07/2016	Tutorial-1		1	DM2/DM4
6.	23/07/2016	Working principle of two stroke SI and CI engines		1	DM1
7.	25/07/2016	Valve timing diagram for four stroke engines		1	DM1/DM6
8.	26/07/2016	Port timing diagram for two stroke engines		1	DM1/DM6
9.	27/07/2016	Applications of I.C. Engines		1	DM1
10.	28/07/2016	Layout of fuel system in SI engines and Carburetion		1	DM1,DM6
11.	30/07/2016	Tutorial-2		1	DM2
12.	01/08/2016	Simple Carburettor		1	DM1
13.	02/08/2016	Defects of simple carburettor		1	DM1
14.	03/08/2016	Fuel supply systems in CI engines and types of fuel Injection		1	DM1/DM6
15.	04/08/2016	Cooling systems, air cooling, water cooling and its comparison		1	DM1/DM6
16.	06/08/2016	Lubrication systems, Mist, wet sump and dry sump lubrication system		1	DM1
17.	08/08/2016	Ignition systems		1	DM1
18.	09/08/2016	Tutorial-3		1	DM2
UNIT-II: Air standard cycles, Fuel air cycles and Actual cycles					
19	10/08/2016	Air standard cycles: Carnot cycle, Otto cycle and its analysis		1	DM1/DM6
20	11/08/2016	Diesel cycle ,Dual cycle and its analysis		1	DM1
21	23/08/2016	Atkinson, Stirling and Ericson cycles		1	DM1/DM6
22	24/08/2016	Brayton cycle and its analysis		1	DM2
23	27/08/2016	Tutorial-4		1	DM2
24	29/08/2016	Problems on Otto, diesel and Dual cycle		1	DM4
25	30/08/2016	Problems on Brayton cycle		1	DM4
26	31/08/2016	Fuel air cycle and their significance		1	DM1
27	01/09/2016	Composition of cylinder gases, Dissociation		1	DM1
28	03/09/2016	Comparison of Air standard and Fuel air cycles		1	DM1
29	06/09/2016	Tutorial-5		1	DM2

30	07/09/2016	Actual cycles and their analysis		1	DM1
31	08/09/2016	Time loss factor, heat loss factor		1	DM1
32	13/09/2016	Exhaust blow down, Loss due to Rubbing friction		1	DM1
33	14/09/2016	Actual and fuel air cycles of engines		1	DM4
34	15/09/2016	Tutorial-6		1	DM2/DM4
UNIT-III: Combustion in SI and CI Engines					
35	20/09/2016	Introduction, Homogeneous and Heterogeneous Mixture		1	DM1/DM6
36	21/09/2016	Stages of Combustion in SI engines		1	DM1
37	22/09/2016	Flame front propagation, Factors influencing Flame speed		1	DM1
38		Factors influencing the flame speed		1	DM1
39	23/09/2016	Abnormal Combustion , Phenomenon of Knock in SI engines		1	DM1/DM6
40	24/09/2016	Phenomenon of knock in SI engines		1	DM1
41	26/09/2016	Effect of engine variables on Knocking		1	DM1/DM6
42	27/09/2016	Tutorial-7		1	DM2
43	28/09/2016	Combustion Chambers for SI engines		1	DM1
44	29/09/2016	Fuel requirement and Fuel rating in SI engines		1	DM1
45	01/10/2016	Stages of Combustion in CI engines		1	DM1
46	03/10/2016	Factors affecting delay period, Detonation		1	DM1
47	04/10/2016	Phenomenon of knock in CI engine		1	DM1
48	05/10/2016	Comparison of Knock in SI and CI engines		1	DM1
49	06/10/2016	Tutorial-8		1	DM2/DM4
50	17/10/2016	Combustion Chambers for CI engines		1	DM1
51	18/10/2016	Combustion Chambers for CI engines		1	DM1
52	19/10/2016	Fuel requirements and Fuel Rating in CI engines		1	DM4
UNIT-IV: Engine Testing and Performance					
53	20/10/2016	Introduction, Parameters of performance		1	DM5/DM6
54	22/10/2016	Measurement of fuel consumption and Air Intake		1	DM1
55	24/10/2016	Measurement of Brake power		1	DM5/DM6
56	25/10/2016	Determination of Frictional power		1	DM1
57	26/10/2016	Tutorial-9		1	DM2
58	27/10/2016	Measurement of Indicated power		1	DM1
59	29/10/2016	Performance tests and problems		1	DM1
60	31/10/2016	Problems on engine performance parameters		1	DM1/DM4
61	01/11/2016	Performance Characteristic curves		1	DM1
62	02/11/2016	Heat balance sheet and Problems		1	DM1/DM6
63	05/11/2016	Tutorial-10		1	DM2

LESSON PLAN

Course Code& Course Name: T216-Internal Combustion engines and Gas Turbines
Programme: B.Tech **Department:** MECHANICAL
Name of the Faculty: Dr.P.Vijay Kumar **SEM: V (B/S)**

UNIT-V: Gas Turbines and Jet propulsion systems					
64	07/11/2016	Introduction, Gas turbines components and its classification		1	DM1/DM6
65	08/11/2016	Analysis of Closed and open cycle gas turbine plants		1	DM1
66	09/11/2016	Methods of improving performance-Intercooler		1	DM1
67	10/11/2016	Methods of improving performance-Regeneration, Reheating		1	DM1
68	15/11/2016	Tutorial-11		1	DM2
69	16/11/2016	Applications, problems on gas turbines		1	DM1
70	17/11/2016	Jet propulsion systems- Turbojet, Turbofan		1	DM1
71	19/11/2016	Turbo propeller		1	DM4
72	21/11/2016	Ram Jet and applications of jet propulsion systems		1	DM1
73	22/11/2016	Tutorial-12		1	DM2
74	23/11/2016	Beyond syllabus		1	DM6
75	24/11/2016	REVISION		1	DM1
76	26/11/2016	REVISION		1	DM1
			Total	76	
Total number of classes required to complete the syllabus					**64**
Total number of classes available as per Schedule					**76**

NOTE: DELIVERY METHODS: **DM1**: Lecture interspersed with discussions/BB, **DM2:** Tutorial, **DM3:** Lecture with a quiz, **DM4**: Assignment/Test, **DM5**: Demonstration (laboratory, field visit), **DM6:** Presentations/PPT

At the End of the course, students attained the **Course Outcomes: CO1, CO2, CO3, CO4, CO5** & sample proofs are enclosed in Course file.

Signature	**Name of the Faculty**	**Course Co-ordinator**	**Module Co-ordinator**	**Programme Co-ordinator**	**HOD**

LESSON PLAN

Course Code& Course Name: T221-INDUSTRIAL MANAGEMENT **SEM:** V

Programme: B.Tech **Department: ME**

SEC-B

S No.	Tentative Date	Topics to be covered	Actual date	No of classes	Content Delivery Methods
UNIT-I INTRODUCTION OF MANAGEMENT					
1.	15-07-16	Management Introduction		1	DM1
2.	16-07-16	Definition, Nature		1	DM1
3.	19-07-16	Importance of management		1	DM1
4.	20-07-16	Functions		1	DM1
5.	21-07-16	Taylor's scientific management theory		1	DM1
6.	22-07-16	Fayal's principles of management		1	DM2
7.	23-07-16	Tutorials		1	DM1
8.	26-07-16	Contribution of Elton mayo		1	DM1
9.	27-07-16	MASLOW theory		1	DM1
10.	28-07-16	Herzberg, douglas, MC Gregor, basic concepts of Orgn.		1	DM1
11.	29-07-16	tutorials		1	DM2
12.	30-07-16	Basic concept of organization :Authority Responsibility		1	DM1
13.	02-08-16	Delegation of Authority and span of control		1	DM1
14.	03-08-16	Departmentation and Decentralization		1	DM1
15.	04-08-16	tutorials		1	DM2
16.	05-08-16	Orgn.structure Line and staff organization		1	DM1
17.	06-08-16	Line and staff organization		1	DM1
18.	09-08-16	Functional organization		1	DM1
19.	09-08-16	Committee Matrix organization		1	DM1
20.	10-08-16	Tutorials		1	DM2
UNIT II: Operations Management					
21.	13-08-16	Operations Management introduction		1	DM1
22.	16-08-16	Plant location Factors influencing location		1	DM1
23.	17-08-16	Principles and types of plant layouts		1	DM1
24.	18-08-16	Methods of production : job batch and mass production		1	DM1
25.	19-08-16	Work study		1	DM1
26.	20-08-16	Basic procedure involved in method study		1	DM1
27.	23-08-16	Work measurement		1	DM1
28.	24-08-16	tutorial		1	DM2
UNIT III:QUALITY AND MATERIAL MANAGEMENT					
29.	27-08-16	quality and materials management		1	DM1
30.	30-08-16	Statistical quality control Meaning		1	DM1
31.	31-08-16	Variables and attributes		1	DM1
32.	01-09-16	X chart R Chart		1	DM1

33.	02-09-16	problems		1	DM1
34.	03-09-16	C Chart PC hart		1	DM1
35.	03-09-16	problems		1	DM1
36.	06-09-16	Acceptance sampling Sampling plans		1	DM1
37.	07-09-16	Deming's contribution to quality		1	DM1
38.	08-09-16	Materials management : objectives		1	DM1
39.	09-09-16	Need for inventory control		1	DM1
40.	10-09-16	Tutorials		1	DM2
41.	13-09-16	Purchase procedure		1	DM1
42.	14-09-16	Store records		1	DM1
43.	15-09-16	EOQ		1	DM1
44.	20-09-16	problems		1	DM1
45.	21-09-16	ABC analysis		1	DM1
46.	22-09-16	Stock levels		1	DM1
47.	23-09-16	Stock level problems		1	DM1
UNIT IV: HUMAN RESOURCES MANAGEMNT					
48.	27-09-16	Concepts of HRM		1	DM1
49.	28-09-16	Concept of hrm		1	DM1
50.	29-09-16	Basic functions of HR manager		1	DM1
51.	30-09-16	Basic functions of HR manager		1	DM1
52.	30-09-16	Man power planning		1	DM1
53.	01-10-16	Selection		1	DM1
54.	04-10-16	Recruitment		1	DM1
55.	05-10-16	Training and development Placement		1	DM1
56.	06-10-16	Wage and salary administration		1	DM1
57.	07-10-16	Promotion		1	DM1
58.	08-10-16	Transfers Separation performance. Appraisal		1	DM1
59.	18-10-16	Job evaluation		1	DM1
60.	19-10-16	merit ranking Tutorials		1	DM1
61.	20-10-16	Tutorials		1	DM2
UNIT V:PROJECT MANAGEMENT					
62.	22-10-16	Early techniques in project management		1	DM1
63.	25-10-16	Network analysis Programme evaluation and review technique (PERT)		1	DM1
64.	26-10-16	Critical path method		1	DM1
65.	27-10-16	Identifying critical path		1	DM1
66.	28-10-16	Problems		1	DM1
67.	29-10-16	Tutorial		1	DM2
68.	01-11-16	Probability of completing project within time		1	DM1
69.	02-11-16	problems		1	DM1
70.	03-11-16	problems		1	DM1
71.	04-11-16	Project crashing		1	DM1
72.	05-11-16	Problems		1	DM1
73.	05-11-16	Problems		1	DM1
74.	08-11-16	II MID EXAM		1	
			Total	74	

	LESSON PLAN
	Course Code& Course Name: T221-INDUSTRIAL MANAGEMENT **SEM:** V **Programme:** B.Tech **Department: ME** **SEC-B**

Total number of classes required to complete the syllabus	65
Total number of classes available as per Schedule	74

NOTE: DELIVERY METHODS (DM):

DM1: Lecture interspersed with discussions/BB,
DM2: Tutorial'
DM3: Lecture with a quiz,
DM4: Assignment/Test,
DM5: Demonstration (laboratory, fieldvisit),
DM6: Presentations/PPT

At the End of the course, students attained the **Course Outcomes: CO1, CO2, CO3, CO4, CO5** & sample proofs are enclosed in Course file.

CO1: Apply management principles to the particle situations to be in a position to know which type of business organization structure suits
CO2: Able to make decision making relating to the problems in operations and production activities there by improving the productivity by proper utilisation input factors by designing the better working methods and with better work study techniques.
CO3: Able to improve quality of working through SQC techniques and also in a position to reduce the investment in materials through better control of inventory
CO4: Able to manage people in working environment with the practices of HRM across corporate businesses
CO5:Able to use PERT & CPM techniques in effective project management to identify critical path and try to complete projects on time as well as reducing the project durations if need arises.

Signature			
	Name of the Faculty	**Name of Course Co-ordinator**	**HOD**
	U.RAMBABU	V.KISHORE REDDY	Dr.V.SREEHARI

LAKIREDDY BALIREDDY COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF MECHANICAL ENGINEERING
LESSON PLAN

Course Name: S308 – Metal Cutting and Machine Tools **Programme: UG**
CLASS: B. Tech **SEM: V (Section – B)** **Branch: Mechanical Engineering**

S No.	Tentative Date	Topics to be covered	Actual Date	No. of classes	Content Delivery Methods
UNIT-I: INTRODUCTION TO ENGINEERING MECHANICS					
1	15-07-2016	**UNIT I: ELEMENTARY TREATMENT OF METAL CUTTING THEORY** Introduction, COs of MC & MT and POs, PEOs		1	DM1/DM6
2	16-07-2016	Elements of cutting process		1	DM1/DM6
3	18-07-2016	Methods of Metal Cutting		1	DM1/DM6
4	20-07-2016	Classification of Cutting Tools		1	DM1/DM6
5	21-07-2016	Geometry of Single Point Cutting Tool		1	DM1/DM6
6	22-07-2016	Numericals		1	DM1/DM6
7	23-07-2016	Numericals		1	DM1/DM6
8	25-07-2016	Chip formation		1	DM1/DM6
9	27-07-2016	**Tutorial - I**		1	DM2 / DM4
10	28-07-2016	mechanism and types of chips		1	DM1/DM6
11	29-07-2016	chip breakers		1	DM1/DM6
12	30-07-2016	Merchant's Force diagram		1	DM1/DM6
13	01-08-2016	measurement of cutting forces		1	DM1/DM6
14	03-08-2016	work done in cutting. Metal cutting theories		1	DM1/DM6
15	04-08-2016	**Tutorial – II, Quiz – I, Assignment - I**		1	DM2 / DM4
16	05-08-2016	Numericals		1	DM1/DM6
17	05-08-2016	Numericals		1	DM1/DM6
18	06-08-2016	Machining parameters - Tool Life		1	DM1/DM6
19	08-08-2016	Tool Failure		1	DM1/DM6
20	09-08-2016	Cutting Tool Materials		1	DM1/DM6
21	11-08-2016	Cutting Fluids		1	DM1/DM6
22	12-08-2016	**Tutorial - III, Quiz – II, Assignment - II**		1	DM2 / DM4
23	13-08-2016	**UNIT – II: ENGINE LATHE:**Introduction		1	DM1/DM6
24	15-08-2016	Principle of working and specification of lathe		1	DM1/DM6
25	17-08-2016	Types of lathes		1	DM1/DM6
26	18-08-2016	Work holders		1	DM1/DM6
27	19-08-2016	tool holders		1	DM1/DM6
28	20-08-2016	Lathe accessories		1	DM1/DM6
29	22-08-2016	**Tutorial - IV**		1	DM2 / DM4
30	24-08-2016	Lathe accessories		1	DM1/DM6
31	25-08-2016	Operations on Lathe		1	DM1/DM6
32	26-08-2016	Operations on Lathe		1	DM1/DM6
33	27-08-2016	Taper turning methods, Thread turning methodology		1	DM1/DM6
34	29-08-2016	lathe attachments		1	DM1/DM6
35	30-08-2016	**Tutorial V, Quiz –III, Assignment - III**		1	DM1/DM6
36	01-09-2016	**UNIT – II: Turret and Capstan Lathes:** Introduction			DM2 / DM4
37	03-09-2016	Principle of working -Collet chucks		1	DM1/DM6
38	04-09-2016	Other work and tool holding devices		1	DM1/DM6
39	05-09-2016	Box and tool layout		1	DM1/DM6
40	07-09-2016	Applications of C & T Lathe			DM1/DM6
41	08-09-2016	Numericals on Lathe parameters			DM1/DM6
42	09-09-2016	Numericals on I Unit			DM1/DM6
43	10-09-2016	Tutorial			DM1/DM6
44	12-09-2016	Numericals			DM1/DM6
45	14-09-2016	Numericals			DM1/DM6
46	15-09-2016	Numericals			DM1/DM6
-	16-09-2016 to 19-09-2016	**I MID EXAMINATIONS**		1	DM1/DM6

47	21-09-2016	**UNIT – III : SHAPING, SLOTTING AND PLANING MACHINES : Introduction**		1	DM1/DM6 & DM3
48	22-09-2016	Introduction to Shaping machine, slotting machine		1	DM1/DM6 & DM3
49	23-09-2016	Introduction to planning machine		1	DM2 / DM4
50	24-09-2016	Principles of working – Principal parts		1	DM1/DM6
51	26-09-2016	Specification		1	DM1/DM6
52	28-09-2016	classification		1	DM1/DM6
53	29-09-2016	Operations performed		1	DM1/DM6
54	30-09-2016	Machining time calculations, Numericals		1	DM1/DM6
55	01-10-2016	**Tutorial - VII**		1	DM2 / DM4
56	03-10-2016	**Drilling and Boring Machines** : Introduction		1	DM1/DM6
57	05-10-2016	Principles of working		1	DM1/DM6
58	06-10-2016	specifications		1	DM1/DM6
59	0710-2016	Types of drilling machines, boring machines		1	DM1/DM6
60	08-10-2016	operations performed		1	DM1/DM6
61	10-10-2016	**Tutorial - VIII**		1	DM2 / DM4
62	12-10-2016	Tool holding devices		1	DM1/DM6
63	13-10-2016	Twist drill		1	DM1/DM6
64	14-10-2016	Boring machines		1	DM1/DM6
65	15-10-2016	Fine boring machines		1	DM1/DM6
66	17-10-2016	Jig Boring machine		1	DM1/DM6
67	19-10-2016	Deep hole drilling machine		1	DM2 / DM4
68	20-10-2016	**Tutorial IX, Quiz – IV, Assignment - IV**		1	DM1/DM6
69	21-10-2016	**UNIT IV : MILLING MACHINES** Principle of working – Specifications		1	DM1/DM6
70	22-10-2016	Classifications of milling machines		1	DM1/DM6
71	24-10-2016	Principal features of horizontal, vertical and universal milling machines		1	DM1/DM6
72	26-10-2016	Machining operations		1	DM1/DM6
73	27-10-2016	**Tutorial - X**		1	DM2 / DM4
74	28-10-2016	Types		1	DM1
75	29-10-2016	Geometry of milling cutters		1	DM1/DM6
76	31-10-2016	Milling cutters		1	DM1/DM6
77	02-11-2016	**Tutorial - XI, Quiz – V, Assignment - V**		1	DM2 / DM4
78	03-11-2016	Methods of indexing – Accessories to milling machines		1	DM1/DM6
79	04-11-2016	Numericals		1	DM1/DM6 & DM3
80	05-11-2016	**Grinding Machines:** Introduction		1	DM1/DM6
81	07-11-2016	Fundamentals – Theory of grinding		1	DM1/DM6
82	09-11-2016	**Tutorial – XII,** Classification of grinding machine		1	DM2 / DM4
83	10-11-2016	Cylindrical and surface grinding machine		1	DM1/DM6
84	11-11-2016	Tool and cutter grinding machine		1	DM1/DM6
85	12-11-2016	special types of grinding machines		1	DM1/DM6
86	14-11-2016	**UNIT – V LAPPING, HONING AND BROACHING MACHINES:** Introduction		1	DM1/DM6
87	16-11-2016	Comparison to grinding – lapping and honing		1	DM1/DM6
88	17-11-2016	Constructional features of speed and feed units		1	DM1/DM6
89	18-11-2016	**Tutorial - XIII , Quiz – VI, Assignment - VI**		1	DM2 / DM4
90	19-11-2016	machining time calculations		1	DM1/DM6
91	21-11-2016	**Jigs and Fixtures:** Introduction		1	DM1/DM6
92	23-11-2016	Principles of design of Jigs and fixtures and uses		1	DM1/DM6
93	24-11-2016	Classification of Jigs & Fixtures		1	DM1/DM6

94	25-11-2016	Principles of location and clamping		1	DM1/DM6
95	26-11-2016	Types of clamping & work holding devices. Typical examples of jigs and fixtures**, Tutorial - XIV , Quiz – V, Assignment - V**		1	DM2 / DM4
-	28-11-2016 to 30-11-2016	**II MID EXAMINATIONS**			
-	01-12-2016 to 07-12-2016	**PRACTICAL EXAMINATIONS AND PREPARATION**			
-	08-12-2016 to 21-12-2016	**END EXAMINATIONS**			
Total				95	
Total number of classes required to complete the syllabus				**95**	
Total number of classes available as per Schedule				**95**	

NOTE: DELIVERY METHODS (DM):
DM1: Lecture interspersed with discussions/BB
DM2: Tutorial
DM3: Lecture with a Quiz
DM4: Assignment/Test
DM5: Demonstration (laboratory, field visit)
DM6: Presentations/PPT

The main objective of this course is to provide overview of metal cutting theory and machine tools.
At the End of the course, students attain the **Course Outcomes CO1, CO2, CO3, CO4 &CO5** and sample proofs are enclosed in Course file.

CO1: Comprehend the basic principles of metal cutting and analyze the forces in machining.

CO2: Understand detailed working and applications of lathe

CO3: Comprehend the detailed working principle and applications on shaper, slotter, planar, drilling and boring machines

CO4: Relate the knowledge of milling and grinding operations with manufacturing industry

CO5: Identify various kinds of finishing processes and different kinds of holding and guiding mechanisms.

TEXT BOOKS

1. R.K. Jain and S.C. Gupta, Production Technology, Khanna publication, 17th edition, 2012**.**
2. H.M.T. (Hindustan Machine Tools), Production Technology, Tata MeGraw Hill, 2009.

REFERENCE BOOKS

1. B.S.Raghu Vamshi ,Workshop Technology, Dhanpat Rai & Co, 10th edition, 2009.
2. Gosh and Malik , Manufacturing Science, East west press Pv.t Ltd., 2nd EDITION, 2011.
3. Kalpakjain S, Manufacturing Engineering & Technology, Pearson Education, 4TH edition 2001.
4. J.P.Kaushish, Manufacturing Processes, PHI, Second Edition, 2010.

Signature					
	Instructor	**Course Co-ordinator**	**Module Co-ordinator**	**Program Co-ordinator**	**HOD**
	Mr. P. Tagore Kumar	Dr. S. Pichi Reddy	Mr. J. Subba Reddy	Dr. S. Pichi Reddy	Dr. K. Appa Rao

LESSON PLAN

Course Code& Course Name: S291 - MACHINE DESIGN - I **SEM:** V (B Section)
Programme: B.Tech **Department:** MECH A.Y:2016-17

S No.	Tentative Date	Topics to be covered	Actual Date	Num. of classes	Content Delivery Methods
Unit-I					
1.	18-07-16	Design - Introduction		1	DM1,DM6
2.	19-07-16	Machine Design-Introduction& Basic Procedure		1	DM1, DM6
3.	20-07-16	Basic requirements of machine elements and Design of Machine Elements		1	DM1, DM6
4.	21-07-16	Design analysis-Design synthesis		1	DM1, DM6
5.	23-07-16	Introduction to Indian standards-Selection of Preferred sizes		1	DM1, DM6
6.	25-07-16	**Tutorial-1**		1	DM2
7.	26-07-16	Modes of failure – Factor of safety		1	DM1, DM6
8.	27-07-16	Stress-strain relationship, Shear stress and shear strain		1	DM1
9.	28-07-16	Stresses due to bending moment		1	DM1
10.	30-07-16	Stresses due to torsional moment		1	DM1
11.	01-08-16	**Tutorial-2**		1	DM2
12.	02-08-16	Eccentric axial loading		1	DM1
13.	03-08-16	Theories of elastic failure – Introduction and Case Study		1	DM1,DM6
14.	04-08-16	Maximum Shear stress theory		1	DM1, DM6
15.	06-08-16	Maximum Shear stress theory		1	DM1
16.	08-08-16	**Tutorial-3**		1	DM2
17.	09-08-16	Maximum principal stress theory		1	DM1, DM6
18	10-08-16	Maximum principal stress theory		1	DM1
19	11-08-16	Distortion energy theory		1	DM1, DM6
20	13-08-16	Distortion energy theory		1	DM1
21	15-08-16	**Tutorial-4**		1	DM2
22	16-08-16	Quiz-1		1	DM3
23	17-08-16	*Beyond Syllabus - Design for Manufacturing and Assembly*		1	DM1,DM6
		Unit-II			
24	18-08-16	Stress concentration & Stress concentration factors		1	DM1, DM6
25	20-08-16	Reduction of stress concentration		1	DM1, DM6
26	22-08-16	Fluctuating stresses		1	DM1, DM6
27	23-08-16	Fatigue failure		1	DM1, DM6
28	24-08-16	Endurance limit – Notch sensitivity		1	DM1, DM6
29	27-08-16	Endurance limit - Approximate estimation		1	DM1, DM6
30	29-08-16	**Tutorial-5**		1	DM2
31	30-08-16	Reversed Stresses		1	DM1, DM6
32	31-09-16	Reversed Stresses		1	DM1
33	01-09-16	Soderberg and Goodman lines-Introduction and Case Study		1	DM1,DM6

34	03-09-16	Soderberg and Goodman lines problems		1	DM1
35	06-09-16	Soderberg and Goodman lines problems		1	DM1
36	07-09-16	Soderberg and Goodman lines Problems, Design for infinite line		1	DM1
37	08-09-16	Quiz-2		1	DM3
38	10-09-16	**Tutorial-6**		1	DM2
39	13-09-16	*Beyond Syllabus-Role of Composite Materials in the Design of Machine Elements*		1	DM1,DM6
		Unit-III			
40	14-09-16	Types of riveted joints and introduction		1	DM1, DM6
41	15-09-16	Types of failures and strength equation, Efficiency of riveted joint		1	DM1
42	17-09-16	Eccentrically loaded riveted joints		1	DM1
43	19-09-16	**Tutorial-7**		1	DM2
44	20-09-16	Eccentrically loaded riveted joints		1	DM1
45	21-09-16	Introduction to welding joints Butt joints-Fillet joints		1	DM1
46	22-09-16	Strength of butt welds		1	DM1, DM6
47	24-09-16	Strength of parallel fillet welds		1	DM1
48	26-09-16	**Tutorial-8**		1	DM2
49	27-09-16	Strength of transverse fillet welds		1	DM1
50	28-09-16	Maximum shear stress in parallel fillet welds		1	DM1
51	29-09-16	Maximum shear stress in transverse fillet welds		1	DM1, DM6
52	01-10-16	Axially loaded unsymmetrical Welded joints		1	DM1
53	03-10-16	**Tutorial-9**		1	DM2
54	04-10-16	Axially loaded unsymmetrical Welded joints		1	DM1, DM6
55	05-10-16	Welded joint subjected to bending moment		1	DM1, DM6
56	06-10-16	Welded joint subjected to bending moment		1	DM1
57	08-10-16	Quiz-3		1	DM3
58	17-10-16	**Tutorial-10**		1	DM2
		Unit-IV			
59	18-10-16	Threaded joints Introduction		1	DM1,DM6
60	19-10-16	Terminology of screw threads and Bolted joints		1	DM1
61	20-10-16	Eccentrically loaded bolted joints in shear		1	DM1
62	22-10-16	Eccentrically loaded bolted joints in shear		1	DM1
63	24-10-16	**Tutorial-11**		1	DM2

64	25-10-16	Eccentric load perpendicular to axis of bolt		1	DM1
65	26-10-16	Eccentric load perpendicular to axis of bolt		1	DM1
66	27-10-16	Bolts of uniform strength		1	DM1
67	29-10-16	Bolts of uniform strength		1	DM1
68	31-10-16	**Tutorial-12**		1	DM2
69	01-11-16	Design of square and flat keys-types, Design of Socket and Spigot cotter joint		1	DM1,DM6
70	02-11-16	Design of Cotter joints		1	DM1,DM5
71	03-11-16	Design of Knuckle joint-Failures		1	DM1,DM5
72	05-11-16	Quiz-4		1	DM3
73	07-11-16	**Tutorial-13**		1	DM2
		UNIT-V			
74	08-11-16	Introduction to transmission shafts		1	DM1, DM6
75	09-11-16	Shaft design on strength basis		1	DM1
76	10-11-16	Shaft design on torsional and strength basis		1	DM1, DM6
77	12-11-16	Shaft design on torsional and strength basis problem and ASME code for shaft design		1	DM1
78	14-11-16	**Tutorial-14**		1	DM2
79	15-11-16	Design of hollow shaft on strength and torsional rigidity basis		1	DM1, DM6
80	16-11-16	Design of hollow shaft on strength and torsional rigidity basis		1	DM1
81	17-11-16	Design of hollow shaft on strength and torsional rigidity basis		1	DM1
82	19-11-16	Flange coupling		1	DM1,DM6
83	21-11-16	**Tutorial-15**		1	DM2
84	22-11-16	Muff coupling		1	DM1, DM6
85	23-11-16	Clamp coupling		1	DM1, DM6
86	24-11-16	Bushed pin flexible coupling		1	DM1, DM6
87	26-11-16	Quiz-5		1	DM3
		Beyond the syllabus topics are scheduled at the end of units 1&2 Topic 1: Design for Manufacturing And Assembly (17-8-16) Topic 2: Role of composite material in the design of machine elements(13-09-16)			
Total number of classes required to complete the syllabus					**85**
Total number of classes available as per Schedule					**87**

LESSON PLAN

Course Code& Course Name: S291 - MACHINE DESIGN - I **SEM:** V (B Section)

Programme: B.Tech **Department:** MECH A.Y:2016-17

NOTE: DELIVERY METHODS: **DM1**: Lecture interspersed with discussions/BB, **DM2:** Tutorial, **DM3:** Lecture with a quiz, **DM4**: Assignment/Test, **DM5**: Demonstration (laboratory, field visit), **DM6:** Presentations/PPT

At the End of the course, students attained the **Course Outcomes: CO1, CO2, CO3, CO4 and CO5**

CO1: Formulate and analyze stresses and strains in machine elements and structures subjected to different loads.
CO2: Evaluate the stress distribution and analyze the failure criterion of mechanical parts under fatigue loads.
CO3: Comprehend the design of permanent joints.
CO4: Analyze the bolts and nuts subjected to axial and eccentric loads.
CO5: Design shaft and shaft couplings for various engineering applications.

Signature					
	Course Instructor	**Course Coordinator**	**Module Coordinator**	**Program Coordinator**	**HOD**
	V.Venkatesu	K.V.Viswanadh	B Sudheer Kumar	Dr. S. Pichi Reddy	Dr. K. Appa Rao

LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING (AUTONOMOUS)
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Laboratory Code	**: L 156**	**Lab:**	**Machine Tools LAB**
Class	**: B. Tech – V Semester (Section – B)**	**A.Y.**	**: 2016-17 (Mech Engg)**
Lab/Practicals	**: 3 hrs/ Week**	**Continuous Internal Assessment**	**: 25**
Credits	**: 02**	**Semester End Examination**	**: 75**
Name of the Faculty	**:** J. Subba Reddy (Associate Professor) /	P. Tagore Kumar (Assistant Professor)	

CEOs and COs

Course Educational Objectives (CEOs):

The main objective of this course is to impart practical exposure on various machine tools used in industry.

Course Outcomes (Cos):

After completion of the course students will be able to:

1. Exhibit the ability in developing sequence of machining operations required for to prepare a machine element.
2. Capable of manufacturing components according to given drawings on various machine tools.

Faculty in charge **HOD**

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Credits	**: 02**	**Semester End Examination**	**: 75**
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LIST OF EXPERIMENTS

At least 06 experiments are to be conducted:

LIST OF EXPERIMENTS:

1. To perform the step turning operation and taper turning operation on a given M.S. work piece
2. To perform knurling operation and threading operation on a given M.S. work piece
3. To form and grind the given work piece (square rod) into single point cutting tool
4. To cut spur gear on a given M.S.Round blank using milling machine.
5. To cut a rectangular groove (or key way) with given dimensions on work piece using Shaping machine.
6. To perform drilling and tapping operations on a given M.S. plate using universal drilling machine.
7. To prepare a smooth flat surface on M.S.flat using surface Grinding machine.

STUDY EXPERIMENTS:

1. Study the principal parts and specifications of Lathe Machine.
2. Study the principal parts and specifications of Capstan and Torrent Lathe Machine
3. Study the principal parts and specifications of Universal Drilling Machine
4. Study the principal parts and specifications of Horizontal Milling Machine
5. Study the principal parts and specifications of Shaper Machine
6. Study the principal parts and specifications of Planar Machine
7. Study the principal parts and specifications of Slotter Machine
8. Study the principal parts and specifications of Surface Grinding Machine
9. Study the principal parts and specifications of Tool Cutter
10. Study the principal parts and specifications of CNC Turing Machine
11. Study the principal parts and specifications of CNC Milling Machine

REFERENCES

Lab Manual

Faculty in charge **HOD**

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Credits	**: 02**	**Semester End Examination**	**: 75**
Name of the Faculty	**:** J. Subba Reddy (Associate Professor) / P. Tagore Kumar (Assistant Professor)		

Batches (Section – B)

Total No. of students	**: 14761A0361 – 381, 383 – 387, 389 – 399, 3A0 – 3C0, 15765A0315 - 328**		
		=	**72**
Batch B1	**: 14761A0361 – 378**	**=**	**18**
Batch B2	**: 14761A0379 – 381, 383 – 387, 389 - 398**	**=**	**18**
Batch B3	**: 14761A0399, 3A0 – 3B6**	**=**	**18**
Batch B4	**: 14761A03B7 – 3C0, 15765A0315 – 328**	**=**	**18**

Sub Batches of B1:

S. No	Batch	Registered Nos	Total
1	B11	14761A0361 – 363	03
2	B12	14761A0364 – 366	03
3	B13	14761A0367 – 369	03
4	B14	14761A0370 – 372	03
5	B15	14761A0373 – 375	03
6	B16	14761A0376 – 378	03
Total (A1)			18

Sub Batches of B2:

S. No	Batch	Registered Nos	Total
1	B21	14761A0379 – 381	03
2	B22	14761A0383 – 385	03
3	B23	14761A0386, 387, 389	03
4	B24	14761A0390 – 392	03
5	B25	14761A0393 – 395	03
6	B26	14761A0396 – 398	03
Total (A2)			18

Sub Batches of B3:

S. No	Batch	Registered Nos	Total
1	B31	14761A0399, 3A0, 3A1	03
2	B32	14761A03A2 – 3A4	03
3	B33	14761A03A5 – 3A7	03
4	B34	14761A03A8 – 3B0	03
5	B35	14761A03B1 – 3B3	03
6	B36	14761A03B4 – 3B6	03
Total (A3)			18

Sub Batches of B4:

S. No	Batch	Registered Nos	Total
1	B41	14761A03B7 – 3B9	03
2	B42	14761A03C0, 15765A0315 – 316	03
3	B43	15765A0317 – 319	03
4	B44	15765A0320 – 322	03
5	B45	15765A0323 – 325	03
6	B46	15765A0326 – 328	03
Total (A4)			18

Faculty in charge **HOD**

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Lab/Practicals	**: 3 hrs/ Week**	**Continuous Internal Assessment**	**: 25**
Credits	**: 02**	**Semester End Examination**	**: 75**
Name of the Faculty	**:** J. Subba Reddy (Associate Professor) / P. Tagore Kumar (Assistant Professor)		

Notification of Cycles (Section – B)

Cycle – I:

1. To perform the step turning operation and taper turning operation on a given M.S. work piece **(Ex – 1)**
2. To perform knurling operation and threading operation on a given M.S. work piece **(Ex – 2)**
3. To form and grind the given work piece (square rod) into single point cutting tool **(Ex – 3)**

Cycle – II:

4. To cut spur gear on a given M.S.Round blank using milling machine **(Ex – 4)**
5. To cut a rectangular groove (or key way) with given dimensions on work piece using Shaping machine **(Ex – 5)**
6. To perform drilling and tapping operations on a given M.S. plate using universal drilling machine **(Ex – 6)**
7. To prepare a smooth flat surface on M.S.flat using surface Grinding machine **(Ex – 6)**

Cycle – III:

STUDY EXPERIMENTS:

1. Study the principal parts and specifications of Lathe Machine. **(SE – 1)**
2. Study the principal parts and specifications of Capstan and Torrent Lathe Machine. **(SE – 2)**
3. Study the principal parts and specifications of Universal Drilling Machine **(SE – 3)**
4. Study the principal parts and specifications of Horizontal Milling Machine **(SE – 4)**
5. Study the principal parts and specifications of Shaper Machine **(SE – 5)**
6. Study the principal parts and specifications of Planar Machine **(SE – 6)**
7. Study the principal parts and specifications of Slotter Machine **(SE – 7)**
8. Study the principal parts and specifications of Surface Grinding Machine **(SE – 8)**
9. Study the principal parts and specifications of Tool Cutter **(SE – 9)**
10. Study the principal parts and specifications of CNC Turing Machine **(SE – 10)**
11. Study the principal parts and specifications of CNC Milling Machine **(SE – 11)**

Faculty in charge **HOD**

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Lab/Practicals	**: 3 hrs/ Week**	**Continuous Internal Assessment**	**: 25**
Credits	**: 02**	**Semester End Examination**	**: 75**
Name of the Faculty	**:** J. Subba Reddy (Associate Professor) / P. Tagore Kumar (Assistant Professor)		

Lab Time Table (Section – B)

Time→ Day ↓	1 09.00 to 09.50	2 09.50 to 10.40	10.40 to 10.50	3 10.50 to 11.40	11.40 to 12.20	4 12.20 to 01.10	5 01.10 to 02.00	6 02.00 to 02.50	7 02.50 to 03.40
Monday			Tea Break		LUNCH BREAK		MT Lab – V Sem – ME (A/S) B_1		
Tuesday							MT Lab – V Sem – ME (B/S) B_1		
Wednesday									
Thursday	MT Lab – V Sem – ME (A/S) B_2								
Friday	MT Lab – V Sem – ME (B/S) B_2								
Saturday			Tea Break						

Faculty in charge **HOD**

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Class	**: B. Tech – V Semester (Section – B)**	**A.Y.**	**: 2016-17 (Mech Engg)**
Lab/Practicals	**: 3 hrs/ Week**	**Continuous Internal Assessment**	**: 25**
Credits	**: 02**	**Semester End Examination**	**: 75**

Name of the Faculty : J. Subba Reddy (Associate Professor) / P. Tagore Kumar (Assistant Professor)

Schedule of Experiments (Section – B)

(Batch – B1) - 14761A0361 – 378 (= 18):

Date	Experiment (Batch)					
	Ex - 1	Ex – 2	Ex – 3	Ex – 4	Ex – 5	Ex – 6
19-07-2016	Demonstration of all experiments, CEOs and COs of the Laboratory (SE – 1 to 11)					
26-07-2016	Demonstration of all experiments, CEOs and COs of the Laboratory (SE – 1 to 11)					
02-08-2016	B11	B12	B13	B14	B15	B16
09-08-2016	B13	B11	B12	B16	B14	B15
16-08-2016	B12	B13	B11	B15	B16	B14
23-08-2016	B14	B15	B16	B11	B12	B13
30-08-2016	B16	B14	B15	B13	B11	B12
06-09-2016	B15	B16	B14	B12	B13	B11
13-09-2016	Preparation of single point cutting tool					
22-11-2016	INTERNAL EXAMINATION					

(Batch – B2) – 14761A0379 – 381, 383 – 387, 389 – 398 (= 18):

Date	Experiment (Batch)					
	Ex – 1	Ex – 2	Ex – 3	Ex – 4	Ex – 5	Ex – 6
19-07-2016	Demonstration of all experiments, CEOs and COs of the Laboratory (SE – 1 to 11)					
26-07-2016	Demonstration of all experiments, CEOs and COs of the Laboratory (SE – 1 to 11)					
20-09-2016	B21	B22	B23	B24	B25	B26
27-09-2016	B23	B21	B22	B26	B24	B25
04-10-2016	B22	B23	B21	B25	B26	B24
18-10-2016	B24	B25	B26	B21	B22	B23
25-10-2016	B26	B24	B25	B23	B21	B22
01-11-2016	B25	B26	B24	B22	B23	B21
08-11-2016	Preparation of single point cutting tool					
15-11-2016	Backlog experiments					
22-11-2016	INTERNAL EXAMINATION					

Faculty in charge **HOD**

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Laboratory Code	**: L 156**	**Lab:**	**Machine Tools LAB**
Class	**: B. Tech – V Semester (Section – B)**	**A.Y.**	**: 2016-17 (Mech Engg)**
Lab/Practicals	**: 3 hrs/ Week**	**Continuous Internal Assessment**	**: 25**
Credits	**: 02**	**Semester End Examination**	**: 75**

Name of the Faculty : J. Subba Reddy (Associate Professor) / P. Tagore Kumar (Assistant Professor)

Schedule of Experiments (Section – B)

(Batch – B3) - 14761A0399, 3A0 – 3B6 (= 18):

Date	Experiment (Batch)					
	Ex - 1	Ex – 2	Ex – 3	Ex – 4	Ex – 5	Ex – 6
15-07-2016	Demonstration of all experiments, CEOs and COs of the Laboratory (SE – 1 to 11)					
22-07-2016	Demonstration of all experiments, CEOs and COs of the Laboratory (SE – 1 to 11)					
29-07-2016	B31	B32	B33	B34	B35	B36
05-08-2016	B33	B31	B32	B36	B34	B35
12-08-2016	B32	B33	B31	B35	B36	B34
19-08-2016	B34	B35	B36	B31	B32	B33
26-08-2016	B36	B34	B35	B33	B31	B32
02-09-2017	B35	B36	B34	B32	B33	B31
09-09-2016	Preparation of single point cutting tool					
25-11-2016	INTERNAL EXAMINATION					

(Batch – B4) - 14761A03B7 – 3C0, 15765A0315 – 328 (= 18):

Date	Experiment (Batch)					
	Ex - 1	Ex – 2	Ex – 3	Ex – 4	Ex – 5	Ex – 6
15-07-2016	Demonstration of all experiments, CEOs and COs of the Laboratory (SE – 1 to 11)					
22-07-2016	Demonstration of all experiments, CEOs and COs of the Laboratory (SE – 1 to 11)					
23-09-2016	B41	B42	B43	B44	B45	B46
30-09-2016	B43	B41	B42	B46	B44	B45
07-10-2016	B42	B43	B41	B45	B46	B44
21-10-2016	B44	B45	B46	B41	B42	B43
28-10-2016	B46	B44	B45	B43	B41	B42
04-11-2016	B45	B46	B44	B42	B43	B41
11-11-2016	Preparation of single point cutting tool					
18-11-2016	Backlog experiments					
25-11-2016	INTERNAL EXAMINATION					

Faculty in charge **HOD**

S. No:	Tentative Date	Topics to be covered	Actual Date	Num. of classes	Content Delivery Methods
UNIT I – LINEAR PROGRAMMING					
1	15-07-16	CEO's &CO's of the OperationsResearch Introduction to Operations Research		1	DM1,DM6
2	16-07-16	Development and Definition Characteristics ,Phases and Applications		1	DM1
3	19-07-16	Definition and formulation LPP		1	DM1
4	20-07-16	Introduction to LPP using Graphical method		1	DM1
5	21-07-16	**Tutorial 1**		1	DM2
6	22-07-16	LP Problems using Graphical method		1	DM1
7	23-07-16	Graphical Solution for LP problems		1	DM1
8	26-07-16	LPP using Simplex Method		1	DM1
9	27-07-16	Problems on Simplex method for obtaintaing Maximization profit.		1	DM1
10	28-07-16	**Tutorial 2**		1	DM2
11	29-07-16	Problems on Simplex method for obtain Minimization time.		1	DM1
12	30-07-16	Artificial Variables Techniques Big-M method with problems		1	DM1
13	02-08-16	Problems on Big-M method		1	DM1
14	03-08-16	Two-Phase simplex method			DM1
15	04-08-16	Problems on Two-Phase simplex method		1	DM1
16	05-08-16	**Tutorial 3**		1	DM2
17	06-08-16	**Assignment/Quiz Test**		1	DM3,DM4
UNIT II – TRANSPORTATION & ASSIGNMENT PROBLEMS					
18	09-08-16	Transportation Model and Formulation, Basic Feasible solution using NWCM with problems		1	DM1, DM6
19	10-08-16	Row minima, Column minima and Least cost methods with problems		1	DM1
20	11-08-16	Penalty method with problems		1	DM1
21	13-08-16	MODI or U-V method for obtain Optimal solution to problems		1	DM1
22	16-08-16	**Tutorial 4**		1	DM2
23	17-08-16	MODI or U-V method for obtain Optimal solution to problems		1	DM1
24	18-08-16	Problems on Degeneracy		1	DM1
25	19-08-16	Problems on Degeneracy		1	DM1
26	20-08-16	Unbalanced transportation problems		1	DM1
27	23-08-16	**Tutorial 5**		1	DM2
28	24-08-16	Assignment Problems Definition, Hungarian Method		1	DM1

29	26-08-16	Assignment Problems		1	DM1
30	27-08-16	Variations in Assignment problems		1	DM1
31	30-08-16	Travelling Salesman problems,		1	DM1
32	31-08-16	Travelling Salesman problems		1	DM1
33	01-09-16	**Tutorial 6**		1	DM2
34	02-09-16	**Assignment/Quiz Test**		1	DM3,DM4
UNIT – III THEORY OF GAMES & INVENTORY CONTROL					
35	03-09-16	Theory of Games introduction		1	DM1,DM6
36	06-09-16	Problems on Minimax (maximin) Criterion modals		1	DM1
37	07-09-16	optimal strategy for problems		1	DM1
38	08-09-16	Solution of games with saddle points problems		1	DM1
39	09-09-16	**Tutorial 7**		1	DM2
40	10-09-16	Problems on Rectangular games without saddle points		1	DM1
41	13-09-16	Problems on dominance principle – m X 2 & 2 X n games		1	DM1
42	14-09-16	Problems solving by graphical method		1	DM1
43	15-09-16	Problems solving by graphical method			DM1
44	20-09-16	**Tutorial 8**		1	DM2
45	21-09-16	Inventory Control introduction		1	DM1,DM6
46	22-09-16	Problems on EOQ model Shortages not allowed		1	DM1
47	23-09-16	Problems on Deterministic models		1	DM1
48	24-09-16	Problems on Probabilistic models		1	DM1
49	27-09-16	Problems on Price breaks		1	DM1
50	28-09-16	**Tutorial 9**		1	DM2
51	29-09-16	**Assignment/Quiz Test**		1	DM3,DM4
UNIT IV – THEORY OF REPLACEMENT & WAITING LINES					
52	30-09-16	Theory of Replacement Introduction		1	DM1,DM6
53	01-10-16	Replacement of Equipment that Deteriorates Gradually		1	DM1
54	04-10-16	Problems on above modals		1	DM1
55	05-10-16	Replacement of Equipment that fails suddenly and Group Replacement policy		1	DM1
56	06-10-16	**Tutorial 10**		1	DM2
57	07-10-16	Problems on Group Replacement policy		1	DM1
58	08-10-16	Problems on Group Replacement policy		1	DM1
59	18-10-16	Waiting Lines Introduction		1	DM1,DM6
60	19-10-16	Elements and Characteristics and classification		1	DM1
61	20-10-16	**Tutorial 11**		1	DM2
62	21-10-16	Poisson arrivals with exponential service, Infinite population models Problems on Single channel,		1	DM1

63	22-10-16	Problems on above modal		1	DM1
64	25-10-16	Problems on above modal		1	DM1
65	26-10-16	Problems on Single channel Poisson arrivals with exponential service time Finite population Restricted Queue Model		1	DM1
66	27-10-16	**Tutorial 12**		1	DM2
67	28-10-16	Problems on above modal		1	DM1
68	29-10-16	Problems on above modal		1	DM1
69	01-11-16	Multi-channel exponential service time infinite population and un restricted queue.		1	DM1
70	02-11-16	Problems on above modal		1	DM1
71	03-11-16	**Tutorial 13**		1	DM2
72	04-11-16	**Assignment/Quiz Test**		1	DM3,DM4
UNIT V – DYNAMIC PROGRAMMING & INTRODUCTION TO OPTIMIZATION					
73	05-11-16	Dynamic Programming-Introduction and Formulation		1	DM1,DM6
74	08-11-16	Bellman's principle of optimality		1	DM1
75	09-11-16	Problems on application of DP		1	DM1
76	10-11-16	Problems on Capital budgeting		1	DM1
77	11-11-16	**Tutorial 14**		1	DM2
78	12-11-16	Solving LPP using dynamic programming		1	DM1
79	15-11-16	Problems on above Modals		1	DM1
80	16-11-16	Introduction To Optimization-Engineering Applications of Optimization		1	DM1,DM6
81	17-11-16	Problem Statement – Design Vector, Design Constraints, Constraint surface,Objective function, Objective function Surfaces.		1	DM1
82	18-11-16	**Tutorial 15**		1	DM2
83	19-11-16	Classification of optimization problems		1	DM1
84	22-11-16	Introduction on Optimization Techniques		1	DM1
85	23-11-16	Single-variable Optimization with problems		1	DM1
86	24-11-16	Problems on Single-variable Optimization		1	DM1
87	25-11-16	**Tutorial 16**		1	DM2
88	26-11-16	**Assignment/Quiz Test**			DM3,DM4
Total				**88**	
Total number of classes required to complete the syllabus				**67**	
Total number of classes available as per Schedule(Tutorial, Assignment/Quiz Test)				**88**	

NOTE: DELIVERY METHODS:

DM1: Lecture interspersed with discussions/BB,
DM2: Tutorial,
DM3: Lecture with a quiz,
DM4: Assignment/Test,
DM5: Demonstration (laboratory, field visit),
DM6: Presentations/PPT

Course Outcomes:

After completion of the course student will be able to:

1. Develop mathematical models for real engineering problems.
2. Demonstrate the familiarity in identifying the key parameters influencing the production cost.
3. Exhibit knowledge in solving inventory control problems.
4. Choose optimal strategy using OR techniques.

At the End of the course, students attained the
Course Outcomes: CO1, CO2, CO3, CO4, CO5& sample proofs are enclosed in Course file.

TEXT BOOK

1. Kantiswarup. P.K.Gupta, Man Mohan, Operations Research, Sultan Chand& Sons, Educational Publications, New Delhi, 14th Edition, 2008.
2. Hiller &Libermann, Introduction to O.R (TMH), 9thEdition, 2009

REFERENCES

1. Singiresu S Rao, Engineering Optimization: Theory and Practice, A Wiley-Interscience Publication, 4th edition,2009.

	Course Instructor	Course Coordinator	Module Coordinator	Programme Coordinator	HOD
Signature					
	Mr.T.VENKATESWARA RAO	**Mr.T.VENKATESWARA RAO**	**Mr.J.SUBBA REDDY**	**Dr.PICHI REDDY**	**Dr.K.APPA RAO**