SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Department of Mechanical Engineering		LP: ME18201 Rev. No: 01 Date: 12/04/2022
B.E/B.Tech/M.E/M.Tech : Mechanical Engineering	Regulation: 2018	
PG Specialisation : NA		
Sub. Code / Sub. Name : ME18201 – Engineering Mechanics		
Unit : 1		

Unit Syllabus: UNIT I - BASICS AND STATICS OF PARTICLES

Introduction - Units and Dimensions - Laws of Mechanics - Principle of transmissibility - Parallelogram and triangular Law of forces - Vectorial representation of forces - Vector operations of forces - additions, subtraction, dot product, cross product - Coplanar Forces - rectangular components - Equilibrium of a particle - Lami's theorem - Forces in space - Equilibrium of a particle in space - Equivalent systems of forces.

Objective:
To understand the laws of mechanics, its concept of equilibrium of particles for rigid bodies.

Session No *	Topics to be covered	Ref	Teaching Aids Ref. No
1	Introduction to Mechanics - Classification - Basic Concepts involved in Mechanics - Importance and types of Units and dimensions	1 – Pg.No : 3 to 10	BB & PPT
2	Explanation of Lami's theorem, Parallelogram and triangular Law of forces with application problems.	2 – Pg.No: 18 to 23	BB & PPT
3	Resolution of forces in scalar and vector approach with Problems, Equilibrium of particles	1 – Pg.No : 27 to 31	BB & PPT
4	Problems in Equilibrium of particles.	1 – Pg.No : 36 to 39	BB & PPT
5	***Tutorial – 1 (Activity based Assignment - Experimental learning)***	-	-
6	Demonstration of Free body diagram, Derivation of Equilibrium of a particle with coplanar concurrent forces and its practical application	1 – Pg.No: 159 to 162	BB & PPT
7	Problems related to Free body diagram	2 – Pg.No: 166 to 171	BB & PPT
8	Introduction to particles in space, Problems in noncoplanar concurrent forces using vector approach	1 – Pg.No: 45 to 58	BB & PPT
9	Application problems in noncoplanar concurrent forces, Equivalent system of forces	2 – Pg.No: 88 to 90	BB & PPT
10	***Tutorial – 2 (Quiz & Descriptive type – Participative learning)***	-	-
Content beyond syllabus covered (if any):			

* Session duration: 50 minutes

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Sub. Code / Sub. Name: ME18201 – Engineering Mechanics

Unit : II

Unit Syllabus: STATICS OF RIGID BODIES AND ANALYSIS OF STRUCTURES

STATICS OF RIGID BODIES: External, Internal forces - moment of a force - varignon's theorem - moment of a couple - resolution of a force into a force and a couple - reduction of a system of forces - reactions at supports and connections - equilibrium of a two and three force bodies - case studies.

ANALYSIS OF STRUCTURES: Simple trusses - Method of joints, method of sections - joints under special loading conditions - space trusses - analysis of frames.

Objective:

To understand the fundamentals of moment and couple and to analyse the structures for frames and trusses.

Session No *	Topics to be covered	Ref	Teaching Aids Ref. No
11	Explanation of Varignon's theorem, Establishment of Equivalent force and couple system and Single equivalent force system	1 – Pg.No: 83, 97 to 108	BB & PPT
12	Explanation of various types of supports and their reaction forces. Types of beams. Problems in beams under static loads.	1 – Pg.No: 162 to 164	BB & PPT
13	Establishment of Equilibrium conditions of a rigid body subjected to planar non-concurrent forces - Construction of Free body diagram	1 – Pg.No: 170 to 184	BB & PPT
14	Application problems in Coplanar Non-concurrent forces	2 – Pg.No: 110 to 112, 182 to 185	BB & PPT
15	***Tutorial – 3 (Quiz & Descriptive type – Participative learning)***	-	-
16	Introduction to Simple trusses, Problems in simple trusses using Method of Joints	1 – Pg.No: 286 to 296	BB & PPT
17	Problems in simple trusses using Method of Sections	1 – Pg.No: 304 to 308	BB & PPT
18	Application of trusses, Problems in trusses under special conditions	1 – Pg.No: 311 to 315	BB & PPT
19	Introduction to space trusses and frames.	1 – Pg.No: 316 to 318	BB & PPT
20	Tutorial – 4 ***(Descriptive type – Participative learning)***	-	-
Content beyond syllabus covered (if any):			

* Session duration: 50 mins

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Sub. Code / Sub. Name: ME18201 – Engineering Mechanics

Unit : III

Unit Syllabus: CENTROID, CENTRE OF GRAVITY AND MOMENT OF INERTIA

Centroids of areas, composite areas, Theorems of Pappus and Guldinus- Parallel axis theorem and perpendicular axis theorem - determination of moment of inertia of plane figures, polar moment of inertia-radius of gyration - mass moment of inertia of simple solids.

Objective:

To make the student know the concept of centroid, first moment of area and second moment of area for various sections. Also, polar and mass moments of inertia and their practical applications.

Session No *	Topics to be covered	Ref	Teaching Aids Ref. No
21	Introduction to properties of surfaces - Explanation of First moment of area - Determination of Centroid for rectangle, triangle and circular sections by integration method	2 – Pg.No: 331 to 346	BB & PPT
22	Determination of centroid for composite sections - Problems	2 – Pg.No: 350 to 354	BB & PPT
23	Problems in Composite section using standard formula, Introduction to Moment of Inertia.	1 – Pg.No: 473 to 475	BB & PPT
24	Pappus and Guldinus theorem, Parallel axis theorem and perpendicular axis theorems and its explanation	2 – Pg.No: 358,379,380	BB & PPT
25	***Tutorial – 5 (Activity based Assignment - Experimental learning)***	-	-
26	Determination of Moment of Inertia for T section, Hollow section by using standard formula - Radius of gyration	1 – Pg.No: 476 to 482	BB & PPT
27	Determination of Moment of Inertia for I section, Angled section by using standard formula		
28	Introduction to Polar Moment of Inertia with Problems	1 – Pg.No: 488 to 489	BB & PPT
29	Determination of Mass moment of Inertia for simple solids	1 – Pg.No: 512 to 520	BB & PPT
30	***Tutorial – 6 (Quiz & Descriptive type – Participative learning)***	-	-

Content beyond syllabus covered (if any):

* Session duration: 50 mins

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Sub. Code / Sub. Name: ME18201 – Engineering Mechanics

Unit: IV

Unit Syllabus: DYNAMICS OF PARTICLES

KINEMATICS: Introduction-plane, rectilinear and rotary motion-time dependent motion - rectangular coordinates - projectile motion.

KINETICS: Equation of motion - rectilinear and rotary motion - Newton's II law - D'Alembert's principle - Energy - potential energy - kinetic energy - conservation of energy - work done by a force - work energy method.

IMPULSE AND MOMENTUM: Concept of conservation of momentum - Impulse-Momentum principle - Impact - Direct central impact, oblique central impact, impact of a moving train on the spring board.

Session No *	Topics to be covered	Ref	Teaching Aids Ref. No
31	Introduction to Kinematics, Explanation of Rectilinear motion, Displacement, Velocity, Acceleration and their relationships, Problems in rectilinear motion.	1 – Pg.No: 602 to 611	BB & PPT
32	Application Problems related to rectilinear and rotary motion	1 – Pg.No: 614 to 615	BB & PPT
33	Introduction to curvilinear motion, Problems in Projectile motion	1 – Pg.No: 641 to 660	BB & PPT
34	Introduction to Kinetics, Equation of Motion, Problems related to D'Alembert's Principle	1 – Pg.No: 692 to 703	BB & PPT
35	***Tutorial – 7 (Quiz & Descriptive type – Participative learning)***	-	-
36	Explanation of Potential energy, Kinetic energy, Work – Energy method with problems	1 – Pg.No: 756 to 768	BB & PPT
37	Problems based on Impulse – Momentum method	1 – Pg.No: 809 to 811	BB & PPT
38	Impact of elastic bodies, different types - Problems	1 – Pg.No: 821 to 830	BB & PPT
39	Impact of a moving train on the spring board – Problems	1 – Pg.No: 832 to 840	BB & PPT
40	***Tutorial – 8 (Descriptive type – Participative learning)***	-	-

Content beyond syllabus covered (if any):

* Session duration: 50 mins

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Sub. Code / Sub. Name: ME18201 – Engineering Mechanics

Unit : V

Unit Syllabus:

FRICTION: Laws of dry friction - angles of friction-coefficient of static and kinetic friction - wedges - surface contact friction - belt friction - journal bearings - axle friction - thrust bearings - disc friction - Point contact friction - wheel friction - rolling resistance - case studies

Objective:

To make the students understand the concept of frictional forces, Laws of friction and the effect of frictional force on belt and rolling resistance.

Session No *	Topics to be covered	Ref	Teaching Aids Ref. No
41	Introduction to Friction force -Explanation of Laws of Friction, Single body on horizontal and inclined plane under external forces	1 – Pg.No: 410 to 416	BB & PPT
42	Explanation of Two bodies in contact- Practical Examples		
43	Practical examples wedge friction and block friction	1 – Pg.No: 429, 430	BB & PPT
44	Calculation of ladder friction with problems	2 – Pg.No: 321 to 322	BB & PPT
45	***Tutorial – 9 (Descriptive type – Participative learning)***	-	-
46	Introduction to surface contact friction, Problems in simple belt friction	1 – Pg.No: 449	BB & PPT
47	Introduction to bearings, Journal bearing, thrust bearing, Disc friction and axle friction problems	1 – Pg.No: 439 , 440	BB & PPT
48	Problems in Wheel friction and Rolling resistance	1 – Pg.No: 442 to 445	BB & PPT
49	Application of friction Case studies with Problems	1 – Pg.No: 460 to 463	BB & PPT
50	***Tutorial – 10 (Descriptive type – Participative learning)***	-	-
Content beyond syllabus covered (if any):			

* Session duration: 50 mins

TEXT BOOKS:

1. Beer F.P and Johnston Jr. E.R, "Vector Mechanics for Engineers (In SI Units): Statics and Dynamics", Nineth Edition, Tata McGraw-Hill Publishing Company, New Delhi, 2011.

2. Hibbeller R.C and Ashok Gupta, "Engineering Mechanics: Statics and Dynamics", 11th Edition, Pearson Education, 2010.

3. Rajasekaran S and Sankarasubramanian G, "Engineering Mechanics Statics and Dynamics", 3rd Edition, Vikas Publishing House Pvt. Ltd., 2005.

REFERENCES:

1. Bhavikatti S.S and Rajashekarappa, K.G, "Engineering Mechanics", New Age International (P) Limited Publishers, 2005.

2. Irving H. Shames and Krishna Mohana Rao G., "Engineering Mechanics - Statics and Dynamics", 4th Edition, Pearson Education, 2006.

3. Meriam J.L and Kraige L.G, "Engineering Mechanics - Statics - Volume 1, Dynamics Volume 2", Third Edition, John Wiley & Sons,1993.

4 Vela Murali, "Engineering Mechanics", Oxford University Press, 2010.

ONLINE RESOURCES:

S.No	Topics	Online resources Link	Mapping
1	Newton's First law	https://youtu.be/5oi5j11FkQg	UNIT - 1
2	Free body diagram	https://youtu.be/4Bwwq1munB0	
3	Inertia and Mass	https://youtu.be/YbWjx3LUc0U	
4	Moment of force	https://youtu.be/22VGQM1jCn8	UNIT - 2
5	Torque and Moment difference	https://youtu.be/zXxrAJld9mo	
6	Centroid	https://youtu.be/nqg6VaK02JA	UNIT - 3
7	First Moment and Second Moment of Area	https://youtu.be/p27blDG-GiQ	
8	Area Moment of Inertia	https://youtu.be/Bls5KnQOWkY	
9	Distance and displacement	https://youtu.be/21BwUNDOQno	UNIT - 4
10	Equation of motion	https://youtu.be/xViRvJxTu6k	
11	Static friction	https://youtu.be/9SMp-jnh8lg	UNIT – 5
12	Rolling friction	https://youtu.be/HRe90ySP38U	
13	Momentum	https://youtu.be/CEz3cpkno3Y	

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

	Prepared by	Approved by
Signature	M.M 7/12/22	
Name	Mr. M. Maheswaran	Dr. M. Mohandass
Designation	Assistant Professor	Associate Professor/Assistant HOD
Date	12/04/22	12/04/2022
Remarks *:		
Remarks *:		

* If the same lesson plan is followed in the subsequent semester/year it should be mentioned and signed by the Faculty and the HOD

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - LABORATORY

Department of Mechanical Engineering	LP: ME18211 Rev. No: 01
B.E/B.Tech/M.E/M.Tech : Mechanical Engineering Regulation: 2018 PG Specialisation : NA Sub. Code / Sub. Name : ME18211 – Machine drawing laboratory	Date: 12/04/2022

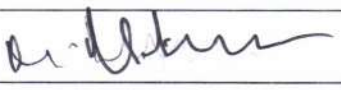
Session No*	List of Experiments
1	Introduction to AUTOCAD software, explanation of coordinate systems (absolute, relative, polar) and creation of simple figures like polygon, multi-line figures and title block – 2 Nos.
2	Creation of simple figures using dynamic input, preparation of template, dimensioning of figures – 2 Nos.
3	Creation of Machine components with dimensions and text – Any One
4	Modelling of Machine components using Array with dimensions – Any One
5	Explanation and modelling of Isometric Projection, Creation of layers, etc – 2 Nos.
6	Introduction to Block and Insert commands, assembly of Sleeve and Cotter Joint with bill of materials
7	Assembly of Plummer block with bill of materials
8	Introduction to fits, Geometric dimensioning and Tolerancing, Modelling for simple machine components with GD & T – 1 No.
9	Introduction to Fusion 360, Modelling of 3D components using Fusion 360
10	Modelling of Revolved objects using Fusion 360
11	Introduction of Generative design and its application for TV wall mount
12	Model Exam
Content beyond syllabus (if any):	

* Session Duration: 150 minutes

Sub. Code / Sub. Name: ME18211 – Machine drawing laboratory

REFERENCES:

1. Gopalakrishna K.R., "Machine Drawing, Subhas Publishers", Bangalore, 2013.
2. Bhatt.N.D, "Machine Drawing", Chorotar Publishing House, 2011.
3. Sham Tickoo, "AutoCAD 2017: A Problem-Solving Approach, Basic and Intermediate", 23rd Edition, 2017.
4. James D. Bethune Boston University, "Engineering Graphics with AutoCAD 2002", Pearson Education, 2005.
5. Alan Kalameja, "AutoCAD 2008: A tutor for Engineering Graphics", Auto Desk Press, 2007.
6. https://thesourcecad.com/autocad-tutorials/

	Prepared by	Approved by
Signature		
Name	M. Maheswaran	Dr. M. Mohandass
Designation	Assistant Professor	AHoD - Mechanical
Date	12/04/2022	12/4/22
Remarks* :		
Remarks* :		

* If the same lab plan is followed in the subsequent semester/year it should be mentioned and signed by the Faculty and the HOD

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Department of Mechanical Engineering	LP: Sub Code ME18401 Rev. No: 00 Date: 14-12-2019
B.E/B.Tech/M.E/M.Tech : Mechanical Regulation: 2018 PG Specialisation : NA Sub. Code / Sub. Name : ME18401 / Thermal Engineering Unit : I	

Unit Syllabus: FUNDAMENTALS OF IC ENGINES AND GAS POWER CYCLES 12

Working principles of IC engines. Classification - Components and their functions. Valve timing diagram and port timing diagram - actual and theoretical p-V diagram of four stroke and two stroke engines. Otto, Diesel, Dual, Brayton cycles, Calculation of mean effective pressure, and air standard efficiency - Comparison of cycles

Objectives: To understand the working principles of IC engines and various air standard cycle and its performance.

Session No *	Topics to be covered	Ref	Teaching Aids
1	Classification - Components and their function, Working principles of 2-s.4-s petrol and Diesel engine	1 P.No.(1018-1030)	PPT
2	Comparison of 2-S, 4-S, petrol, diesel engine, Applications	1 P.No.(1055-1058)	PPT
3	Valve timing diagram four stroke and two stroke engines Petrol & Diesel engine	1 P.No.(1047-1055)	PPT
4	Actual and theoretical p-V diagram of four stroke and two stroke engines	1 P.No.(1047-1055)	PPT
5	Cycle , Air standard cycle, Efficiency of air standard cycle Types of Thermodynamics cycle, Terms used in Air standard cycles	1 P.No(932)	PPT
6	Otto cycle Or Constant volume cycle , P-V and T-s diagram Work done, efficiency effect of compression ratio ,Mean effective Pressure, mean effective pressure Vs compression ratio	1 P.No(941-955)	PPT
7	Problems solved in otto cycle	1 P.No(941-942)	PPT
8	Diesel cycle Or Constant pressure cycle , P-V and T-s diagram Work done, efficiency effect of compression ratio , mean effective pressure	1 P.No(942-955)	PPT
9	Problems solved in Diesel cycle.	1 P.No(957-960)	PPT
10	Dual cycle Or limited pressure cycle , P-V and T-s diagram Work done, efficiency effect of compression ratio	1 P.No(961-967)	PPT
11	Problems solved in Dual cycle. Comparison between Otto, Diesel and Dual cycle	1 P.No(967-969)	PPT
12	Braton cycle and it's type, work done, Thermodynamic analysis Problems solved in Brayton cycle	1 P.No(969-985)	PPT

Content beyond syllabus covered (if any):

* Session duration: 50 minutes

Sub. Code / Sub. Name: ME18401/Thermal Engineering

Unit : II

UnitSyllabus

INTERNAL COMBUSTION ENGINES SYSTEM AND PERFORMANCE 12

Simple and complete Carburetor. MPFI, Diesel pump and injector system, CRDI. Battery and Magneto Ignition System - Principles of Combustion and knocking in SI and CI Engines. Lubrication and Cooling systems. Performance calculation - Fuel consumption, Brake power, Indicated power, Friction power, Thermal efficiencies and Heat Balance sheet.

Objective: To make the students to familiar with working principle of IC engines sub system, its components and performance of IC Engines

Session No *	Topics to be covered	Ref	Teaching Aids
13	Fuel supply system for S.I engines ,Simple and complete Carburetor	2 P.No.(225-247)	PPT
14	Fuel Pump (or) mechanical pump, Fuel pump or Mechanical pump	2 P.No.(281-379)	PPT
15	TPI,MPI, Spark plug, CRDI	2 P.No.(322-326)	PPT
16	Fuel supply system for C.I engines, Air injection, Air less injection system-types	2 P.No.(281-285)	PPT
17	Fuel Injection Pump - Fuel Injection Pump, Distributor type Fuel Pump Fuel injector, Types of Nozzle	2 P.No.(285-290)	PPT
18	Ignition system - Battery ignition system, Magneto ignition system, Electronic ignition system	1 P.No.(1038-1063)	PPT
19	Principles of Combustion and knocking in SI and CI Engines	1 P.No.(1077-11110821082,1086-1090)	PPT
20	Lubrication system, and it's types.	1 P.No.(1064-1074)	PPT
21	Cooling systems and it's type	1 P.No.(1064-1074)	PPT
22	Performance calculation BP,IP,FP, Thermal efficiencies	1 P.No.(1112-1131	PPT
23	Types of Heat balance sheet and calculation	1 P.No.(1112-1131	PPT
24	CAT I		

Content beyond syllabus covered (if any):

* Session duration: 50 mins

Sub. Code / Sub. Name: ME18401/Thermal Engineering

Unit : III

Unit Syllabus : STEAM NOZZLES AND TURBINES 12

Flow of steam through nozzles, shapes of nozzles, effect of friction, critical pressure ratio, supersaturated flow. Impulse and Reaction principles, compounding, velocity diagram for simple and multi-stage turbines, speed regulations – Governors.

Objective

To make the students to familiar with the various shapes, effect of friction, compounding and governing of Nozzle,

Session No *	Topics to be covered	Ref	Teaching Aids
25	Steam nozzles, shapes of nozzles, flow through nozzle, mass flow rate	1 P.N0(755-757)	PPT
26	Condition for maximum discharge, maximum velocity of the nozzle	1 P.N0(757-760)	PPT
27	Effect of friction, Metastable flow, Supersaturated flow	1 P.N0(761-764)	PPT
28	Problem solved	1 P.N0(769-789)	PPT
29	Problem solved to find maximum condition	1 P.N0(769-789)	PPT
30	Impulse turbine, construction of velocity diagram	1 P.N0(803-806,811-817)	PPT
31	Combined velocity diagram, Two stage turbine, performance	1 P.N0(811-818)	PPT
32	Condition for maximum efficiency, problem solved.	1 P.N0(820-843)	PPT
33	Reaction turbine, construction of velocity diagram	1 P.N0(820-843)	PPT
34	Degree of reaction, compounding of turbine, pressure compounding, velocity compounding, pressure- velocity compounding	1 P.N0(807-810)	PPT
35	Problems solved in turbines	1 P.N0(820-860)	PPT
36	Governing turbine- Throttle governing, Nozzle governing, By-pass of governing	1 P.N0(880-883)	PPT

Content beyond syllabus covered (if any):

* Session duration: 50 mins

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Sub. Code / Sub. Name: ME18401/Thermal Engineering

Unit : IV

Unit Syllabus : AIR COMPRESSOR **12**

Classification and working principle of various types of compressors, work of compression with and without clearance, Volumetric efficiency, Isothermal efficiency and Isentropic efficiency of reciprocating compressors, Multistage air compressor and inter cooling – work of multistage air compressor. Applications of air compressor in Automobile vehicles.

Objectives: Make the students to know about the working principles of single, multistage compressor and it's efficiency.

Session No *	Topics to be covered	Ref	Teaching Aids
37	Air Compressors, Classification, Important terminology of air compressor, Working principles of Single stage Reciprocating air compressor	1 P.No.(1172-1176)	PPT
38	Work done in a single stage reciprocating air compressor without clearance 1. Polytrophic, 2. Isentropic 3. Isothermal	1 P.No.(1176-1178)	PPT
39	Work done in a single stage reciprocating air compressor with clearance 1. Polytrophic, 2. Isentropic 3. Isothermal	1 P.No.(1178-1179)	PPT
40	Volumetric efficiency of a Reciprocating air compressor with clearance volume	1 P.No.(1179-1181)	PPT
41	Disadvantages of single stage compression, Multistage compression, working principles of Two stage Reciprocating air compressor	1 P.No.(1182-1190)	PPT
42	Work done in a Two stage Compressor (i) Incomplete Inter-cooling. (ii) Complete inter-cooling Condition for minimum work	1 P.No.(1190-1198)	PPT
43	Heat Rejected in reciprocating Compressor, Ratio of cylinder diameter, Advantages and disadvantages of Multistage compression	1 P.No.(1190-1198)	PPT
44	Problem solved in single stage with & without clearance volume	1 P.No.(1200-1237)	PPT
45	Problem solved in single complete and incomplete inter cooler	1 P.No.(1200-1237)	PPT
46	Problem solved two stage compressor with & with t clearance	1 P.No.(1200-1237)	PPT
47	Rotary compressors , *Classification* , Displacement compressors Roots Blower , Vane blower, Centrifugal Compressors	1 P.No.(1200-1237)	PPT
48	CAT II		
Content beyond syllabus covered (if any):			

* Session duration: 50 mins

Sub. Code / Sub. Name: ME18401/Thermal Engineering

Unit : V

Unit Syllabus REFRIGERATION AND AIR CONDITIONING 12

Refrigeration - Vapour compression refrigeration cycle- super heat, sub cooling – Performance calculations - working principle of Vapour absorption system, Ammonia–Water, Lithium bromide – water systems (Descriptive only). Air conditioning system - Processes, Types and Working Principles - Concept of RSHF, GSHF, ESHF - Cooling load estimation (Descriptive only). Refrigerants - desirable properties, refrigerants used in modern Refrigerators and Air-conditioners.

Objectives: To make the students to understand the basic thermodynamic principles of vapour compression vapour absorption system and air conditioning system

Session No *	Topics to be covered	Ref	Teaching Aids
49	Refrigeration, Application, Refrigeration system. Unit of Refrigeration, Co- efficient of performance	1 P.No.(1360-1362)	PPT
50	Vapour compression refrigeration system, and its components	1 P.No.(1360-1362)	PPT
51	Types of vapour compression refrigeration cycle Cycle with dry saturated vapour after ,Cycle with wet vapour after compression,	1 P.No.(1172-1176)	PPT
52	Cycle with super heated vapour after compression, Cycle with super heated vapour before compression, Cycle with under cooling (or) sub cooling of refrigerant	1 P.No.(1172-1176)	PPT
53	Problems solved in cycle Cycle with dry saturated vapour after	1 P.No.(1360-1362)	PPT
54	Problems solved in the cycles cycle Cycle with super-heated vapour after and before compression	1 P.No.(1360-1362)	PPT
55	Problems solved with under cooling	1 P.No.(1360-1362)	PPT
56	Refrigerant, Classification, Properties.Vapour absorption refrigeration System i). Ammonia Absorption system , Lithium-Bromide Absorption Refrigeration system	1 P.No.(1388-1390&,1411-1419)	PPT
57	Air conditioning, Classification , Winter Air Conditioning System, Summer Air Conditioning System, Types of Air conditioning units	1 P.No.(1425-1432)	PPT
58	Cooling load - Sources of sensible heat, Sources of latent heat, Room Sensible Heat Factor (RSHF), Grand Sensible Heat Factor Effective Sensible Heat Factor	1 P.No.(1448-1453)	PPT
59	Properties of refrigerant, refrigerants used in modern Refrigerators and Air-conditioners.	1 P.No.(1448-1453)	PPT
60	CAT III		

Content beyond syllabus covered (if any):

* Session duration: 50 mins

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Week	1		2		3		4		5		6		7		8		9	
	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II
Units	I				II				III				IV				V	

TEXT BOOKS:

1. Rajput. R. K., "Thermal Engineering" S. Chand Publishers, 2000.
2. Kothandaraman.C.P., Domkundwar. S, Domkundwar. A.V., "A course in thermal Engineering", Fifth Edition, "Dhanpat Rai & sons , 2002.

REFERENCES:

1. Sarkar, B.K, "Thermal Engineering" Tata McGraw-Hill Publishers, 2007.
2. Arora.C.P, "Refrigeration and Air Conditioning ," Tata McGraw-Hill Publishers, 1994.
3. Ganesan V." Internal Combustion Engines" , Third Edition, Tata Mcgraw-Hill, 2007.
4. Rudramoorthy, R, "Thermal Engineering ",Tata McGraw-Hill, New Delhi, 2003.
5. Ramalingam. K.K., "Thermal Engineering", SCITECH Publications (India) Pvt. Ltd., 2009.

	Prepared by	Approved by
Signature	S.Sar / Dhanapathi	R.Ramesh
Name	Dr.S.Saravanan/Mr.R.Kaliyanasunder	Dr.R.Ramesh
Designation	Professor/Assistant Professor	AHOD / Mechanical Engineering
Date	14.12.2019	14.12.2019

Remarks *: Same lesson will followed the academic year 2020-21
Dhanapathi R.Ramesh

Remarks *: Same lesson plan will followed the academic year 2021-22
Dhanapathi

* If the same lesson plan is followed in the subsequent semester/year it should be mentioned and signed by the Faculty and the HOD

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Department of Mechanical Engineering	LP: ME 18402 Rev. No: 00
B.E/~~B.Tech/M.E/M.Tech~~ : Mechanical Engineering Regulation: 2018 Sub. Code / Sub. Name : **ME 18402 – MACHINE TOOLS AND MACHINING PROCESSES** Unit : 1	Date: 16/12/2019

Unit Syllabus: **METAL CUTTING THEORY & SIMPLE MACHINING PROCESSES**

Introduction to Metal Cutting, Cutting tools – Nomenclature, Materials, Tool Life, Tool Wear, Cutting fluids & Thermal aspects, Chips: Mechanics of chip formation, Types of chips, Orthogonal metal cutting - Single point cutting tool, Forces in Machining – Merchant's Circle diagram, Oblique cutting, Tool dynamometer – Types, Construction and working.

Objective: To acquire knowledge about the theory of metal cutting, mechanism of chip formation and the cutting parameters that influence the machining processes

Session No *	Topics to be covered	Ref	Teaching Aids
1	Introduction, Need for metal removal process, comparison of metal machining process with respect to metal forming process, Classification of machine tools.	R1, p.35-36 R4 p.418-421	PPT
2	Theory of metal cutting, Cutting tools – Nomenclature, Tool signature, Types of chip, Continuous chips with built up edge, for the formation of various types of chips discontinuous chips, continuous chips without built up edge, conditions favorable for formation of different types of chips	R1, p. 51-53 R4, p.423-424 R5, p.3-6	PPT
3	Types of metal cutting – Orthogonal cutting and oblique cutting, Cutting force in single point cutting tool, merchants circle construction, velocity triangle in metal cutting	R1, p. 37-45 R5, p.6-8	PPT
4	Cutting fluids – objectives and functions. Thermal aspects in machining	R1, p. 60-62 R1, p. 76-79 R5, 9-10	PPT
5	Cutting tool materials, Tool materials properties	R1, p. 71-76 R4, p.453-464	PPT
6	Tool wear and various mechanisms of tool wear	R1, p. 62-64, R4, p.440-447	PPT
7	Tool Life – Taylors tool life equation, Problems related to tool life equation	R1, p. 65-69	PPT
8	Tool Dynamometer – construction and types of tool dynamometer	R1, p. 49-51 R6, p. 1221-1228	PPT
9	Problems related to cutting force, velocity triangle and tool life	R3, p. 380-389	PPT

* Session duration: 50 minutes

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Department of Mechanical Engineering	LP: ME 18402 Rev. No: 00
B.E/~~B.Tech/M.E/M.Tech~~ : Mechanical Engineering Regulation: 2018 Sub. Code / Sub. Name : **ME 18402 – MACHINE TOOLS AND MACHINING PROCESSES** Unit : I	Date: 16/12/2019

Unit Syllabus: **METAL CUTTING THEORY & SIMPLE MACHINING PROCESSES**

Introduction to Metal Cutting, Cutting tools – Nomenclature, Materials, Tool Life, Tool Wear, Cutting fluids & Thermal aspects, Chips: Mechanics of chip formation, Types of chips, Orthogonal metal cutting - Single point cutting tool, Forces in Machining – Merchant's Circle diagram, Oblique cutting, Tool dynamometer – Types, Construction and working.

Objective: To acquire knowledge about the theory of metal cutting, mechanism of chip formation and the cutting parameters that influence the machining processes

Session No *	Topics to be covered	Ref	Teaching Aids
1	Introduction, Need for metal removal process, comparison of metal machining process with respect to metal forming process, Classification of machine tools.	R1, p.35-36 R4 p.418-421	PPT
2	Theory of metal cutting, Cutting tools – Nomenclature, Tool signature, Types of chip, Continuous chips with built up edge, for the formation of various types of chips discontinuous chips, continuous chips without built up edge, conditions favorable for formation of different types of chips	R1, p. 51-53 R4, p.423-424 R5, p.3-6	PPT
3	Types of metal cutting – Orthogonal cutting and oblique cutting, Cutting force in single point cutting tool, merchants circle construction, velocity triangle in metal cutting	R1, p. 37-45 R5, p.6-8	PPT
4	Cutting fluids – objectives and functions. Thermal aspects in machining	R1, p. 60-62 R1, p. 76-79 R5, 9-10	PPT
5	Cutting tool materials, Tool materials properties	R1, p. 71-76 R4, p.453-464	PPT
6	Tool wear and various mechanisms of tool wear	R1, p. 62-64, R4, p.440-447	PPT
7	Tool Life – Taylors tool life equation, Problems related to tool life equation	R1, p. 65-69	PPT
8	Tool Dynamometer – construction and types of tool dynamometer	R1, p. 49-51 R6, p. 1221-1228	PPT
9	Problems related to cutting force, velocity triangle and tool life	R3, p. 380-389	PPT

* Session duration: 50 minutes

Sub. Code / Sub. Name: **ME 18402 – MACHINE TOOLS AND MACHINING PROCESSES**

Unit : III

Unit Syllabus : **OTHER MACHINE TOOLS & GEAR MANUFACTURING**

Drilling,, Shaping and Milling machines – Classification, Construction and operations, Cutters & types, Comparison of processes. Broaching Machines – Push, Pull, surface and continuous broaching. Nomenclature of Drill tool, Milling tool, reamers and broaching tool. Operation planning sheet. Gear cutting: Classification, Principle and construction of Gear milling, Hobbing and Shaping processes. Procedure for generating spur and helical gear.

Objective: Understand the types of reciprocating machine tools, their constructions, specifications, operations performed and the gear manufacturing procedure

Session No *	Topics to be covered	Ref	Teaching Aids
20	Drilling – construction, types, specifications, operations performed, Shaping – Construction, specifications, quick return principle – Hydraulic mechanism, crank and slotted lever mechanism	R1, p.227-250, R2, p.167-168 R1, p.297-309	PPT
21	Planer – construction, specifications, belt drive mechanism, difference between shaper and planer	R1, p.325-337 R3, p. 486	PPT
22	Milling machine – construction, types, specifications, milling cutters, operations	R1, p.397-400, R3, p.506-526	PPT
23	Broaching machines – classification (Pull, Push, Surface and continuous broaching), specifications	R1, p.533-538 R4 p.490-492	PPT
24	Nomenclature of Drill Tool, Peripheral Milling Cutter, reamers and broaching tool	R1, p.258-261 , R1, p. 267-270, R1, p. 426-428, R1, p. 533-536,	PPT
25	Gear Manufacturing – Classification, Gear Forming and Gear generation methods	R1, p.451-453, R1, p.482-486	PPT
26	Principle and construction of gear milling – Indexing calculations	R1, p.454-465	PPT
27	Gear Hobbing – Construction, Types of Hobbing, procedure for manufacturing spur and helical gears	R1, p.481-485, R3, p.605-607	PPT
28	Gear shaper – construction, Procedure for manufacturing spur and helical gears	R3, p.603-604, R4, p. 692-695	PPT

* Session duration: 50 mins

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Sub. Code / Sub. Name: **ME 18402 – MACHINE TOOLS AND MACHINING PROCESSES**

Unit : IV

Unit Syllabus : **ABRASIVE PROCESSES & CNC MACHINES**

Finishing processes: Grinding - cylindrical grinding, surface grinding, centreless grinding and internal grinding, Grinding wheel specification, Buffing, Honing & Lapping, Super Finishing, Laser Ablation.
Computer Numerical Control (CNC) machine tools –Constructional details, Special features, Turning centre, Machining centre. Introduction to Part programming – Fanuc – G & M codes, sample programs for simple lathe and milling operations.

Objective: To make the students familiar in various metal finishing processes and also in CNC programming

Session No *	Topics to be covered	Ref	Teaching Aids
29	Need for finishing processes, types of finishing processes, Introduction to cylindrical grinding.	R1, p.357-364 R5, p. 417 R5, p. 250-253	PPT
30	Centreless grinding – construction details, types of feed, surface grinding-construction details	R1, p.364-370 R5, p.253-255	PPT
31	Grinding wheel specifications	R1, p.387-390 R4 p.540	PPT
32	Super finishing processes – Buffing, Honing & Lapping, Super Finishing, Laser Ablation	R5, p. 417-431 R1, p. 545-548	PPT
33	Computer Numerical Control (CNC) machine tools –Constructional details and need for CNC, special features in CNC machines	R5, p.650-656, R6, p. 1599-1608	PPT
34	Turning centre and Machining centre - explanations	R6, p. 1622-1630 R7, p. 644-646	PPT
35	Introduction to Part programming – Fanuc – G & M codes	R7, p. 610-619	PPT
36	Sample programs for simple lathe and milling operations using G & M codes	R7, p.630.643	PPT
37, 38	CAT-II		

* Session duration: 50 mins

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Sub. Code / Sub. Name: **ME 18402 – MACHINE TOOLS AND MACHINING PROCESSES**

Unit : V

Unit Syllabus: **INTRODUCTION TO NON TRADITONAL MACHINING PROCESSES**

Introduction, Classification, Abrasive Jet Machining, Electrical Discharge Machining, Chemical Machining, Laser Beam Machining , Working Principles, Equipment used and Applications.

Objective: To make the students familiar with various non traditional machining processes

Session No *	Topics to be covered	Ref	Teaching Aids
39	Need for non traditional machining processes, classification	R1, p.605-608	PPT
40	Abrasive Jet Machining - Working Principles, Equipment used and Applications. Process parameters	R1, p. 608-610, R5, p.502-505	PPT
41	Electrical Discharge Machining - Working Principles, Equipment used and Applications.	R1, p. 631-638 R5, p.459-468	PPT
42	Wire cut electric discharge machining - Working Principles, Equipment used and Applications.	R5, p.474	PPT
43	Chemical Machining - Working Principles, Equipment used and Applications.	R1, p. 615-618 R5, p. 490-497	PPT
44	Laser Beam Machining - Working Principles, Equipment used and Applications.	R1, p.641-646 R5, p. 505-512	PPT
45, 46	CAT- III		

* Session duration: 50 mins

b Code / Sub Name: **ME 18402 – MACHINE TOOLS AND MACHINING PROCESSES**

REFERENCES:

1. Hajra Choudhury, "Elements of Workshop Technology", Vol.II., Media Promoters, 2004
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6. R.K. Jain, "Production Technology", Khanna publishers, 2003
7. Dr. Sadhu singh, "Computer aided design& manufaduring", Khanna publishers, 2003

	Prepared by	Approved by
ature		
e	Dr. S. Ramesh babu	Dr. S. Ramesh babu
gnation	Professor & Head	Professor & Head
	16/12/2019	16/12/2019

rks *

rks *: The same lesson plan is being followed for the AY 2020-21 even semester.
1. Dr. S. RAJYALU - S.E.
2. Dr. V. SELVAVAN

* If the same lesson plan is followed in the subsequent semester/year it should be mentioned and signed by the Faculty and the HOD

The same lesson plan will be followed for the A.y 2021-22 (even)

(S. Ponnurel, ASP/MED)

AHOD/MEC
(Dr. M. Mohandass)
18/3/22

The same lesson plan will be followed for the AY 2022-23 even
6/2/23 Ponnurel, ASP/MED

AHOD/MEC
Dr. M. Mohandass
6/2/2023

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Department of Mechanical Engineering	LP: ME18403 Rev. No: 01 Date: 01/11/2019
B.E/~~B.Tech/M.E/M.Tech~~ : Mechanical Engineering Regulation: 2018 PG Specialisation : NA Sub. Code / Sub. Name : ME18403 – Kinematics of Machinery Unit : I	

Unit Syllabus: BASICS OF MECHANISMS

Classification of mechanisms – Basic kinematic concepts and definitions – Degree of freedom, Mobility – Kutzbach criterion, Gruebler"s criterion – Grashof"s Law – Kinematic inversions of Four-bar chain and Slider crank chains – Limit positions – Mechanical advantage – Transmission Angle – Description of some common mechanisms – Quick return mechanisms, Straight line generators, Universal Joint – rocker mechanisms. SYNTHESIS OF LINKAGES: Number and Dimensional synthesis – Two position synthesis of slider crank and four bar- mechanisms.

Objective: i. To understand the terms, types, and design related to mechanisms.
ii. To understand the working principles of common mechanisms

Session No *	Topics to be covered	Ref	Teaching Aids
1	Definitions – Link, Kinematic pair, Kinematic chain, Mechanism, and Machine. -Degree of Freedom – Mobility	2 – Ch.1;Pg .1 - 6	PPT / BB
2	Kutzbach criterion (Gruebler's criterion) -Grashoff's law	2 – Ch.1;Pg .7 – 14	PPT / BB
3	Kinematic Inversions of four-bar chain and slider crank chain	2 – Ch.1;Pg .17 – 21 2- Ch.1;Pg. 27 to 32	PPT / BB
4	Mechanical Advantage-Transmission angle-description of common mechanisms	2 – Ch.1;Pg .22 – 24	PPT / BB
5	Quick return mechanisms	11 – Ch.5;Pg .108 – 110	PPT / BB
6	Straight line generators (Peaucellier and Watt mechanisms)	11 – Ch.9;Pg .232-237	PPT / BB
7	Universal joint-Rocker mechanism	11 – Ch.9:Pg .242-255 2 – Ch.6;Pg .210	PPT / BB
8	SYNTHESIS OF LINKAGES: Number and Dimensional synthesis – Two position synthesis of slider crank and four bar- mechanisms.	2 – Ch.6;Pg. 210 – 211	PPT / BB
9	Problem-Mechanism	11 – Ch.5;Pg.111 - 113	PPT / BB

Content beyond syllabus covered (if any):

* Session duration: 50 minutes

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Sub. Code / Sub. Name: ME18403 – Kinematics of Machinery

Unit : II

Unit Syllabus: KINEMATICS OF LINKAGE MECHANISMS

Displacement, velocity and acceleration analysis of simple mechanisms - Graphical method- Velocity and acceleration polygons - Velocity analysis using instantaneous centers - kinematic analysis of simple mechanisms - Coincident points - Coriolis component of Acceleration

Objective: To perform kinematic analysis on various mechanisms.

Session No *	Topics to be covered	Ref	Teaching Aids
10	Displacement, velocity and acceleration - analysis in simple mechanisms -	11 – Ch.;Pg. 9- 22	PPT / BB
11	Plane motion of a rigid body. Instantaneous Centre (IC) of Velocity. Velocity analysis using IC (Slider-crank mechanism, Four-bar mechanism)	2 - Ch.2;Pg.70-84	PPT / BB
12	Relative velocity method(Shaping machine mechanism)	2 - Ch.2;Pg.44-60	PPT / BB
13	Problems	2 - Ch.2;Pg.44-60	PPT / BB
14	Acceleration in slider crank mechanism and four bar mechanism.	2 - Ch.3;Pg.89-107	PPT / BB
15	Problems	2 - Ch.3;Pg.89-107	PPT / BB
16	Coriolis acceleration-Problems	2 - Ch.3;Pg.108-122	PPT / BB
17	Problems	2 - Ch.3;Pg.108-122	PPT / BB
18	Problems	2 - Ch.3;Pg.108-122	PPT / BB
Content beyond syllabus covered (if any): -			

* Session duration: 50 mins

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Sub. Code / Sub. Name: ME18403 – Kinematics of Machinery

Unit : III

Unit Syllabus: KINEMATICS OF CAM MECHANISMS

Classification of cams and followers - Terminology and definitions - Displacement diagrams -Uniform velocity, parabolic, simple harmonic and cycloidal motions - Derivatives of follower motions - Layout of plate cam profiles - Pressure angle and undercutting

Objective: i) To draw the cam profile.
ii)To study about types of cams and cam terminologies.

Session No *	Topics to be covered	Ref	Teaching Aids
19	Classifications - Displacement diagrams-parabolic, Simple harmonic and Cycloidal motions	2 - Ch.7;Pg.232-236	PT / BB
20	Layout of plate cam profiles	2 - Ch.7;Pg.245	PPT / BB
21	Derivatives of Follower motion	2 - Ch.7;Pg.237	PPT / BB
22	Problem-cam profile	2 - Ch.7;Pg.245-256	PPT / BB
23	Problem-cam profile	2 - Ch.7;Pg.245-256	PPT / BB
24	Problem-cam profile	2 - Ch.7;Pg.245-256	PPT / BB
25	Problem-cam profile	2 - Ch.7;Pg.245-256	PPT / BB
26	Pressure angle and undercutting.	2 – Ch.7:Pg.256 267.239	PPT / BB
27	Problem	2 – Ch.7;Pg.256-267	PPT / BB

Content beyond syllabus covered (if any): NA

* Session duration: 50 mins

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Sub. Code / Sub. Name: ME18403 – Kinematics of Machinery

Unit : IV

Unit Syllabus: GEARS AND GEAR TRAINS

Law of toothed gearing - Involutes and cycloidal tooth profiles -Spur Gear terminology and definitions- Gear tooth action - contact ratio - Interference and undercutting. Helical, Bevel, Worm, Rack and Pinion gears [Basics only]. Gear trains - Speed ratio, train value - Parallel axis gear trains - Epicyclic Gear Trains.

Objective: To know kinematics of gears and gear trains.

Session No *	Topics to be covered	Ref	Teaching Aids
28	Classification of gears , Spur gear Terminology	2- Ch.10;Pg. 372-375	PPT / BB
29	Fundamental Law of toothed gearing and Involute gearing	2- Ch.10;Pg. 380-385	PPT / BB
30	Length of path of contact and contact ratio	2- Ch.10;Pg. 388-389	PPT / BB
31	Interference and undercutting.	2- Ch.10;Pg. 393-403	PPT / BB
32	Problem	2- Ch.10;Pg. 393-403	PPT / BB
33	Gear trains- Simple, compound gear trains	2- Ch.11;Pg.424-426	PPT / BB
34	Epicyclic gear trains-Differentials	2- Ch.11;Pg. 427-428	PPT / BB
35	Problem gear train	2- Ch.11;Pg. 428-436	PPT / BB
36	Problem gear train	2- Ch.11;Pg. 428-436	PPT / BB
Content beyond syllabus covered (if any): -			

* Session duration: 50 mins

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Sub. Code / Sub. Name: ME18403 – Kinematics of Machinery

Unit : V

Unit Syllabus: FRICTION IN MACHINE ELEMENTS

Surface contacts - Sliding and Rolling friction - Friction drives - Friction in screw threads - Friction clutches - Belt and rope drives - Friction in brakes- Band and Block brakes- basics of Bearings and lubrication

Objective: To understand the concept of friction and its applications.

Session No *	Topics to be covered	Ref	Teaching Aids
37	Dry friction – Friction in screw jack	2- Ch.8;Pg. 279-291	PPT / BB
38	Problem	2- Ch.8;Pg. 292-293	PPT / BB
39	Pivot and collar friction	2- Ch.8;Pg. 297-301	PPT / BB
40	Friction clutches	2- Ch.8;Pg. 302-314	PPT / BB
41	Tutorial	2- Ch.8;Pg. 302-314	PPT / BB
42	Belt and rope drives	2- Ch.8;Pg. 329-362	PPT / BB
43	Tutorial	2- Ch.8;Pg. 329-362	PPT / BB
44	Friction aspects in Brakes,Block brakes,	2- Ch.15;Pg. 597-603	PPT / BB
45	Band brakes	2- Ch.15;Pg.603-617	PPT / BB

Content beyond syllabus covered (if any): -

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Sub Code / Sub Name: ME18403 – Kinematics of Machinery

Week	1		2		3		4		5		6		7		8		9		10		11		12		13		14		15	
	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II	I	II
Units	Unit I				Unit II						Unit III														Unit V					

REFFRENCES:

1. Uicker, J.J., Pennock G.R and Shigley, J.E., "Theory of Machines and Mechanisms", 3rd Edition, Oxford University Press, 2009
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3. Thomas Bevan, "Theory of Machines", 3rd Edition, CBS Publishers and Distributors, 2005
4. Cleghorn, W.L., "Mechanisms of Machines", Oxford University Press, 2005
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6. Allen S. Hall Jr., "Kinematics and Linkage Design", Prentice Hall, 1961
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11. Khurmi, R.S., "Theory of Machines",14th Edition, S Chand Publications, 2005
12. Sadhu Sigh : Theory of Machines, "Kinematics of Machine", Third Edition, Pearson Education,2012

	Prepared by	Approved by
Signature		R. Ramesh
Name	Dr. N. MUTHUKRISHNAN / Mr. K. RAM PRASAD	Dr. R.RAMESH
Designation	Professor Assistant Professor	Professor & Asst.Head
Date	27/12/2019	27-12-2019

Remarks *: Same lesson plan is to be followed during the academic year 2020-21

Remarks *:

* If the same lesson plan is followed in the subsequent semester/year it should be mentioned and signed by the Faculty and the HOD

10.1.2021 — 10/01/2021

N. Muthukrishnan

Same lesson plan is to be followed for the Academic year of 2022-23. C. Sudhakar 6/2/2023

6/2/2023

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Department of Mechanical Engineering	LP: ME18404
B.E/B.Tech/M.E/M.Tech : Mechanical Engineering Regulation: 2018 PG Specialisation : NA Sub. Code / Sub. Name : ME18404 / HYDRAULICS AND PNEUMATICS SYSTEMS Unit : I	Rev. No: 0 Date: 16.12.2019

Unit Syllabus:

FLUID POWER PRINCIPLES AND FUNDEMENTALS 7

Introduction, Advantages and Applications of Fluid power system. Types of fluid power systems - Basics of Hydraulics and Pneumatics. Hydraulic fluids- types and properties of hydraulic fluids. Properties of air– Perfect Gas Laws, Pascal's Law, Darcy's equation, Valves and fittings. Losses in pipes and fittings-K factor. Hydraulic and Pneumatic power packs

Objective:

To acquaint the basic concepts of fluid power, various gas laws and losses in pipes & fittings.

Session No *	Topics to be covered	Ref	Teaching Aids
1.	Introduction to Fluid power, Types of fluid power system, Advantages, Disadvantages and Applications of fluid power system.	T1(C1) Pg.No.17-30	PPT/BB
2.	Basics of Hydraulics and Pneumatics, comparison of hydraulics and pneumatics.	T1(C1) Pg.No.17-30	PPT/BB
3.	Types of hydraulic fluids- properties of hydraulic fluids, relative merits and demerits.	T1(C2) Pg.No.37-67	PPT/BB
4.	Properties of air– Perfect Gas Laws, Pascal's Law and Darcy's equation	T1(C13) Pg.No.470-476	PPT/BB
5.	Valves and fittings, Losses in pipes and fittings-K factor.	T1(C3) Pg. No. 81-85, (C4) 133	PPT/BB
6.	Losses in pipes and fittings - Problem solving	T1(C4) Pg.No.138-143	PPT/BB
7.	Hydraulic and Pneumatic power packs	T1(C4) Pg.No.138-143	PPT/BB
Content beyond syllabus covered (if any):			

* Session duration: 50 minutes

Sub. Code / Sub. Name: ME18404 / Hydraulics and Pneumatics Systems

Unit : II

Unit Syllabus:

HYDRAULIC SYSTEM AND COMPONENTS 11

Sources of Hydraulic power- Pumping Theory – Pump Classification- Construction, Working, Advantages, Disadvantages, Performance and Selection criterion of Linear & Rotary pumps. Hydraulic Actuators - Cylinders & Motors - Types and construction. Control Components - Directional control, Flow control and Pressure control valves- Types, Construction, Operation and Applications. Fluid Power ANSI Symbol.

Objective:

To familiarize the students on the fundamental principles, design and operation of hydraulic components.

Session No *	Topics to be covered	Ref	Teaching Aids
8.	Introduction to Hydraulic Pump and its Classification.	T1(C5) Pg.No.158-178	PPT/BB
9.	Linear and Rotary pump – Construction, Working, Advantages & Disadvantages.	T1(C5) Pg.No.158-178	PPT/BB
10.	Fixed and Variable displacement pumps - Construction, Working Advantages & Disadvantages.	T1(C5) Pg.No.158-178	PPT/BB
11.	Performance, Selection criterion of pumps.	T1(C5) Pg.No.187-200	PPT/BB
12.	Hydraulic Actuators - Cylinders – types and construction.	T1(C6) Pg.No.211-215	PPT/BB
13.	Hydraulic Motors and its Classification.	T1(C7) Pg.No.243-254	PPT/BB
14.	Direction control valve - Types, Construction and Operation-Applications – Types of actuation.	T1(C8) Pg.No.278	PPT/BB
15.	Flow control valve - Types, Construction and Operation-Applications.	T1(C8) Pg.No.300	PPT/BB
16.	Pressure control valves Types, Construction and Operation-Applications.	T1(C8) Pg.No.291	PPT/BB
17.	Accumulators, Intensifiers, Pressure Switches, Limit switches, Relays-Applications.	T1(C11) Pg.No.397	PPT/BB
18.	Fluid Power ANSI Symbol of hydraulic components.	Appendix Pg.No.669	PPT/BB

Content beyond syllabus covered (if any):

Demonstration on hydraulic circuits in the Mechatronics laboratory for the better understanding of working of hydraulics components and their applications.

* Session duration: 50 minutes.

Sub. Code / Sub. Name: ME18404 / Hydraulics and Pneumatics Systems

Unit : III

Unit Syllabus:

DESIGN OF HYDRAULIC CIRCUITS 9

Accessories - Pressure Switches, Electrical switches, Limit switches, Relays – Applications. Types of Accumulators and its Applications.

Design of Hydraulic circuits- Reciprocation, Speed control- meter-in & meter-out circuits, Sequence, Synchronization, Regenerative, Pump Unloading-Double pump circuits. Pressure Intensifier, Air-over oil system, Hydrostatic transmission, Electro hydraulic circuits and Mechanical Hydraulic servo systems

Objective:

To teach the students to get the knowledge on design of basic fluid power circuits.

Session No *	Topics to be covered	Ref	Teaching Aids
19.	Accessories - Pressure Switches, Electrical switches - Applications	T1(C9) Pg.No.324	PPT/BB
20.	Accessories - Limit switches, Relays – Applications	T1(C9) Pg.No.328	PPT/BB
21.	Design of Hydraulic circuits- Reciprocation, Speed control-meter-in & meter-out circuits	T1(C9) Pg.No.332-333	PPT/BB
22.	Design of Hydraulic circuits- Sequence, Synchronization, Regenerative circuits	T1(C9) Pg.No.351	PPT/BB
23.	Design of Hydraulic circuits- Pump Unloading-Double pump circuits	T1(C9) Pg.No.337-338	PPT/BB
24.	Pressure Intensifier and Air-over oil system	T1(C9) Pg.No.344-348	PPT/BB
25.	Hydrostatic transmission circuits	T1(C9) Pg.No.349	PPT/BB
26.	Electro hydraulic circuits	T1(C9) Pg.No.355	PPT/BB
27.	Mechanical Hydraulic servo systems.	T1(C9) Pg.No.355	PPT/BB

Content beyond syllabus covered (if any):

Design of Hydraulic circuits using Automation Studio software.

* Session duration: 50 mins

Sub. Code / Sub. Name: ME18404 / Hydraulics and Pneumatics Systems

Unit : IV

Unit Syllabus:

PNEUMATIC SYSTEM AND COMPONENTS 7

Compressors- types and working principle. Filter, Regulator, Lubricator, Muffler, Air control Valves, Quick Exhaust valves, Pneumatic actuators, Servo systems. Introduction to Fluidics, Pneumatic logic circuits.

Objective:

To understand the fundamental principles, design and operation of pneumatic components.

Session No *	Topics to be covered	Ref	Teaching Aids
28.	Air Compressors – Types, construction and working principle.	T1(C13) Pg.No.476	PPT/BB
29.	Filter, Regulator & Lubricator - construction and working principle.	T1(C13) Pg.No.478-485	PPT/BB
30.	Muffler, Air control Valves (flow, direction), Quick Exhaust valves.	T1(C13) Pg.No.498	PPT/BB
31.	Pneumatic actuators, Servo systems	T1(C13) Pg.No.506	PPT/BB
32.	Introduction to Fluidics - Moving Part Logic Control - applications	T1 (C12) Pg.No.494	PPT/BB
33.	Design of fluid power circuits using fluidics	T1 (C12) Pg.No.503	PPT/BB
34.	Pneumatic logic circuits	T1(C13) Pg.No.528	PPT/BB
Content beyond syllabus covered (if any):			

* Session duration: 50 mins

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Sub. Code / Sub. Name: ME18404 / Hydraulics and Pneumatics Systems

Unit : V

Unit Syllabus:

DESIGN OF INDUSTRIAL HYDRAULIC AND PNEUMATIC CIRCUITS 11

Design of circuits using the components of hydraulic system for Drilling, Planning, Shaping, Punching, Pressing operations. Sequential circuit design for simple application using cascade method, Electro pneumatic circuits.

Selection of Hydraulic and Pneumatic components, Installation, fault finding and maintenance of hydraulic and pneumatic components. Microprocessor and PLC- Applications in Hydraulic and Pneumatics, Low cost Automation

Objective:

To acquaint the students in designing of fluid power circuits for different applications, automation and to familiarize with the maintenance of fluid power systems.

Session No *	Topics to be covered	Ref	Teaching Aids
35.	Design of circuits using the components of hydraulic system for Drilling	T1(C9) Pg.No.324	PPT/BB
36.	Design of circuits using the components of hydraulic system for Planning	T1(C9) Pg.No.324	PPT/BB
37.	Design of circuits using the components of hydraulic system for Shaping	T1(C9) Pg.No.324	PPT/BB
38.	Design of circuits using the components of hydraulic system for Punching and Press	T1(C9) Pg.No.324	PPT/BB
39.	Sequential circuit design for simple application using cascade method	T1(C9) Pg.No.324	PPT/BB
40.	Electro pneumatic circuits	T1(C17) Pg.No.601	PPT/BB
41.	Selection, fault finding and maintenance of hydraulic components	T1(C12) Pg.No.436	PPT/BB
42.	Selection criteria of pneumatic components	T1(C14) Pg.No.523	PPT/BB
43.	Installation fault finding and maintenance of pneumatic components.	T1(C14) Pg.No.523	PPT/BB
44.	Microprocessor and PLC- Applications in Hydraulic and Pneumatics	T1(C17) Pg.No.612	PPT/BB
45.	Low cost Automation	T1(C17) Pg.No.612	PPT/BB

Content beyond syllabus covered (if any):

Practical exposure on design of hydraulic and pneumatic circuits using fluid power trainer kits and Automation Studio software.

* Session duration: 50 mins

Sub Code / Sub Name: ME18404 / Hydraulics and Pneumatics Systems

TEXT BOOKS:

1. Anthony Esposito," Fluid Power with Applications", 7th Edition, Pearson Education, 2009
2. James L. Jhonson, Introduction to Fluid Power, Delmar Thomson Learning, 2002.

REFERENCES :

1. Dudelyt, A Pease and John J.Pippenger, Basic Fluid Power, Prentice Hall, 1987.
2. Majumdar, S.R., Oil Hydraulics Systems-Principles and Maintenance, Tata McGraw-Hill, 2001.
3. Majumdar, S.R., Pneumatic Systems-Principles and Maintenance, Tata McGraw-Hill, 2007.
4. Micheal J, Pinches and Ashby, J.G., Power Hydraulics, Prentice Hall, 1989.
5. ShanmugaSundaram, K.,Hydraulic and Pneumatic controls, S. Chand limited, 2006.
6. Srinivasan. R., Hydraulic and Pneumatic Control, Tata McGraw-Hill Education, 2012.

E – RESOURCES

1. NPTEL Course - https://nptel.ac.in/courses/112105046/

	Prepared by	Approved by
Signature	1. 2.	
Name	1. Dr. V SRIDHARAN 2. Mr. A. KUMARASWAMY	Dr. R RAMESH
Designation	1. Assistant Professor 2. Assistant Professor	Professor & Assistant Head of the Dept
Date	16/12/2019	16-12-2019
Remarks *:	Same lesson plan is to be followed for the Academic year 2020-2021 25/1/2021 (Dr. M. MUHANDASS)	25/01/2021
Remarks *:	Same lesson plan to be followed for the academic year - 2022-2023. 07/02/2023 (Dr. V. Sridharan)	7/2/23 (Dr. M. Mohandass)

* If the same lesson plan is followed in the subsequent semester/year it should be mentioned and signed by the Faculty and the HOD.

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Department of Mechanical Engineering	LP: ME18405 Rev. No: 01 Date: 26.12.2019
B.E/B.Tech : **Mechanical Engineering** Regulation: 2018 Sub. Code / Sub. Name : ME18405 / FLUID MECHANICS AND MACHINERY Unit : I	

Unit Syllabus:

UNIT I FLUID PROPERTIES AND FLOW CHARACTERISTICS 8

Units and dimensions- Properties of fluids- mass density, specific weight, specific volume, specific gravity, viscosity, compressibility, vapor pressure, surface tension and capillarity. Pressure measurement devices - U-tube manometers, pressure gauges. Flow characteristics – concept of control volume - application of continuity equation, energy equation and momentum equation.

Objective: To understand the properties of fluids, pressure measurement and flow characteristics.

Session No *	Topics to be covered	Ref	Teaching Aids
1	Introduction to the subject & syllabus contents, Units & Dimensions	1 – Ch.1; Pg.01 – 03 4 – Ch.1; Pg.01 – 10 6-Ch.1;Pg.01-03	PPT, BB
2	Properties of fluids – Mass density, specific weight, specific volume-definitions & problems	1 – Ch.1; Pg.01 – 02 5– Ch.1; Pg.02 – 03 6-Ch.1;Pg.1-3	PPT, BB
3	Specific gravity, viscosity, compressibility- definitions & problems	2 – Ch.1; Pg.01–02 5– Ch.1; Pg.02-23 6-Ch.1;Pg.6-8	PPT, BB
4	Vapour pressure, surface tension and capillarity - definitions & problems	1 – Ch.1; Pg.29 – 30 5– Ch.1; Pg.23 – 29	PPT, BB
5	Pressure measurement devices - U-tube manometers, pressure gauges	1– Ch.2; Pg.35-65	PPT, BB
6	Flow characteristics – concept of control volume	5– Ch.5; Pg.165 - 169 7-Ch-1,Pg.7-8	PPT, BB
7	Application of continuity equation	2– Ch.7; Pg.288 –300 5– Ch.6; Pg.261 -267	PPT, BB
8	Energy equation – Bernoulli's theorem - Problems	2 – Ch.7; Pg.305 – 317 3– Ch.6; Pg.238 – 252 7-Ch.3:169-177	PPT, BB
9	Orifice, Venturimeter & Pitot tube -Problems, Momentum equation.	2 – Ch.5; Pg.230 –246 5– Ch.6; Pg.160 - 169	PPT, BB
Content beyond syllabus covered (if any): Pressure measurement			

* Session duration: 50 minutes

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Sub. Code / Sub. Name: **ME18405/ FLUID MECHANICS AND MACHINERY**

Unit : II

Unit Syllabus :

UNIT II **FLOW THROUGH CIRCULAR CONDUITS** 8

Hydraulic and energy gradient - Laminar flow through circular conduits and circular annuli-Boundary layer concepts – types of boundary layer thickness – Darcy Weisbach equation –friction factor-Moody diagram- commercial pipes- minor losses – Flow through pipes in series and parallel.

Objective: To understand types of flow, Boundary layer concepts and losses in pipes.

	Topics to be covered	Ref	Teaching Aids
10	Flow through pipes - Hydraulic and energy gradient	2 – Ch.3; Pg.129 5– Ch.11; Pg.491	PPT, BB
11	Viscous flow - Laminar flow through circular conduits & annuli	2 – Ch.6; Pg.268 – 272 5– Ch.9; Pg.387 – 392, 397 - 401	PPT, BB
12	Boundary layer concepts - Types of boundary layer thickness	2 – Ch.7; Pg.318 – 325 5– Ch.13;Pg.611–616,625-626	PPT, BB
13	Major Losses - Darcy Weisbach equation – derivation	5 – Ch.11; Pg.465 – 471 5– Ch.10; Pg.434 - 436	PPT, BB
14	Problems on Darcy Weisbach equation	5– Ch.11; Pg.467 - 469	PPT, BB
15	Finding friction factor - Moody diagram- commercial pipes	2 – Ch.6; Pg.293– 295	PPT, BB
16	Minor losses - Problems	5– Ch.11; Pg.471 – 474, 483-486	PPT, BB
17	Flow through pipes in series - Problems	5– Ch.11; Pg.502 – 506, 508-511	PPT, BB
18	Flow through pipes in parallel- Problems	5– Ch.11; Pg.522 – 536	PPT, BB

Content beyond syllabus covered (if any): Flow of viscous fluid between two parallel plates. Problems on Boundary layer

* Session duration: 50 mins

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Sub. Code / Sub. Name: **ME18405/ FLUID MECHANICS AND MACHINERY**

Unit : III

Unit syllabus:

UNIT III **DIMENSIONAL ANALYSIS** 9

Need for dimensional analysis – methods of dimensional analysis – Similitude –types of similitude - Dimensionless parameters- application of dimensionless parameters – Model analysis.

Objective

To have an adequate knowledge of dimensional analysis.

Session No *	Topics to be covered	Ref	Teaching Aids
19	Introduction - Dimensional analysis, Fundamental dimensions and derived units	3 – Ch.7; Pg.292–293	PPT, BB
20,21	Methods of dimensional analysis - Buckingham's π theorem	3 – Ch.7; Pg.294–295	PPT, BB
22,23	Similitude – types of similarities – Geometric, Kinematic & Dynamic similarities	3 – Ch.7; Pg.305–308	PPT, BB
24	Non-dimensional parameters – its significance	3 – Ch.7; Pg.305–308	PPT, BB
25	Application of dimensionless parameters – Model analysis	3 – Ch.7; Pg.308–314	PPT, BB
26,27	Problems on Model analysis- using various non-dimensional numbers	3 – Ch.7; Pg.308–314	PPT, BB
28	Tutorial		
Content beyond syllabus covered (if any): --Rayleigh method of Dimensional analysis			

Sub. Code / Sub. Name: **ME18405 / FLUID MECHANICS AND MACHINERY**

Unit : IV

Unit syllabus:

UNIT IV PUMPS 10

Impact of jets - Euler's equation - Theory of roto-dynamic machines – various efficiencies– velocity components at entry and exit of the rotor- velocity triangles - Centrifugal pumps– working principle - work done by the impeller - performance curves - Reciprocating pump- working principle – Rotary pumps –classification.

Objective

To understand different types of pumps and its characteristics.

Session No *	Topics to be covered	Ref	Teaching Aids
29	Introduction to Pumps- Impact of jets - Euler's equation	2 – Ch.24; Pg.1131– 1132	PPT, BB
30	Roto-dynamic machines – Definitions of various efficiencies	2 – Ch.24; Pg.1131-1132	PPT, BB
31	Roto-dynamic machines – Definitions of various efficiencies	2 – Ch.24; Pg.1131-1133	PPT, BB
32	Velocity components – Drawing velocity triangles	2 – Ch.24; Pg.1131-1133	PPT, BB
33	Centrifugal pumps– working principle – Derivation of work done by the impeller	2 – Ch.24; Pg.1182– 1190	PPT, BB
34	Centrifugal pumps– working principle – Derivation of work done by the impeller	2 – Ch.24; Pg.1190– 1203	PPT, BB
35	Centrifugal pumps - performance curves	2 – Ch.24; Pg.1203– 1209	PPT, BB
36	Problems on Centrifugal pumps	2 – Ch.24; Pg.1203– 1209	PPT, BB
37	Reciprocating pump- working principle & problems	2 – Ch.24; Pg.1203– 1243	PPT, BB
38	Rotary pumps – classification	2 – Ch.24; Pg.1203-1243	PPT, BB
39	Tutorial	-	BB
Content beyond syllabus covered (if any): Demonstration of Centrifugal pump			

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Sub. Code / Sub. Name: **ME18405 / FLUID MECHANICS AND MACHINERY**

Unit : V

UNIT V **TURBINES** 10

Classification of turbines – heads and efficiencies – velocity triangles. Axial, radial and mixed flow turbines. Pelton wheel, Francis turbine and Kaplan turbines- working principles - work done by water on the runner – draft tube. Specific speed - unit quantities – performance curves for turbines – governing of turbines.

Objective

To understand different types of turbines and its characteristics.

Session No *	Topics to be covered	Ref	Teaching Aids
40	Introduction to Hydraulic Turbines - Classification – Definition of heads and efficiencies	2 - Ch. 21; Pg.1021-1027	PPT, BB
41,42	Velocity components - Drawing Velocity triangles	2 - Ch. 21; Pg.1021-1037	PPT, BB
43	Types of turbines - Axial, radial and mixed flow	2 - Ch. 21; Pg.1034-1050	PPT, BB
44	Pelton wheel, Francis turbine and Kaplan turbines-working principles	2 - Ch. 21; Pg.55 – 56, 81 -82, 1028-1033	PPT, BB
45	Work done by water on the runner – draft tube	2- Ch. 21; Pg.1028-1033	PPT, BB
46	Problems on Pelton wheel, Francis turbine and Kaplan turbines	2: Ch. 21; Pg.1028-1050	PPT, BB
47	Problems on Pelton wheel, Francis turbine and Kaplan turbines	2 - Ch. 21; Pg.1028-1050	PPT, BB
48	Specific speed - unit quantities	2 - Ch. 21; Pg.1028-1050	PPT, BB
49,50	Performance curves for turbines – Governing of turbines	2- Ch. 21; Pg.1-28-1050	PPT, BB
51	Tutorial	-	BB
Content beyond syllabus covered (if any):Demonstration of Pelton wheel turbine			

TEXT BOOKS:

1.Bansal.R.K. "Fluid Mechanics and Hydraulics machines",5th edition. Lakmi Publications Pvt Ltd,New Delhi,2008

2. Modi P.N. and Seth, S.M. "Hydraulics and Fluid Mechanics", Standard Book House, New Delhi, 2004.

REFERENCES:

3. Fox W.R. and McDonald A.T., Introduction to Fluid Mechanics John-Wiley and Sons. Singapore, 1995.

4. Jain A. K. "Fluid Mechanics", Khanna Publishers, 2010

5. Roberson J.A and Crowe C.T., "Engineering Fluid Mechanics", Jaico Books Mumbai, 2000.

6.Streeter, V.L., and Wylie, E.B., "Fluid Mechanics", McGraw Hill, 2000.

7.White, F.M., "Fluid Mechanics", Tata McGraw Hill, 5th Edition, New Delhi, 2003.

	Prepared by	Approved by
Signature		
Name	Dr.K.Pitchandi/Dr.S.Natarajan	Dr. Ramesh Babu
Designation	Professor / ME & Assistant Professor/ME	Professor & Head / ME
Date	26.12.2019	26.12.2019
Remarks *:	The Same Lesson plan is followed for the academic year 2020-2021.	

26/10/2021.
(Dr S. Natarajan).

26/10/2021

The Same Lesson plan is followed for the academic years 2021-2022.

1/3/2022
(Dr S. Natarajan)

1/3/22
(Dr. M. Mohandas)
AHOD/MECL

The Same Lesson plan is followed for the academic year 2022-23

07/02/23
(Dr. S. Natarajan)
Course Coordinator.
Mech. Engg. Dept.

4/2/2023
(Dr. M. Mohandas)
AHOD/Mech. Engg. Dept.

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - LABORATORY

Department of _Mechanical Engineering_	**LP: ME18413** **Rev. No:** **Date: 16.12.2019**
B.E/B.Tech/M.E/M.Tech : Mechanical Engineering Regulation:_2018 **PG Specialisation : ____Nil_____** **Sub. Code / Sub. Name : ME18413: Thermal Engineering Laboratory**	

Session No*	List of Experiments
	CYCLE-I
1	**Draw the Valve Timing and Port Timing diagrams on four stroke and two stroke engine**
2	**Heat Balance Test on 4–stroke twin cylinder Diesel Engine**
3	**To do the Morse Test on Multi-cylinder Petrol Engine.**
4	**To do the Retardation Test on a single cylinder Diesel Engine**
5	**To determine the Flash Point and Fire Point of fuels / Viscosity of lubricating oil.**
6	**To do the Performance Test on 4 –stroke single cylinder Diesel Engine.**
	CYCLE-II
7	**Performance, combustion and emission Test on 4 –stroke single cylinder Diesel Engine**
8	**Performance and Energy Balance Test on a Steam Generator.**
9	**To find quality (dryness) of steam Steam Calorimeter.**
10	**Performance Test on Steam Turbine.**
11	**Performance Test on Steam Condenser.**
Content beyond syllabus (if any):	

* Session Duration: 150 minutes

FT/GN/68A/02/30.06.16

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - LABORATORY Page 2 of 2

Sub. Code / Sub. Name: : ME18413: Thermal Engineering Laboratory

	Prepared by	Approved by
Signature		
Name	Dr.P.RAGHU/Mr.S.ARUMUGAM	Dr.R.RAMESH
Designation	Assistant Professor/MEC	Professor/HOD
Date	16.12.2019	16.12.2019

Remarks* :

Remarks* :

* If the same lab plan is followed in the subsequent semester/year it should be mentioned and signed by the Faculty and the HOD

- The Same Lesson plan was followed for the Academic year 2021-2022

01/03/2022

The Same Lesson Plan was followed for the Academic year 2022-2023

7/2/2023

7/2/23

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Department of **Mechanical Engineering**	LP: ME18002 Rev. No: 0 Date: 12.01.2021
B.E/~~B.Tech/M.E/M.Tech~~ : MEC Regulation: R2018 PG Specialisation : NA Sub. Code / Sub. Name : ME18002 / 3D Printing and Design Unit : I - Introduction to Additive Manufacturing	

Unit Syllabus 9

Introduction to AM, AM evolution, Distinction between AM & CNC machining, Advantages of AM, AM process chain: Conceptualization, CAD, conversion to STL, transfer to AM, STL file manipulation, Machine setup, build, removal and clean up, post processing.

Objective:

To learn the principle of Additive Manufacturing; basic steps in AM; CAD modeling & file conversion.

Session No *	Topics to be covered	Ref	Teaching Aids
1.	Introduction to AM; evolution of AM technology	R1:1-3	PPT-Google Meet
2.	Distinction between AM & CNC machining; role of AM in product development	R1:5-7	”
3.	Advantages of AM for various stake holders	R1:11-13	”
4.	AM process chain: Conceptualization	R1:19-21	”
5.	3D CAD modeling; various considerations	R1:26-28	”
6.	File formats: direct & indirect translation	R4:20-23	”
7.	STL file manipulation: error checking	R2:111-115 R2:135-136	”
8.	Machine setup, building	R2:139-148	”
9.	Removal and clean up and post processing	R1:14-17	”
Content beyond syllabus covered (if any):			

* Session duration: 50 minutes

Sub. Code / Sub. Name: ME18002 / 3D Printing and Design

Unit – II : AM PROCESSES

Unit Syllabus:

Liquid polymer system, discrete particle system, molten material systems, solid sheet system

Objective:

To learn various additive manufacturing (AM) processes and the process parameters.

Session No *	Topics to be covered	Ref	Teaching Aids
1.	Classification of AM processes – Liquid, molten material, discrete particle, and solid sheet systems	R1:295-338	PPT- Google Meet
2.	Liquid polymer system: Stereolithography Apparatus (SLA); principle, process, process parameters;	R4:87-93	”
3.	SLA- Process parameter – simple problem; advantages, disadvantages, and applications.	R4:87-93 R4:109-115	”
4.	Molten material systems: Fused Deposition Modeling (FDM); principle, process, process parameters;	R1:26	”
5.	FDM-Process parameter – simple problem; advantages, disadvantages, and applications. Solid sheet system: Laminated Object Manufacturing (LOM): principle, process,	R4:119	”
6.	LOM - process parameters, advantages, disadvantages, and applications.	R4:117-121	”
7.	Discrete particle system- powder based: Selective Laser Sintering (SLS); principle, process, process parameters, advantages, disadvantages, and applications.	R1:237-276 R2:12-13	”
8.	3D Printing (3DP): principle, process, process parameters, advantages, disadvantages, and applications.	R2:192-203	”
9.	Laser Engineered Net Shaping (LENS): principle, process, process parameters, advantages, disadvantages, and applications.	R2:187-190	”
Content beyond syllabus covered (if any):			

* Session duration: 50 mins

Sub. Code / Sub. Name: ME18002 / 3D Printing and Design

Unit – III : DESIGN FOR AM

Unit Syllabus:

Motivation, DFMA concepts and objectives, AM unique capabilities, Exploring design freedoms, Design tools for AM, Part Orientation, Removal of Supports, Hollowing out parts, Inclusion of Undercuts and Other Manufacturing Constraining Features, Interlocking Features, Reduction of Part Count in an Assembly, Identification of markings/ numbers etc. Guidelines for process selection: selection methods for a part, challenges of selection, example system for preliminary selection, production planning and control.

Objective:

To learn the various design requirements for Additive Manufacturing.

Session No *	Topics to be covered	Ref	Teaching Aids
1.	DFMA concepts and objectives	R1:35-45	PPT- Google Meet
2.	Exploring design freedoms	R1:46-50 R2:43-45	,,
3.	Design tools for AM	R1:51-53 R2:46-49	,,
4.	Manufacturing Constraining Features: Part Orientation, Removal of Supports, Hollowing out parts, Inclusion of Undercuts	R1:51-53	,,
5.	Interlocking Features,	R1:124-126	,,
6.	Reduction of Part Count in an Assembly, Identification of markings/ numbers	R1:127-130 R2:52-54	,,
7.	Guidelines for process selection: selection methods for a part	R1:131-132	,,
8.	Guidelines for process selection: challenges of selection; example system for preliminary selection	R1:111-115	,,
9.	Production planning and control	R1:116-120 R2:61-64	,,

Content beyond syllabus covered (if any):

Sub. Code / Sub. Name: ME18002 / 3D Printing and Design

Unit – IV : POST PROCESSING

Unit Syllabus:

Support material removal, surface texture improvement, accuracy improvement, aesthetic improvement, preparation for use as a pattern, property enhancements using non-thermal and thermal techniques.

Objective:

To understand various post processing methods in AM

Session No *	Topics to be covered	Ref	Teaching Aids
1.	Support Material Removal: Natural Support Post-Processing, Synthetic Support Removal	R1:173-176	PPT-Google Meet
2.	Surface Texture Improvements	R1:177-180 R2:55-57	,,
3.	Accuracy improvement: Error Sources, Model Pre-processing	R1:181-183 R2:58-60	,,
4.	Accuracy improvement: Machining Strategy - Adaptive Raster Milling, Sharp Edge Contour Machining, Hole Drilling	R1:193-196 R2:76-77	,,
5.	Aesthetic Improvements	R1:197-198	,,
6.	Preparation for use as a Pattern: Investment Casting Patterns, Sand Casting Patterns	R1:199-201	,,
7.	Other Pattern Replication Methods	R1:202 R2:65-66	,,
8.	Property Enhancements using Non-thermal Techniques	R1:203-204	,,
9.	Property Enhancements using Thermal Techniques	R1:214-215	,,

Content beyond syllabus covered (if any):

Sub. Code / Sub. Name: ME18002 / 3D Printing and Design

Unit – V : APPLICATIONS OF AM

Unit Syllabus:

Functional models, Pattern for investment and vacuum casting, Medical models, art models, Engineering analysis models, Rapid tooling, new materials development, Bi-metallic parts, Re-manufacturing. Application examples for Aerospace, defense, automobile, Bio-medical and general engineering industries.

Objective:

To learn various applications of AM in various fields

Session No *	Topics to be covered	Ref	Teaching Aids
1.	Functional models, Pattern for investment and vacuum casting	R1:216	PPT- Google Meet
2.	Medical models, art models	R1:327-331	”
3.	Engineering analysis models	R1:303,332 R3:191-200	”
4.	Rapid tooling	R4:56-62	”
5.	New materials development, Bi-metallic parts, Re-manufacturing	R2:299-303	”
6.	Applications in Aerospace, automobile	R1:173-176	”
7.	Applications in defense	R1:177-180 R2:55-57	”
8.	Applications in Bio-medical field.	R1:181-183 R2:58-60	”
9.	Applications in general engineering industries	R1:193-196 R2:76-77	”

Content beyond syllabus covered (if any):

Sub Code / Sub Name: ME18002 / 3D Printing and Design

REFERENCES:

1. Chua Chee Kai, Leong KahFai, "Rapid Prototyping: Principles & Applications", World Scientific, 2003
2. Ian Gibson, David W Rosen, Brent Stucker., "Additive Manufacturing Technologies: Rapid Prototyping to Direct Digital Manufacturing", Springer, 2010
3. Ali K. Kamrani, Emand Abouel Nasr, "Rapid Prototyping: Theory & Practice", Springer, 2006.
4. D.T. Pham, S.S. Dimov, Rapid Manufacturing: The Technologies and Applications of Rapid Prototyping and Rapid Tooling, Springer 2001.

	Prepared by	Approved by
Signature		
Name	K.S.Badrinathan	Dr. R. RAMESH
Designation	Professor	PROFESSOR
Date	12.01.2021	12-01-2021

Remarks *: The same lesson plan will be followed during 2021-22, Even Semester in off-line mode. 23/2/22 23/2/22

Remarks *: The same lesson plan will be followed during 2022-23 Even Semester. 20/1/23 20/1/2023

* If the same lesson plan is followed in the subsequent semester/year it should be mentioned and signed by the Faculty and the HOD

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Department of Mechanical Engineering	
B.E/B.Tech/M.E/M.Tech :B.E Regulation: 2018 PG Specialisation : NA Sub. Code / Sub. Name : ME 18014 DIGITAL MANUFACTURING MANUFACTURING Unit : I	LP: ME18014 Rev. No: 0 Date: 26.02.2022

Unit Syllabus: INTRODUCTION OF NC, CNC, DNC AND ADAPTIVE CONTROL

Classification of machine tools – types, functions and processes - fundamentals of NC and CNC technologies Adaptive control - types, application and benefits - general configuration of adaptive control and function – reasons for process change -practical problems with adaptive control - example for feedback and adaptive control**.**

Objective:

- To understand and apply the basic concepts of NC, CNC, DNC and Adaptive control.
- To learn the various components of NC, CNC, DNC and Adaptive control.

Session No *	Topics to be covered	Ref	Teaching Aids
1	Classification of machine tools	Ref 3 Pg No 1-4	BB
2	Types, functions and processes	Ref 1 Pg No 1-3	PPT. ICT
3	Fundamentals of NC and CNC technologies Adaptive control – **Q & A for Participative Learning**	Ref 1 Pg No 2-3	PPT, ICT
4	Types, application and benefits	Ref 1 Pg No 5-11	PPT, ICT
5	General configuration of adaptive control and function	Ref 3 Pg No 35-40	PPT, ICT
6	Reasons for process change	Ref 3 Pg No 150-160	PPT, ICT
7	Practical problems with adaptive control – **Participative Learning**	Ref 3 Pg No 212-216	PPT, ICT
8	Example for feedback and adaptive control – **Visual Demonstration using ICT**	Ref 3 Pg No 221-230	PPT, ICT

Content beyond syllabus covered (if any):

Adaptive control Practice

* Session duration: 50 minutes

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Sub. Code / Sub. Name:MS 18014 DIGITAL MANUFACTURING

Unit : II

Unit Syllabus : MECHATRONIC ELEMENTS IN CNC MACHINE TOOLS

CNC systems - configuration of the CNC system – interfacing – monitoring – diagnostics machine data - compensations for machine accuracies - PLC in CNC – PLC programming for CNC, steps in programming and case studies - machine structure -types of loads on CNC machine - guide ways and types - mechanical transmission elements - elements for rotary motion to linear motion - ball screw and types -roller screw and types - rack and pinion - various torque transmission elements - requirements of feed drives and spindle drive**.**

Objective:

To understand the various image Mechatronics elements of NC, CNC and PLC circuits.

Session No *	Topics to be covered	Ref	Teaching Aids
9.	CNC systems	Ref 1 Pg No 68-80	BB, PPT
10.	Configuration of the CNC system	Ref 3 Pg No 82-84	BB, PPT
11.	Interfacing – monitoring – diagnostics machine data – **Video Demonstration using ICT**	Ref 3 Pg No 88-100	BB, PPT
12.	Compensations for machine accuracies	Ref 3 Pg No 107-115	BB, PPT
13.	PLC in CNC – PLC programming for CNC, steps in programming and case studies	Ref 3 Pg No 139-149	BB, PPT
14.	Machine structure – Images identification for **Participative Learning**	Ref 3 Pg No 364-379	PPT, ICT
15.	Types of loads on CNC machine	Ref 3 Pg No 427-429	PPT, ICT
16.	Guide ways and types	Ref 3 Pg No 427-451	PPT, ICT
17.	Mechanical transmission elements – **Video demonstration**	Ref 3 Pg No 383-396	PPT, ICT
18.	Elements for rotary motion to linear motion – Seminar presentation for **Participative Learning**	Ref 3 Pg No 427-438	PPT, ICT
19	Ball screw and types -roller screw and types - rack and pinion	Ref 3 Pg No 208-210	PPT, ICT
20	Various torque transmission elements -requirements of feed drives and spindle drive.	Ref 3 Pg No 333-354	PPT, ICT
Content beyond syllabus covered (if any):			

* Session duration: 50 mins

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Sub. Code / Sub. Name: MS 18014 DIGITAL MANUFACTURING

Unit : III

Unit Syllabus : MECHATRONICS ELEMENT IN CNC MEASURING SYSTEM AND TOOLING

Measuring systems - feedback devices - velocity feedback -analog and digital - position feedback - rotary and linear. Tooling - requirement and planning -preset, qualified and semi qualified tools. Fixtures – requirement - unified and modular fixtures -tool identification - touch trigger probe tool coding -EEPROM tools. 19 Tool condition monitoring - various indirect and direct methods. Identification and gauging of work piece. Tool locking system -ball lock mechanism and contact pressure monitoring. Automatic tool changing system - types and benefits -tool magazine – sensors in CNC.

Objective:

To understand the mechatronics elements in CNC Measuring System and Tooling.

Session No *	Topics to be covered	Ref	Teaching Aids
21.	Measuring systems	Ref 3 Pg No 511-512	BB
22.	Feedback devices - velocity feedback -analog and digital - position feedback - rotary and linear.	Ref 1 Pg No 16-32	BB
23.	Tooling - requirement and planning -preset, qualified and semi qualified tools – Quiz / Q & A session for **Participative Learning**	Ref 1 Pg No 16-32	BB, PPT
24.	Fixtures – requirement - unified and modular fixtures -tool identification	Ref 3 Pg No 316-325	PPT, ICT
25.	Touch trigger probe tool coding -EEPROM tools. 19 Tool condition monitoring	Ref 3 Pg No 516, 545-550	PPT, ICT
26.	Various indirect and direct methods – Industrial Visit for **Experiential Learning**	Ref 3 Pg No 486-489	PPT, ICT
27.	Identification and gauging of work piece	Ref 3 Pg No 525-535	PPT, ICT
28.	Tool locking system -ball lock mechanism and contact pressure monitoring	Ref 1 Pg No 69-80	PPT, ICT
29.	Automatic tool changing system – Seminar / PPT presentation for **Participative Learning**	Ref 2 Pg No 519-525	PPT, ICT
30.	Types and benefits -tool magazine – sensors in CNC.	Ref 2 Pg No 282-312	PPT, ICT

Content beyond syllabus covered (if any):

* Session duration: 50 mins

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Sub. Code / Sub. Name: MS 18014 DIGITAL MANUFACTURING

Unit : IV

Unit Syllabus : CNC PROGRAMMING

Machine axes identification - primary, secondary and tertiary -manual CNC programming - Milling programming fundamentals - compensation and offset in milling -fixed cycles in milling - repetitive programming - loops, sub programs and macros. Turning programming fundamentals - compensation and offset in turning -fixed cycles in turning. Computer assisted programming in APT - basic geometry definition -cutter motion definition -postprocessor statements -generation and execution of APT programs

Objective:

To understand the various image processing and image analysis algorithms and the issues involved in applying them to various machine vision applications

Session No *	Topics to be covered	Ref	Teaching Aids
31.	Machine axes identification	Ref 3 Pg No 669-671	BB,PPT
32.	Primary, secondary and tertiary	Ref 3 Pg No 556-565	PPT, ICT
33.	Manual CNC programming - Milling programming fundamentals – Video demonstration by **Virtual Lab ICT**	Ref 1 Pg No 235-241	PPT, ICT
34.	Compensation and offset in milling -fixed cycles in milling - repetitive programming	Ref 3 Pg No 624-638	PPT, ICT
35.	Loops, sub programs and macros. Turning programming fundamentals	Ref 1 Pg No 283-292	PPT, ICT
36.	Compensation and offset in turning -fixed cycles in turning – **Video demonstration**	Ref 1 Pg No 208-212	PPT, ICT

Content beyond syllabus covered (if any):

* Session duration: 50 mins

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Sub. Code / Sub. Name: MS 18014 DIGITAL MANUFACTURING

Unit : V

Unit Syllabus: TESTING AND MAINTENANCE OF CNC MACHINES

Verification of technical specification and functional aspects, Verification during idle running & machine tool and the work piece accuracy -Installation of CNC machines -Maintenance of CNC machines - machine elements – hydraulic elements -electrical and electronic elements – maintenance schedules.

To expose students to various applications of vision and challenges involved in each.

Session No *	Topics to be covered	Ref	Teaching Aids
37.	Verification of technical specification and functional aspects,	Ref 5 Pg No 237-303	BB, PPT
38.	Verification during idle running & machine tool and the work piece accuracy – Seminar presentation for **Participative Learning**	Ref 5 Pg No 237-303	PPT, ICT
39.	Installation of CNC machines	Ref 5 Pg No 237-303	PPT, ICT
40.	Maintenance of CNC machines	Ref 5 Pg No 237-303	PPT, ICT
41.	Machine elements - Seminar presentation for **Participative Learning**	Ref 5 Pg No 237-303	PPT, ICT
42.	Hydraulic elements	Ref 5 Pg No 237-303	PPT, ICT
43.	Electrical and electronic elements – Seminar presentation for **Participative Learning**	Ref 5 Pg No 237-303	PPT, ICT
44.	Maintenance schedules	Ref 5 Pg No 237-303	PPT, ICT
45.	Maintenance schedules	Ref 5 Pg No 237-303	PPT, ICT

Content beyond syllabus covered (if any):

CMM Measurement and CNC Programming

* Session duration: 50 mins

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Sub Code / Sub Name: MS 18014 DIGITAL MANUFACTURING

REFERENCES:

1. Grahamt.Smith, "Advanced Machining: The Handbook of Cutting Technology", IFS Publications Ltd., 1989
2. Groover, M.P., "Automation, Production System and CIM", Prentice Hall of India Pvt. Ltd, 2003.
3. HMT Limited, "Mechatronics", Tata Mcgraw-Hill Publishing Co Ltd, 2008.
4. Jayakumar,V., and Mahendran,B., "Computer Aided Manufacturing", Lakshmi Publications, 2013.
5. Jonathan Lin,S.C., "Computer Numerical Control (From Programming to Networking)", Delmar Publishers Inc., 2000.
6. Radhakrishnan,P., "CNC Machine", New Central Book Agency, 2000.
7. Sehrawatt,M.S., and Narang,J.S., "CNC Machine", DhanpatRai And Co, 2002. 8. Stenerson and Curran, "Computer Numerical Control-Operation and Programming", PHI Learning Pvt. Ltd., 2008

	Prepared by	Approved by
Signature	V.	
Name	V.Senthilvelan	Dr.M.Mohandass
Designation	Assistant Professor	Assistant HOD / MEC
Date	26/02/2022	26/02/2022

Remarks *: The same Course plan is being followed for AY 2022-23

V. 6/4/23 (V. SENTHILVELAN) 6/04/23

Remarks *:

* If the same lesson plan is followed in the subsequent semester/year it should be mentioned and signed by the Faculty and the HOD

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

DEPARTMENT OF MECHANICAL ENGINEERING	LP: ME18601 Rev. No: 00 Date: 09/02/2021
B.E/~~B.Tech/M.E/M.Tech~~ : Mechanical Engineering Regulation: 2018 PG Specialisation : NA Sub. Code / Sub. Name : ME18601 – COMPUTER AIDED DESIGN AND MANUFACTURING Unit : 1	

UNIT I INTRODUCTION 9

Product cycle- Design process- sequential and concurrent engineering- Computer aided design – CAD system architecture- Computer graphics – co-ordinate systems- 2D and 3D transformations homogeneous coordinates - Line drawing -Clipping- viewing transformation.

Objective: To understand the basic concepts of geometric modelling, computer graphics and design.

Session No *	Topics to be covered	Ref	Teaching Aids
1	Introduction to CAD, Need of CAD, benefits of CAD, Implementation of CAD, Difference between conventional Design process and Computer Aided design process.	T 1 (C1) P.N:5	PPT/BB
2	Process of Product life cycle - Design process and Manufacturing process	T 1 (C1) P.N:6-7	PPT/BB
3	Design process - Sequential and concurrent engineering approaches	T 1 (C1) P.N:7-8	PPT/BB
4	Workstation of CAD and Architecture of CAD system	T 1 (C1) P.N:7-11	PPT/BB
5	Communication and interpretation of Computer graphics	T 1 (C1) P.N:445-456	PPT/BB
6	Common Co-ordinate systems - world coordinate system, user co-ordinate system and Homogeneous coordinate systems	T 1 (C1) P.N:16	PPT/BB
7	Translation, Rotation and Scaling of 2D Transformations	R 3 (C5) P.N:183-190	PPT/BB
8	Translation, Rotation and Scaling of 3D Transformations	R 3 (C11) P.N: 407-422	PPT/BB
9	By using equation to draw Line -2D graphics of Clipping, 3D graphics of clipping, Depth clipping, cohen Sutherland algorithm, Sutherland – Hodgman algorithm.	- T 1 (C 1) P.N:478-481 R1 (C 4)	PPT/BB
10	Techniques of the Viewing transformation	1 (C1) P.N-77, 108-109,216-222,431-437	PPT/BB
Content beyond syllabus covered (if any):			

* Session duration: 50 minutes

Sub. Code / Sub. Name: ME18601 – COMPUTER AIDED DESIGN AND MANUFACTURING

Unit : II

UNIT II GEOMETRIC MODELING 9

Representation of curves- Hermite curve- Bezier curve- B-spline curves-rational curves-Techniques for surface modeling – surface patch- Coons and bicubic patches- Bezier and B-spline surfaces. Solid modeling techniques- CSG and B-rep.

Objective: To understand the various techniques of geometric modelling and surface modelling for the mechanical components.

Session No *	Topics to be covered	Ref	Teaching Aids
11	Techniques involved in the representation of curves	T 1 (C6) P.N-149-195	PPT/BB
12	Techniques of Hermite curves, Properties of Hermite curves. Techniques of Beizer curves, Types of Beizer curves, Properties of Beizer curves	T 1 (C6) P.N-196-207	PPT/BB
13	Techniques of Bernstein basis spline curves, Characteristics of B-Spline curves, Techniques of Rational curves	T 1 (C6) P.N-149-193	PPT/BB
14	Techniques of surface modelling – Properties of surface modelling, Advantages and limitations of surface modelling.	R 1 (C3) P.N:73-74	PPT/BB
15	Techniques of Coons patch, Properties of Coons patch, Advantages and limitations of Coons patch	R 1 (C 3) P.N: 75	PPT/BB
16	Techniques of surface patch, Properties of surface patch, Advantages and limitations of surface patches.	R 1 (C 3) P.N: 75	PPT/BB
17	Techniques of Bi-Cubic patch, Properties of Bi-Cubic patch, Advantages and limitations of Bi-Cubic patches.	R 1 (C 3) P.N: 76	PPT/BB
18	Introduction to techniques of Solid modelling, Properties of Solid modelling, Advantages and Limitations of Solid modelling	R 1 (C 3) P.N: 78	PPT/BB
19	Techniques of Constructive Solid Geometry, Properties of CSG, Advantages and Limitations of CSG	T 1 (C 9) P.N: 383-395	PPT/BB
20	Techniques of Boundary representations, Properties of B-rep, Advantages and Limitations of B-rep	T 1 (C 9) P.N: 374-382	PPT/BB
Content beyond syllabus covered (if any):			

* Session duration: 50 mins

Sub. Code / Sub. Name: ME18601 – COMPUTER AIDED DESIGN AND MANUFACTURING

Unit : III

UNIT III VISUAL REALISM 9

Hidden – Line-Surface - Solid removal algorithms – Shading – Coloring – Engineering animation.

Objective: Students will understand the various visual techniques in 2d and 3d modelling packages..

Session No *	Topics to be covered	Ref	Teaching Aids
21	Methods of visual realism, Classifications of Visualization. Process of Visualization	R 1 (C 4) P.N:109	PPT/BB
22	Method of Hidden line removal and its algorithm. Hidden line removal in 2D wireframe model.	R 1 (C 4) P.N:109,110	PPT/BB
23	Method of Hidden line removal and its algorithm, Hidden surface removal in 3D parts.	R 1 (C 4) P.N:110,111	PPT/BB
24	Hidden surface algorithm – Depth-Buffer algorithm	R 2 (C 24) P.N:369-371	PPT/BB
25	Hidden surface algorithm - Scan line coherence algorithm	R 2 (C 24) P.N:372-375	PPT/BB
26	Hidden surface algorithm – Area coherence algorithm	R 2 (C 24) P.N:376	PPT/BB
27	Solid removal algorithms – Ray tracing algorithm, Advantages and disadvantages of ray tracing algorithm.	T 1 (C 13) P.N:524-525	PPT/BB
28	Different techniques of Shading Image with edge lines, Image without lines, Images with shading- Flat shading, Smooth shading, Gourang shading and phong shading. Various Lighting techniques used in shading.	T 1 (C 13) P.N:536-545	PPT/BB
29	Techniques of Coloring for differentiate a parts.	T 1 (C 13) P.N:548-549	PPT/BB
30	Engineering animation procedure.	T 1 (C-14) P.N:557-571 & R 3 (C 16) P.N:583-597	PPT/BB
Content beyond syllabus covered (if any):			

* Session duration: 50 mins

Sub. Code / Sub. Name: ME18601 – COMPUTER AIDED DESIGN AND MANUFACTURING

Unit : IV

UNIT IV CAD STANDARDS 9

Standards for computer graphics- Graphical Kernel System (GKS) - standards for exchange images- Open Graphics Library (OpenGL) - Data exchange standards - IGES, STEP, CALS etc. - communication standards.

Objective: To understand the way in which standards are applied to graphics, communication and data exchange in CAD/CAM

Session No *	Topics to be covered	Ref	Teaching Aids
41	Purpose of CAD standards	R 4 (C 20) P.N:25-30	PPT/BB
42	Various standards in computer graphics Programming	R 1 (C 7) P.N:213	PPT/BB
43	Parts of Graphical kernel system, Functions of GKS	R 1 (C 7) P.N:214	PPT/BB
44	Standard for Exchange images - Features of Exchange images	R 1 (C 7) P.N:216	PPT/BB
45	Structure of (Open GL) - Features of Open GL	R 1 (C 7) P.N:216	PPT/BB
46	Data exchange standards, Evolution of Data exchange format	R 1 (C 7) P.N:223	PPT/BB
47	IGES Specifications, Structure of IGES, IGES Extraction methodology, IGES testing, Topology of IGES, Advantages and limitations of IGES.	R 1 (C 7) P.N:223	PPT/BB
48	Components of STEP, Architecture of STEP	R 1 (C 7) P.N:228-229	PPT/BB
49	CAL methods, Functions of Cals	R 1 (C 7) P.N:237	PPT/BB
50	Communication Standards, Elements of CGM, Character coding of CGM, Elements of CGI, Character Coding of CGI.	R 1 (C 7) P.N:239	PPT/BB

Content beyond syllabus covered (if any):

* Session duration: 50 mins

Sub. Code / Sub. Name: ME18601 – COMPUTER AIDED DESIGN AND MANUFACTURING

Unit : V

UNIT V COMPUTER AIDED MANUFACTURING 9

Introduction to NC systems and CNC – Machine axis and Co-ordinate system- CNC machine tools- Principle of operation CNC- Construction features including structure- Drives and CNC controllers - Introduction of Part Programming. – Detailed Manual part programming using FANUC on Lathe & Milling machines using G codes and M codes- Introduction of CAM package.

Objective: To understand NC and CNC co-ordinate systems and able to generate coding for lathe and milling machines with help of G codes and M Codes.

Session No *	Topics to be covered	Ref	Teaching Aids
41	Introduction to NC systems and CNC	T-3 (C-22) PN: 863, 869	PPT/BB
42	Machine axis and Co-ordinate system	T-3 (C-22) PN: 872	PPT/BB
43	CNC machine tools	T-3 (C-22) PN: 865-871	PPT/BB
44	Principle of operation CNC	T-3 (C-22) PN: 869	PPT/BB
45	Construction features including structure	T-3 (C-22) PN: 864	PPT/BB
46	Drives and CNC controllers	T-3 (C-22) PN: 869	PPT/BB
47	Introduction of Part Programming	T-3 (C-22) PN: 872-874	PPT/BB
48	Detailed Manual part programming using FANUC on Lathe machine process using G codes and M codes	T-3 (C-22) PN: 877	PPT/BB
49	Detailed Manual part programming using FANUC on Milling machine process using G codes and M codes	T-3 (C-22) PN: 877	PPT/BB
50	Introduction of CAM package.	T-3 (C-1) PN: 08-09	PPT/BB

Content beyond syllabus covered (if any):

* Session duration: 50 mins

Sub Code / Sub Name: ME18601 COMPUTER AIDED DESIGN AND MANUFACTURING

TEXT BOOKS:

1. Agoston and Max K, "Computer Graphics & Geometric Modeling", Springer-Verlag London Limited, 2005.
2. Gerald Farin, "Curves and Surfaces for CAGD - A Practical Guide", Morgan-Kaufmann, 2002.
3. Ibrahim Zeid "Mastering CAD CAM" Tata McGraw-Hill Publishing Co.2009 2. Donald Hearn and M. Pauline Baker "Computer Graphics with open GL", 4th Edition, Prentice Hall, Inc., 2014.
4. Mikell P. Groover, Emory W. Zimmer, CAD/CAM Computer Aided Design & Manufacturing, Pearson Education, 1st edition, 2003
5. Rao. P.N "CAD/CAM Principles & Applications", TMH Publications, 3rd edition, 2010

REFERENCES:

1. Chris McMahon and Jimmie Browne "CAD/CAM Principles", "Practice and Manufacturing management" Second Edition, Pearson Education, 1999.
2. Foley, Wan Dam, Feiner and Hughes - "Computer graphics principles & practice" Pearson Education - 2003.
3. Jayanta Sarkar "Computer Aided Design: A Conceptual Approach" CRC Press, 2014.
4. Shah J J and Mantyla M, "Parametric and Feature-based CAD/CAM", John Wiley & Sons. New York, 1995.
5. William M Neumann and Robert F. Sproul "Principles of Computer Graphics", McGraw Hill Book Co. Singapore, 1989.

WEB RESOURCES :

1. https://nptel.ac.in/courses/112/102/112102102/
2. https://nptel.ac.in/courses/112/102/112102103/

	Prepared by	Approved by
Signature		
Name	Mr G.Kirubakaran/Dr S Muniraj	Dr.S.Rameshbabu
Designation	Assistant Professor	Professor and Head
Date	09/02/2021	09/02/2021
Remarks *:	The same lesson plan will be followed for academic year 2021-22 Even semester 10/1/22	
Remarks *:	The same lesson plan will be followed for academic year 2022-23 Even Semester 1/2/2023	

* If the same lesson plan is followed in the subsequent semester/year it should be mentioned and signed by the Faculty and the HOD

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Department of Mechanical Engineering	LP: ME18602 Rev. No: 01 Date: 05/04/2022
B.E/~~B.Tech/M.E/M.Tech~~ : Mechanical Engineering, Regulation: R2018 PG Specialisation : --- Sub. Code / Sub. Name : **ME18602/ DESIGN OF TRANSMISSION SYSTEMS** Unit : **I**	

Unit Syllabus: **DESIGN OF FLEXIBLE ELEMENTS** 12

Design of Flat belts and pulleys - Selection of V belts and pulleys – Selection of hoisting wire ropes and pulleys – Design of Transmission chains and Sprockets.

Objective:. To gain knowledge on the principles and procedure for the design of flexible elements

Session No *	Topics to be covered	References	Teaching Aids
1	Design of Flat belts and pulleys	1(Chap.-13, pag.-499-501)	BB
2	Design of Flat belts and pulleys	1(Chap.-13, pag.-509-517)	BB, ICT
3	Design of Flat belts and pulleys- **Video demonstration**	1(Chap.-13, pag.-509-517)	BB, ICT
4	Selection of V belts and pulleys	1(Chap.-13, pag.-522-530)	ICT, BB
5	Selection of V belts and pulleys	1(Chap.-13, pag.-522-530)	ICT
6	Selection of V belts and pulleys	1(Chap.-13, pag.-522-530)	BB, ICT
7	Selection of hoisting wire ropes and pulleys	1(Chap.-4, pag.-624)	ICT
8	Selection of hoisting wire ropes and pulleys	1(Chap.-4, pag.-624)	ICT
9	Selection of hoisting wire ropes and pulleys	1(Chap.-4, pag.-624)	ICT
10	Design of Transmission chains and Sprockets.	1(Chap.-14, pag.-544-551)	ICT
11	Design of Transmission chains and Sprockets.	1(Chap.-14, pag.-544-551)	ICT
12	Design of Transmission chains and Sprockets.	1(Chap.-14, pag.-544-551)	ICT
Content beyond syllabus covered (if any):			

* Session duration: 50 minutes
* ICT – Laptop, Projector, Pen drive, Google Classroom, Microsoft tools, YouTube Videos

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Sub. Code / Sub. Name: ME18602/ DESIGN OF TRANSMISSION SYSTEMS
Unit : **II**

Unit Syllabus : SPUR GEARS AND PARALLEL AXIS HELICAL GEARS 12

Speed ratios and number of teeth -Force analysis -Tooth stresses - Dynamic effects – Fatigue strength - Factor of safety - Gear materials – Design of straight tooth spur & helical gears based on strength and wear considerations – Pressure angle in the normal and transverse plane- Equivalent number of teeth-forces for helical gears.

Objective: To understand and familiarize the standard procedure available for Design of cylindrical gears

Session No *	Topics to be covered	References	Teaching Aids
13	Speed ratios and number of teeth	6 (Chap.-1, pag.-1.1-1.5)	ICT
14	Tooth stresses - Dynamic effects	6 (Chap.-1, pag.-1.6-1.10)	ICT
15	Fatigue strength - Factor of safety - Gear materials	6 (Chap.-1, pag.-1.10-1.12)	ICT, LAB
16	Design of straight tooth spur based on strength and wear considerations **(Laboratory demonstration of Spur gear – Experiential Learning)**	6 (Chap.-1, pag.-1.13-1.35)	LAB, ICT
17	Design of straight tooth spur gears based on strength and wear considerations	6 (Chap.-1, pag.-1.13-1.35)	BB, ICT
18	Design of straight tooth spur gears based on strength and wear considerations	6 (Chap.-1, pag.-1.13-1.35)	ICT
19	Design of straight tooth spur gears based on strength and wear considerations	6 (Chap.-1, pag.-1.13-1.35)	BB, ICT
20	Design of straight tooth spur gears based on strength and wear considerations	6 (Chap.-1, pag.-1.13-1.35)	ICT
21	Design of straight tooth helical gears based on strength and wear considerations-**Video demonstration**	6 (Chap.-2, pag.-2.1-2.15)	ICT
22	Design of straight tooth helical gears based on strength and wear considerations	6 (Chap.-2, pag.-2.1-2.15)	ICT
23	Design of straight tooth helical gears based on strength and wear considerations	6 (Chap.-2, pag.-2.1-2.15)	ICT
24	Design of straight tooth helical gears based on strength and wear considerations	6 (Chap.-2, pag.-2.1-2.15)	ICT
Content beyond syllabus covered (if any):			

* Session duration: 50 minutes
* ICT – Laptop, Projector, Pen drive, Google Classroom, Microsoft tools, YouTube Videos

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Sub. Code / Sub. Name: ME18602/ DESIGN OF TRANSMISSION SYSTEMS

Unit : **III**

Unit Syllabus **BEVEL AND WORM GEARS** 12

Straight bevel gear: Tooth terminology, tooth forces and stresses, equivalent number of teeth. Estimating the dimensions of pair of straight bevel gears. Worm Gear: Merits and demerits Terminology. Thermal capacity, materials-forces and stresses, efficiency, estimating the size of the worm gear pair

Objective: Insight the standard procedure available for Design of bevel and worm gear drives

Session No *	Topics to be covered	References	Teaching Aids
25	Straight bevel gear: Tooth terminology	6 (Chap.-3, pag.-3.1-3.14)	ICT
26	Straight bevel gear-forces and stresses	6 (Chap.-3, pag.-3.1-3.14)	ICT
27	Equivalent number of teeth	6 (Chap.-3, pag.-3.1-3.14)	ICT
28	Estimating the dimensions of pair of straight bevel gears	6 (Chap.-3, pag.-3.1-3.14)	ICT,
29	Estimating the dimensions of pair of straight bevel gears	6 (Chap.-3, pag.-3.1-3.14)	BB, ICT
30	Estimating the dimensions of pair of straight bevel gears	6 (Chap.-3, pag.-3.1-3.14)	ICT
31	Worm Gear: Merits and demerits Terminology- **Video demonstration**	6 (Chap.-4, pag.-4.1-4.13)	BB, ICT
32	Thermal capacity	6 (Chap.-4, pag.-4.1-4.13)	ICT
33	Materials-forces and stresses, efficiency	6 (Chap.-4, pag.-4.1-4.13)	ICT
34	Estimating the size of the worm gear pair	6 (Chap.-4, pag.-4.1-4.13)	BB,ICT
35	Estimating the size of the worm gear pair	6 (Chap.-4, pag.-4.1-4.13)	BB,ICT
36	Estimating the size of the worm gear pair	6 (Chap.-4, pag.-4.1-4.13)	BB,ICT

Content beyond syllabus covered (if any): The refractory metals, super-alloys, noble metals, Lead and Zinc alloys.

* Session duration: 50 minutes
* ICT – Laptop, Projector, Pen drive, Google Classroom, Microsoft tools, YouTube Videos

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Sub Code / Sub Name: ME18602/ DESIGN OF TRANSMISSION SYSTEMS

Unit : **IV**

Unit Syllabus : GEAR BOXES 12

Geometric progression - Standard step ratio - Ray diagram, kinematics layout -Design of sliding mesh gear box - Design of multi speed gear box for machine tool applications - Constant mesh gear box Speed reducer unit. – Variable speed gear box for automotive applications.

Objective: To impart the knowledge on gears in the design of gear box.

Session No*	Topics to be covered	References	Teaching Method
37	Geometric progression - Standard step ratio	6 (Chap.-6, pag.-6.1-6.2)	ICT
38	Ray diagram	6 (Chap.-6, pag.-6.3)	ICT
39	kinematics layout	6 (Chap.-6, pag.-6.4)	ICT
40	Design of sliding mesh gear box- **Video demonstration**	6 (Chap.-6, pag.-6.4-6.24)	ICT
41	Design of sliding mesh gear box	6 (Chap.-6, pag.-6.4-6.24)	ICT
42	Design of sliding mesh gear box	6 (Chap.-6, pag.-6.4-6.24)	ICT
43	Design of multi speed gear box for machine tool applications – **Power point presentation by students – Participative learning**	6 (Chap.-6, pag.-6.4-6.24)	ICT
44	Design of multi speed gear box for machine tool applications	6 (Chap.-6, pag.-6.4-6.24)	ICT
45	Design of multi speed gear box for machine tool applications	6 (Chap.-6, pag.-6.4-6.24)	ICT
46	Constant mesh gear box Speed reducer unit	6 (Chap.-6, pag.-6.4-6.24)	ICT
47	Constant mesh gear box Speed reducer unit	6 (Chap.-6, pag.-6.4-6.24)	ICT
48	Variable speed gear box for automotive applications.	6 (Chap.-6, pag.-6.4-6.24)	ICT
Content beyond syllabus covered (if any):			

* Session duration: 50 minutes
* ICT – Laptop, Projector, Pen drive, Google Classroom, Microsoft tools, YouTube Videos

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Sub. Code / Sub. Name: ME18602/ DESIGN OF TRANSMISSION SYSTEMS
Unit : **V**

Unit Syllabus : CLUTCHES AND BRAKES **12**

Design of plate clutches –axial clutches - cone clutches - internal expanding rim clutches, Electromagnetic clutches. Band and Block brakes - external shoe brakes – Internal expanding shoe brake.

Objective: • To enhance the practicing in design of clutches and brakes

Session No*	Topics to be covered	References	Teaching Method
49	Design of plate clutches - **Video demonstration**	1 (Chap.-11, pag. 448)	BB, ICT
50	Design of plate clutches	1 (Chap.-11, pag. 448)	BB, ICT
51	Design of axial clutches	1 (Chap.-11, pag. 456)	BB, ICT
52	Design of axial clutches	1 (Chap.-11, pag. 456)	BB, ICT, LAB
53	Design of cone clutches	1 (Chap.-11, pag. 461)	BB, ICT
54	Design of cone clutches	1 (Chap.-11, pag. 461)	ICT
55	Internal expanding rim clutches	1 (Chap.-11, pag. 467)	ICT
56	Internal expanding rim clutches	1 (Chap.-11, pag. 467)	BB, ICT
57	Electromagnetic clutches.	1 (Chap.-12, pag. 472)	BB, ICT
58	Band and Block brakes- **Video demonstration**	1 (Chap.-12, pag. 490)	BB, ICT
59	External shoe brakes	1 (Chap.-12, pag. 475)	ICT
60	Internal expanding shoe brake.	1 (Chap.-12, pag. 485)	ICT
Content beyond syllabus covered (if any):			

* Session duration: 50 minutes

* ICT – Laptop, Projector, Pen drive, Google Classroom, Microsoft tools, YouTube Videos

Sub. Code / Sub. Name: ME18602/ DESIGN OF TRANSMISSION SYSTEMS

TEXT BOOKS:

1. Bhandari V, "Design of Machine Elements", Tata McGraw-Hill Book Co, 4th Edition, 2016. 98

2. Joseph Shigley, Charles Mischke, Richard Budynas and Keith Nisbett "Mechanical Engineering Design", Tata McGraw-Hill, 10th Edition, 2015

REFERENCES :

1. Alfred Hall, Halowenko, A and Laughlin, H., "Machine Design", Tata McGrawHill Book Co.(Schaum's Outline), 2010.

2. Ansel Ugural, "Mechanical Design – An Integral Approach", Tata McGrawHill Book Co, 2nd Edition, 2015.

3. Bernard Hamrock, Steven Schmid, Bo Jacobson, "Fundamentals of Machine Elements", Tata McGraw-Hill Book Co., 3rd Edition, 2014.

4. Jindal, U.C., "Machine Design-Design of Transmission System", Dorling Kindersley, 2010.

5. Merhyle F. Spotts, Terry E. Shoup and Hornberger, Lee. E, "Design of Machine Elements", Printice Hall, 8th Edition, 2003.

6. Prabhu, T.J., "Design of Transmission Elements", Mani Offset, Chennai, 2000.

7. Robert C. Juvinall and Kurt M. Marshek, "Fundamentals of Machine Design", Wiley, 2013.

8. Sundararajamoorthy, T.V and Shanmugam.N, "Machine Design", Anuradha Publications, Chennai, 2003.

	Prepared by	Approved by
Signature		
Name	T Saravanakumar	Dr. M. Mohamed Ars
Designation	AP/Mech	Asst. HOD
Date	28/2/22	28/2/22
Remarks *:		
Remarks *:		

* If the same lesson plan is followed in the subsequent semester/year it should be mentioned and signed by the Faculty and the HOD

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Department of Mechanical Engineering	LP: Sub ode:**ME18603**
B.E/~~B.Tech/M.E/M.Tech~~ : **Mechanical Engineering** Regulation:_2018	Rev. No: 0
PG Specialisation : _Nil_____	Date: 18.01.2021
Sub. Code / Sub. Name : **ME18603**: **GAS DYNAMICS AND JET PROPLUSION**	
Unit : I	

Unit Syllabus:

Energy and momentum equations of compressible fluid flows – Stagnation states, Mach waves and Mach cone – Effect of Mach number on compressibility – Isentropic flow through variable ducts – Nozzle and Diffusers, Design of inlets nozzles and Diffusers

Objective:

To understand the basic fundamentals of compressible flow concepts, non-dimensional numbers in compressible flows and to solve the simple compressible flows problems. Also too understand the effect of compressibility in nozzles and diffusers.

Session No *	Topics to be covered	Ref	Teaching
1	Introduction to compressible flow , thermodynamics and fluid properties	Ref:2,ch:1,pp.3-21	PPT
2	Steady flow energy equations	Ref:2,ch:2,pp36-38	PPT
3	Static, stagnation and critical state	Ref:2,ch:2,pp.39-42	PPT
4	Various regions of compressible flow, M* and Crooco number and their relation	Ref:2,ch:2,pp.43-48	PPT
5	Reference velocities, Types of waves, Mach angle and Mach cone, Effect of Mach number on compressibility	Ref:2,ch:2,pp.49-50	PPT
6	Numerical problems	Ref:2,ch:2,pp.52-53	Tutorial
7	Introduction to nozzles and diffusers, T-S and h-s Diagrams for nozzle and diffuser flows.	Ref:2,ch:2,pp.54-56	PPT,*ICT*
8	Relation between change in area to Mach number, relation between area ratio to number numbers	Ref:2,ch:4,pp.69-77	PPT,ICT
9	Impulse function flow through convergent –divergent nozzle. Flow throw diffusers	Ref:2,ch:2,pp.78-84	PPT, ICT
10	Use of gas tables with examples	Ref:2,ch:2,pp 90-93	PPT
11	Use of gas tables with examples	Ref:2,ch:2,pp 90-93	PPT
12	Numerical problems	Ref:2,ch:2,pp94-97	PPT
Content beyond syllabus covered (if any):			

* Session duration: 50 minutes

Sub. Code / Sub. Name: **ME18603:** GAS DYNAMICS AND JET PROPLUSION

Unit : II

Unit Syllabus :

Flows through constant area ducts with heat transfer (Rayleigh flow),Slope of Rayleigh line, and Friction (Fanno flow) Slope of fanno line– Flows through constant area ducts in a isothermal flow-variation of flow properties.(12)

Objective:

To understand the effect of friction (Fanno flow) and Heat transfer(Rayleigh Flow) incompressible flow and to solve Fanno and heat transfer problems.

	Topics to be covered	Ref	Teaching
13	Description of Fanno, Isothermal and Rayleigh flows	Ref:2,ch:8,pp.211-214	PPT
14	Fanno flow Equation and curve	Ref:2,ch:8,pp.214-216	PPT,*ICT*
15	Variation of properties and Mach numbers with duct length	Ref:2,ch:8,pp.224-225	PPT
16	Numerical problems	Ref:2,ch:8,pp.233-235	PPT,
17	Numerical problems in isothermal flows	Ref:2,ch:8,pp.236-239	PPT
18	Introduction to Rayleigh Flows, Curves and important remarks	Ref:2,ch:9,pp.247-249	PPT,ICT
19	Derivations for Rayleigh flow	Ref:2,ch:9,pp.250-253	PPT
20	Variation of flow properties in Rayleigh flows	Ref:2,ch:9,pp.256-257	PPT
21	Variation of flow properties in isothermal flow	Ref:2,ch:9,pp.257-258	PPT
22	Numerical problems	Ref:2,ch:9,pp.261-263	PPT
23	Numerical problems	Ref:2,ch:9,pp.261-263	PPT
24	Numerical problems	Ref:2,ch:9,pp.261-263	PPT
	CAT-1		
Content beyond syllabus covered (if any):			

* Session duration: 50 mins

Sub. Code / Sub. Name: **ME18603:** GAS DYNAMICS AND JET PROPLUSION

Unit : III

Unit Syllabus:

Governing equations – Variation of flow parameters across the normal and oblique shocks – Prandtl Meyer relations, Rankine-Hugoniot equations, Strength of the shock–Applications

Objective:

To understand the concepts of shock waves, its effect and types of shock waves and t

to solve the normal and oblique shock problems

Session No *	Topics to be covered	Ref	Teaching Aids
25	Introduction to shock waves, Types and conditions for shock	Ref:2,ch:6,pp.134-137	PPT
26	Prandtl-Meyer equation, Rankine Hugoiniot Equations	Ref:2,ch:6,pp.139-141	PPT,
27	Mach number across the shock, static properties across the shock	Ref:2,ch:6,pp.142-143	PPT
28	Stagnation properties across the shock, Numerical problems	Ref:2,ch:6,pp.144-149	PPT,
29	Normal shocks in Fanno and Rayleigh flows	Ref:2,ch:6,pp.164-167	PPT,ICT
30	Flow with oblique shock waves	Ref:2,ch:7,pp.174-177	PPT,
31	Mach number across the oblique shock	Ref:2,ch:6,pp.182-185	PPT, BB
32	Static properties across the shock	Ref:2,ch:6,pp.186-188	PPT
33	Numerical problems	Ref:2,ch:6,pp.204-207	PPT, BB
34	Strenght of a shock wave	Ref:2,ch:6,pp.186-188	PPT, ICT
35	Numerical problems	Ref:2,ch:6,pp.204-207	PPT
36	Numerical problems	Ref:2,ch:6,pp.204-207	PPT
Content beyond syllabus covered (if any):			

* Session duration: 50 mins

Sub. Code / Sub. Name: **ME18603:** GAS DYNAMICS AND JET PROPLUSION

Unit : IV

Unit Syllabus:

Theory of jet propulsion –Thrust equation –Thrust power and propulsive efficiency –Operating principle, cycle analysis,performance characteristics of ram jet, turbojet, turbofan and turbo prop engines, Aircraft matching.

Objective:

To understand propulsive methods, concept of aircraft propulsion system, performance of Ramjet, Turbojet, Turbofan and turbo prop engines

Session No *	Topics to be covered	Ref	Teaching Aids
37	Introduction to jet propulsion , Types of Jet propulsion	Ref:2,ch:12,pp.357-360	PPT,
38	Energy equations, power and efficiencies	Ref:2,ch:12,pp.357-360	PPT
39	Working of Ramjet, Turbojet,	Ref:2,ch:12,pp.363-381	PPT, ICT
40	Working of turbofan and turbo prop engines	Ref:2,ch:12,pp.363-381	PPT,ICT
41	Use of stagnation state performance of ram jet, turbojet, turbofan and turbo prop engine	Ref:2,ch:12,pp.368-375	PPT
42	Thermal and propulsive and overall efficiencies	Ref:2,ch:12,pp.368-375	PPT,ICT
43	Numerical problems	Ref:2,ch:12,pp.386-388	PPT,
44	Numerical problems	Ref:2,ch:12,pp.386-388	PPT,BB
45	Thrust equations for aircraft propulsion	Ref:2,ch:12,pp.368-375	PPT,BB
46	Numerical problems	Ref:2,ch:12,pp.386-388	PPT,BB
47	Numerical problems	Ref:2,ch:12,pp.386-388	PPT,BB
48	Aircraft Matching	Ref:2,ch:12,pp.386-388	PPT,
Content beyond syllabus covered (if any):			

* Session duration: 50 mins

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Sub. Code / Sub. Name: **ME18603:** GAS DYNAMICS AND JET PROPLUSION

Unit : V

Unit Syllabus:

Types of rocket engines – Propellants - feeding systems – Ignition and combustion – Theory of rocket propulsion – Performance study – Terminal and characteristic velocity – Applications – space flights.-Rocket equations – Escape and Orbital velocity. (12)

Objective: To understand propulsive methods, concept of rocket propulsion system ,ignition and combustion, performance calculation of Rocket propelling system.

Session No *	Topics to be covered	Ref	Teaching
49	Introduction to rocket propulsion	Ref:2,ch:13,pp.397-398	PPT
50	Types of Rocket propulsive systems-	Ref:2,ch:13,pp.398-402	PPT
51	Energy equation	Ref:2,ch:13,pp.421-422	PPT
52	Ignition and combustion	Ref:2,ch:13,pp.402-404	PPT
53	Propellants - feeding systems- Turbo pump and gas pressure	Ref:2,ch:13,pp.407-410	PPT
54	Propellants - feeding systems- Turbo pump and gas pressure	Ref:2,ch:13,pp.407-410	PPT, ICT
55	Performance study of rocket engines	Ref:2,ch:13,pp.421-428	PPT,ICT
56	Terminal and characteristics velocity	Ref:2,ch:13,pp.428-433	PPT
57	Escape and orbital velocity problems	Ref:2,ch:13,pp.440-446	PPT, ICT
58	Numerical problems	Ref:2,ch:13,pp.448-451	PPT
59	Numerical problems	Ref:2,ch:13,pp.448-451	PPT
60	Numerical problems	Ref:2,ch:13,pp.448-451	PPT

Content beyond syllabus covered (if any):

* Session duration: 50 mins

Sub. Code / Sub. Name: **ME18603:** GAS DYNAMICS AND JET PROPLUSION

TEXT BOOKS:

1.Yahya, S.M. "Fundamentals of Compressible Flow" , New Age International (P) Limited, New Delhi, 6th edition,2016.

2.Anderson, J.D., "Modern Compressible flow" 3rd Edition, McGraw Hill, 2003.

REFERENCES :

1. Hill. P. and C. Peterson, "Mechanics and Thermodynamics of Propulsion" , Addison – Wesley Publishing company, 1992.

2. Zucrow. N.J., "Aircraft and Missile Propulsion", Vol.1 & II, John Wiley, 1975.

3. Zucrow. N.J., "Principles of Jet Propulsion and Gas Turbines", John Wiley, New York, 1970.

4. Sutton. G.P., "Rocket Propulsion Elements", John wiley,New York,1986.

5. Shapiro. A.H.,"Dynamics and Thermodynamics of Compressible fluid Flow", John wiley, New York, 1953.

6. Ganesan. V., "Gas Turbines", Tata McGraw Hill Publishing Co., New Delhi,1999.

7. Somasundaram. PR.S.L., "Gas Dynamics and Jet Propulsions", New Age International Publishers, 1996.

8. Babu. V., "Fundamentals of Gas Dynamics", ANE Books India, 2008.

9. Cohen. H., G.E.C. Rogers and Saravanamutto, "Gas Turbine Theory", Longman Group Ltd., 1980.

ttps://www.researchgate.net/publication/332798145_Fanno_Flow_Adiabatic_Flow_in_a_Constant_Area_Duct_with_Friction

Flows with heat transfer (Rayleigh flows) — Gas Dynamics notes (kyleniemeyer.github.io)

Shock Wave - Meaning, Types, Example and Characteristics (vedantu.com)

Aircraft Propulsion - Course (nptel.ac.in)

ttps://onlinecourses.nptel.ac.in/noc19_me76/preview,

Rocket Propulsion - Course (nptel.ac.in)

REFERENCES :

1. Hill. P. and C. Peterson, "Mechanics and Thermodynamics of Propulsion" , Addison – Wesley Publishing company, 1992.
2. Zucrow. N.J., "Aircraft and Missile Propulsion", Vol.1 & II, John Wiley, 1975.
3. Zucrow. N.J., "Principles of Jet Propulsion and Gas Turbines", John Wiley, New York, 1970.
4. Sutton. G.P., "Rocket Propulsion Elements", John wiley,New York,1986.
5. Shapiro. A.H.,"Dynamics and Thermodynamics of Compressible fluid Flow", John wiley, New York, 1953.
6. Ganesan. V., "Gas Turbines", Tata McGraw Hill Publishing Co., New Delhi,1999.
7. Somasundaram. PR.S.L., "Gas Dynamics and Jet Propulsions", New Age International Publishers, 1996.
8. Babu. V., "Fundamentals of Gas Dynamics", ANE Books India, 2008.
9. Cohen. H., G.E.C. Rogers and Saravanamutto, "Gas Turbine Theory", Longman Group Ltd., 1980.

	Prepared by	Approved by
Signature		18/01/21
Name	**Dr.P.RAGHU/Mr.S.ARUMUGAM**	**Dr.S.RAMESHBABU**
Designation	Assistant Professor/MEC	Professor/HOD
Date	18.01.2021	18.01.2021
Remarks *:		
Remarks *:		

* If the same lesson plan is followed in the subsequent semester/year it should be mentioned and signed by the Faculty and the HOD

The Same Lesson plan was followed for academic year 2021 – 2022

2/3/22 2/3/22

The Same Lesson plan was followed for academic year 2022 – 2023

23/1/23 23/1/23

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - LABORATORY

Department of Mechanical	LP: ME18612 Rev. No:
B.E/B.Tech/M.E/M.Tech : Mechanical Regulation: R2018 PG Specialisation : NA Sub. Code / Sub. Name : ME18612 – Computer Aided Design and Manufacturing Laboratory	Date: 01.09.2021

Session No*	List of Experiments
	CYCLE-I
1	Introduction to 3D modeling/ Creo features and detailing of parts. Part modeling for simple components (2 components)
2	Part modeling for simple components (2 components) with detailing.
3	Modeling and assembling of Knuckle Joint with detailing.
4	Modeling and assembling of Protected Flange Coupling with detailing.
5	Modeling and assembling of Universal Joint with detailing.
6	Modeling and assembling of Plumber Block with detailing.
	CYCLE-II
7	Introduction to CNC programming – G codes and M codes, Simple Programming – Linear and Circular interpolation.
8	Facing, Turning, Step Turning, Chamfering using CNC turning.
9	Taper turning, Grooving, Threading using Canned cycles.
9	Profile milling, Rectangle & Circular Pocketing using Canned cycles.
10	Drill, Peck-Drill, Bore, tap – Using Canned cycles.
11	Demonstration of Part program generation for turning & milling for Fanuc Control system and Machining.
12	Model Exam
Content beyond syllabus (if any):	

* Session Duration: 150 minutes

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE OUTCOMES - LABORATORY

Department of Mechanical Engineering		CO: ME18612
~~B.E/B.Tech/M.E/M.Tech~~	: Mechanical Engineering	Rev. No:
UG /~~PG~~ Specialisation	: Mechanical Engineering	Date:
Regulation	: R 2018	01.09.2021
Sub. Code / Sub. Name	:	

CO	Statements	RBT* Level
CO1	The students will be able to sketch and interpret the Components based on dimensions	L2
CO2	The students will be able to develop and correlate 3D parts in a Component Assembly	L3
CO3	The students will be able to develop CNC programming and perform manufacturing using CNC Turning software	L3
CO4	The students will be able to develop CNC programming and perform manufacturing using CNC Milling software	L3

* Revised Bloom's Taxonomy

Mapping CO – PO - PSO*:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO-1	PSO-2
CO1														
CO2														
CO3														
CO4														

A – Strong; B – Moderate; C – weak

* Add Column if needed

Assessment Methods:

Stream	Internal Assessment Marks			End Semester Examination Marks
	Continuous Assessment (As per AAR)	Model Exam	Total	
Autonomous	50	25	75	25

Signature of Faculty / Course Coordinator	Signature of Module Coordinator

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - LABORATORY

Sub. Code / Sub. Name: ME18612 – Computer Aided Design and Manufacturing Laboratory

	Prepared by	Approved by
Signature		
Name	1. Dr. M. Mohandass 2. Dr. S. Ponnuvel 3. Dr. C. Senthamarai Kannan 4. Mr. M. Arulkumar	for Dr. S. Ramesh Babu
Designation	1. Associate Professor & AHOD 2. Associate Professor 3. Assistant Professor 4. Assistant Professor	Professor & Head
Date	01.09.2021	01.09.2021

Remarks* : The same lesson plan will be followed for the academic 2021-22 Even semester 10/1/22

Remarks* : The same lesson plan will be followed for the academic year 2022-23 Even Semester 1/2/2023

* If the same lab plan is followed in the subsequent semester/year it should be mentioned and signed by the Faculty and the HOD

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Department of Mechanical Engineering	LP: ME18018
B.E/~~B.Tech/M.E/M.Tech~~ : Mechanical Engineering, Regulation: R2018 PG Specialisation : --- Sub. Code / Sub. Name : ME18018, ENTREPRENEURSHIP DEVELOPMENT Unit : I	Rev. No: 01 Date: 01/03/2022

Unit Syllabus: ENTREPRENEURSHIP 9

Entrepreneur – Types of Entrepreneurs – Difference between Entrepreneur and Intrapreneur – Entrepreneurship in Economic Growth, Factors Affecting Entrepreneurial Growth.

Objective:

On completion of this chapter, the students will be equipped to understand the concept of entrepreneurship, the role of entrepreneurship in economic development of the country and the scope for an entrepreneur

Session No *	Topics to be covered	References	Teaching Aids
1	Entrepreneur: Concept / Meaning	1 – Page 1 to 6	ICT
2	Entrepreneur: Characteristics		ICT
3	Functions of an entrepreneur, difference between entrepreneur & manager		ICT
4	Types of entrepreneurs, meaning of intrapreneur, Difference b/w entrepreneur & intrapreneur		ICT
5	Concept of Entrepreneurship	1 - Page 8 to 17	ICT
6	Growth of Entrepreneurship: during the period of pre-independence		ICT
7	Growth of Entrepreneurship: during the period of pre-independence		ICT
8	Role of Entrepreneurship in economic development of state / nation		ICT
9	Factors affecting Entrepreneurial Growth: Economic & non-economic factors	1 – Page 33 to 39	ICT
Content beyond syllabus covered (if any): Discussion on SVCE Alumni Entrepreneurs			

* Session duration: 50 minutes

* ICT – Laptop, Projector, Pen drive, Google Classroom, Microsoft tools, YouTube Videos

Sub. Code / Sub. Name: **ME18018, ENTREPRENEURSHIP DEVELOPMENT**

Unit : **II**

Unit Syllabus : MOTIVATION **9**

Motivation Theories – Motivating factors – Achievement Motivation: Achieve Motivation Training – AMT tools: Self Rating, Business Games, Thematic Apperception Test – Entrepreneurial competencies – Entrepreneurship Development Programs – Need, Objectives, content, phases, evaluation.

Objective:
On completion of this unit, the students shall be able to understand the motivational aspects of entrepreneurship, factors motivate towards entrepreneurship, importance of EDPs.

Session No *	Topics to be covered	References	Teaching Aids
10	Motivational aspects of an entrepreneur	1 – Page 40	ICT
11	Motivational theories	1 – Page 40 – 42	ICT
12	Motivating factors influencing an Entrepreneur, Achievement Motivation (AM), Suggestion for development of AM	1 – Page 42 – 45	ICT
13	Achievement Motivation Training (AMT), tools & techniques to assess AMT, Self-rating, Business game	1 – Page 45 – 47	ICT
14	Achievement Motivation Training (AMT), tools & techniques to assess AMT, TAT	1 – Page 48 – 49	ICT
15	Entrepreneurial competencies	1 – Page 51 – 52	ICT
16	Entrepreneurship Development Program (EDP): Need, Objective, Course contents and Curriculum	1 – Page 61 – 63	ICT
17	EDP: Various phases, Evaluation methodology	1 – Page 63 – 64	ICT
18	EDP: problems faced by EDPs	1 – Page 65 – 67	ICT
Content beyond syllabus covered (if any): Group Activity for AMT practice			

* Session duration: 50 minutes
* ICT – Laptop, Projector, Pen drive, Google Classroom, Microsoft tools, YouTube Videos

Sub. Code / Sub. Name: **ME18018, ENTREPRENEURSHIP DEVELOPMENT**

Unit : **III**

Unit Syllabus : BUSINESS **9**

Small Enterprises – Definition, Characteristics, role of small enterprises in economic development – Project Formulation – content and formulation of a project report – Project Appraisal – concept and methods – Ownership Structures – Market Survey and Research, Techno Economic Feasibility Assessment – Preliminary Project Report – Start-ups.

Objective:

On completion of this unit, the student enables to understand what is small enterprises, problems faced by small enterprises, ownership pattern of small enterprises, the contents of a project report, formulation of a project report, methods adopted in project appraisal, sources of information on promotion of small enterprise.

Session No *	Topics to be covered	References	Teaching Aids
19	Small Enterprises: Definition, Classification, Characteristics, Various types of ownership structures	1 – Page 125 – 137	ICT
20	Differences, Advantages, Disadvantages and selection criteria		ICT
21	Steps involved in setting up a Business	1 – Page 83 – 87	ICT
22	Business Identification & Selection		ICT
23	Market Survey, Research and Analysis	1 – Page 88 – 93	ICT
24	Project Report: Significance, Contents		ICT
25	Project formulation, specimen copy of project report		ICT
26	Project appraisal: Concept and methods	1 – Page 102 – 107	ICT
27	Sources of information, Techno-economic feasibility report		ICT
Content beyond syllabus covered (if any): Business Model Canvass			

* Session duration: 50 minutes

* ICT – Laptop, Projector, Pen drive, Google Classroom, Microsoft tools, YouTube Videos

Sub Code / Sub Name: **ME18018, ENTREPRENEURSHIP DEVELOPMENT**

Unit : **IV**

Unit Syllabus : FINANCING AND ACCOUNTING 9

Sources of Finance – Term Loans – Financial Institutions – working capital management – Accounting process, journal, ledger, trial balance, profit loss account, balance sheet – Taxation and benefits for small enterprises and start-ups.

Objective:

On completion of this unit, the students shall be able to understand the need of financial planning to start small enterprises, to identify the various sources of finance, types of term loans, taxation.

Session No*	Topics to be covered	References	Teaching Method
28	Financial planning, sources of finance	1 – Page 108 – 112	ICT
29	Term Loans	1 – Page 112 – 117	ICT
30	Various financial institutions	1 – Page 143 – 151	ICT
31	Various financial institutions (cntd')		ICT
32	Working Capital Management	1 – Page 205 – 216	ICT
33	Break Even Analysis	1 – Page 263 – 266	ICT
34	Costing, Product Pricing		ICT
35	Taxation for Small Enterprises and Start-ups	1 – Page 171 – 175	ICT
36	Legal aspects of Small Enterprises and Start-ups		ICT
Content beyond syllabus covered (if any): **Audited Financial Statement / Report of Corporates**			

* Session duration: 50 minutes

* ICT – Laptop, Projector, Pen drive, Google Classroom, Microsoft tools, YouTube Videos

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Sub. Code / Sub. Name**: ME18018, ENTREPRENEURSHIP DEVELOPMENT**

Unit : **V**

Unit Syllabus : **SUPPORT TO ENTREPRENEURS** **9**

Sickness in small Business – Concept, Signal and symptoms, Causes and Consequences, Corrective Measures – Business Incubators – Government Policy for Small Enterprises and start-ups – Growth Strategies in small enterprises – Expansion, Diversification, Joint Venture, Merger and Sub Contracting.

Objective:
On completion of this unit, the learners should be able to understand about the sickness in small business, importance of business incubators, to know the government policy on promoting small enterprises, strategies used for growth of small enterprises.

Session No*	Topics to be covered	References	Teaching Method
37	Concept of Industrial Sickness in small business	1 – Page 322 – 323	ICT
38	Signals and symptoms of Industrial sickness	1 – Page 323 – 326	ICT
39	Magnitude of Industrial Sickness, Causes & Consequences of Industrial Sickness	1 – Page 326 – 333	ICT
40	Corrective measures	1 – Page 333 – 335	ICT
41	Business Incubator – Definition, objective, importance	1 – Page 177 – 184	ICT
42	Govt. policy for small enterprises and start-ups		ICT
43	Govt. support for small enterprises and start-ups – State & Central govt. schemes		ICT
44	Growth strategies: Objective, various stages, Types of growth strategies	1 – Page 313 – 321	ICT
45	Growth strategies: Objective, various stages, Types of growth strategies		ICT

Content beyond syllabus covered (if any):
Visit to nearby Incubators

* Session duration: 50 minutes
* ICT – Laptop, Projector, Pen drive, Google Classroom, Microsoft tools, YouTube Videos

SRI VENKATESWARA COLLEGE OF ENGINEERING

COURSE DELIVERY PLAN - THEORY

Sub. Code / Sub. Name: **ME18018, ENTREPRENEURSHIP DEVELOPMENT**

REFERENCES:

1. Khanka S S, "Entrepreneurial Development", S. Chand & Co. Ltd., New Delhi, 2010.

	Prepared by	Approved by
Signature		
Name	**V.SENTHILVELAN**	**DR.M.MOHANDASS**
Designation	**Assistant Professor**	**Assistant HOD / MEC**
Date	**01.03.2022**	**01.03.2022**
Remarks *:	The same Lesson plan can be used for AY 2022-23 also. (V. SENTHILVELAN) (S. IYAPPAN)	
Remarks *:		

* If the same lesson plan is followed in the subsequent semester/year it should be mentioned and signed by the Faculty and the HOD