K. S. INSTITUTE OF TECHNOLOGY, BENGALURU - 560109
DEPARTMENT OF MECHANICAL ENGINEERING
LESSON PLAN 2023-2024 ODD SEMESTER

KSIT

COURSE INCHARGE   : RANGANATH N

COURSE CODE/TITLE   : BME301/MECHANICS OF MATERIALS

YEAR/ SEMESTER/SECTION : II/III

BRANCH   : MECHANICAL ENGINEERING

Sl. No.	Topic to be covered	Mode of Delivery	Teaching Aid	No. of Periods	Cumulative No. of Periods	Proposed Date
	Module 1: Simple stress and strain					
1	Definition/derivation of normal stress	L+D, PS	BB/PPT/LCD	2	2	16/11/2023
2	shear stress, and normal strain and shear strain	L+D, PS	BB/PPT/LCD	1	3	17/11/2023
3	Stress strain diagram for brittle and ductile materials	L+D, PS	BB/PPT/LCD	1	4	20/11/2023
4	Poisson's ratio & volumetric strain	L+D, PS	BB/PPT/LCD	1	5	21/11/2023
5	Elastic constants – relationship between elastic constants	L+D, PS	BB/PPT/LCD	2	7	23/11/2023
6	Poisson's ratio – Generalised Hook's law	L+D, PS	BB/PPT/LCD	1	8	24/11/2023
7	Deformation of simple and compound bars	L+D, PS	BB/PPT/LCD	1	9	27/11/2023
8	Resilience, Gradual, sudden, impact and shock loadings – thermal stresses.	L+D, PS	BB/PPT/LCD	1	10	28/11/2023
9	Numericals	L+D, PS	BB/PPT/LCD	1	11	1/12/2023

10	Numericals		L+D, PS	BB/PPT/LCD	1	12	4/12/2023
Module 2: Bi-axial Stress system and Thick & Thin cylinders							
11	Bi-axial Stress system: Introduction, plane stress		L+D, PS	BB/PPT/LCD	1	13	5/12/2023
12	stresses on inclined sections		L+D, PS	BB/PPT/LCD	2	15	7/12/2023
13	principal stresses and maximum shear stresses		L+D, PS	BB/PPT/LCD	1	16	8/12/2023
14	graphical method - Mohr's circle for plane stress.		L+D, PS	BB/PPT/LCD	1	17	9/12/2023
15	graphical method - Mohr's circle for plane stress.		L+D, PS	BB/PPT/LCD	1	18	11/12/2023
16	Thick and Thin cylinders: Stresses in thin cylinders		L+D, PS	BB/PPT/LCD	1	19	12/12/2023
17	Lame's equation for thick cylinders subjected to internal and external pressures		L+D, PS	BB/PPT/LCD	2	21	14/12/2023
18	Lame's equation for thick cylinders subjected to internal and external pressures		L+D, PS	BB/PPT/LCD	1	22	15/12/2023
19	Lame's equation for thick cylinders subjected to internal and external pressures		L+D, PS	BB/PPT/LCD	1	23	18/12/2023
20	Changes in dimensions of cylinder (diameter, length and volume), simple numerical.		L+D, PS	BB/PPT/LCD	1	24	19/12/2023
21	Changes in dimensions of cylinder (diameter, length and volume), simple numerical.		L+D, PS	BB/PPT/LCD	2	26	21/12/2023
Module 3: Bending moment and Shear forces in beams							
22	Definition of beam – Types of beams – Concept of shear force and bending moment		L+D, PS	BB/PPT/LCD	1	27	22/12/2023
23	Definition of beam – Types of beams – Concept of shear force and bending moment		L+D, PS	BB/PPT/LCD	1	28	23/12/2023
24	S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, uniformly distributed loads, uniformly varying loads and combination of these loads – Point of contra flexure		L+D, PS	BB/PPT/LCD	1	29	26/12/2023
25	S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads		L+D, PS	BB/PPT/LCD	2	31	28/12/2023

26	S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, uniformly distributed loads	L+D, PS	BB/PPT/LCD	1	32	29/12/2023
27	S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, uniformly distributed loads, uniformly varying loads	L+D, PS	BB/PPT/LCD	1	33	30/12/2023
28	INTERNAL ASSESSMENT – 1			1	34	1/1/2024
29	S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, uniformly distributed loads, uniformly varying loads and combination of these loads	L+D, PS	BB/PPT/LCD	2	36	4/1/2024
30	S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, uniformly distributed loads, uniformly varying loads and combination of these loads – Point of contra flexure	L+D, PS	BB/PPT/LCD	1	37	5/1/2024
Module 4: Theory of simple bending						
31	Assumptions – Derivation of bending equation	L+D, PS	BB/PPT/LCD	1	38	8/1/2024
32	Neutral axis – Determination of bending stresses	L+D, PS	BB/PPT/LCD	1	39	9/1/2024
33	section modulus of rectangular and circular sections (Solid and Hollow) - I sections	L+D, PS	BB/PPT/LCD	2	41	11/1/2024
34	section modulus of rectangular and circular sections (Solid and Hollow) - I, T sections	L+D, PS	BB/PPT/LCD	1	42	12/1/2024
35	section modulus of rectangular and circular sections (Solid and Hollow) - I, T and Channel sections	L+D, PS	BB/PPT/LCD	1	43	13/1/2024
36	Design of simple beam sections	L+D, PS	BB/PPT/LCD	1	44	16/1/2024
37	Shear Stresses: Derivation of formula	L+D, PS	BB/PPT/LCD	2	46	18/1/2024
38	Shear stress distribution across various beams sections like rectangular sections.	L+D, PS	BB/PPT/LCD	1	47	19/1/2024
39	Shear stress distribution across various beams sections like rectangular, circular sections.	L+D, PS	BB/PPT/LCD	1	48	22/1/2024
40	Shear stress distribution across various beams sections like rectangular, circular, triangular sections.	L+D, PS	BB/PPT/LCD	1	49	23/1/2024
41	Shear stress distribution across various beams sections like rectangular, circular, triangular, I, and T sections.	L+D, PS	BB/PPT/LCD	2	51	25/1/2024
Module-5: Torsion of circular shafts and Theory of columns						

42	Introduction, pure torsion, assumptions	L+D, PS	BB/PPT/LCD	1	52	27/1/2024
43	derivation of torsional equations	L+D, PS	BB/PPT/LCD	1	53	29/1/2024
44	polar modulus, torsional rigidity / stiffness of shafts	L+D, PS	BB/PPT/LCD	1	54	30/1/2024
45	power transmitted by solid and hollow circular shafts.	L+D, PS	BB/PPT/LCD	2	56	1/2/2024
46	Theory of columns – Long column and short column	L+D, PS	BB/PPT/LCD	1	57	2/2/2024
47	Euler's formula – Rankine's formula	L+D, PS	BB/PPT/LCD	1	58	5/2/2024
48	Numericals	L+D, PS	BB/PPT/LCD	1	59	6/2/2024
49	**INTERNAL ASSESSMENT 2**			1	60	8/2/2024
50	Revision – Module 1	L+D, PS	BB/PPT/LCD	1	61	12/2/2024
51	Revision – Module 2	L+D, PS	BB/PPT/LCD	1	62	13/2/2024
52	Revision – Module 3	L+D, PS	BB/PPT/LCD	2	64	15/2/2024
53	Revision – Module 4	L+D, PS	BB/PPT/LCD	1	65	16/2/2024
54	Revision – Module 5	L+D, PS	BB/PPT/LCD	1	66	19/2/2024
55	**Revision of Question Paper**	L+D, PS	BB/PPT/LCD	1	67	20/2/2024

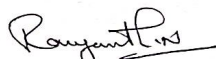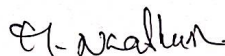**Suggested Learning Resources:**
Books

- Mechanics of Materials, S.I. Units, Ferdinand Beer & Russell Johnstan, 7th Ed, TATA McGrawHill-2014
- Mechanics of Materials, K.V.Rao, G.C.Raju, Subhash Stores, First Edition, 2007
- Strength of Materials by R.K. Bansal ,Laxmi Publications 2010.
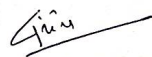
Web links and Video Lectures (e-Resources):

1. Statics and Strength of Materials, Shehata, 2nd edition, 1994.
   (http://www.astm.org/DIGITAL_LIBRARY/JOURNALS/TESTEVAL/PAGES/JTE12637J. htm).

2. http://www.astm.org/DIGITAL_LIBRARY/JOURNALS/TESTEVAL/PAGE S/JTE12637J.htm.

3. http://www.freeengineeringbooks.com/Civil/Strength-of-MaterialBooks.php

Details of the teaching aids: Chalk and talk, videos, ppt, animations, NPTEL videos, NPTEL lectures etc.,

Course Incharge   **Module coordinator**   Head of Department
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DEPARTMENT OF MECHANICAL ENGINEERING
MANUFACTURING PROCESS- Course Plan

NAME OF THE STAFF   : HARISH U
SUBJECT CODE/NAME   : BME302/MANUFACTURING PROCESS
SEMESTER/YEAR   : III/II
ACADEMIC YEAR   : 2023-24

Sl. No.	Topic to be covered	Mode of Delivery	Teaching Aid	No. of Periods	Cumulative No. of Periods	Proposed Date
Module 1: Introduction & basic materials used in foundry						
1	Introduction: Definition	L+D	BB+LCD	1	1	15.11.2023
2	Classification of manufacturing processes. Metals cast in the foundry-classification,	L+ D	BB+LCD	1	2	17.11.2023
3	factors that determine the selection of a casting alloy.	L+ D	BB+LCD	1	3	17.11.2023
4	Preparation of sand specimens and conduction of the following tests: Compression, Shear and Tensile tests on Universal Sand Testing Machine.	L+D	BB	Lab session 2 hrs	5	21.11.2023
5	Introduction to casting process & steps involved	L+D	BB+LCD	1	6	22.11.2023
6	Patterns: Definition, classification, materials used for pattern,	L+D	BB+LCD	1	7	24.11.2023
7	various pattern allowances and their importance.	L+D	BB+LCD	1	8	24.11.2023
8	Sand moulding: Types of base sand, requirement of base sand. Binder, Additive's definition, need and types.	L+D	BB+LCD	1	9	25.11.2023

9	To determine permeability number of green sand, core sand and raw sand.	L+D	BB	Lab session 2 hrs	11	28.11.2023
10	preparation of sand moulds. Molding machines-Jolt type,	L+D	BB+LCD	1	12	29.11.2023
11	squeeze type and Sand slinger.	L+D	BB+LCD	1	13	1.12.2023
12	**Study of important moulding process:** Green sand, core sand, dry sand, sweep mould, CO2mould, shell mould,	L+D	BB+LCD	1	14	1.12.2023
13	To determine AFS fineness no. and distribution coefficient of given sand sample. Studying the effect of the clay and moisture content on sand mould properties	L+D	BB	Lab session 2 hrs	16	5.12.2023
14	Melting furnaces: Classification of furnaces.	L+D	BB+LCD	1	17	6.12.2023
15	Gas fired pit furnace, Resistance Furnace.	L+D	BB+LCD	1	18	8.12.2023
16	Coreless Induction Furnace.	L+D	BB+LCD	1	19	8.12.2023
17	Use of Arc welding tools and welding equipment Preparation of welded joints using Arc Welding equipment L-Joint, T-Joint, Butt joint, V-Joint, Lap joints on M.S. flats	L+D	BB	Lab session 2 hrs	21	9.12.2023
18	Foundry Practice: Use of foundry tools and other equipment for Preparation of molding sand mixture.	L+D	BB	Lab session 2 hrs	23	12.12.2023
19	Electric Arc Furnace.	L+D	BB+LCD	1	24	13.12.2023
20	Constructional features & working principle of cupola furnace.	L+ D	BB+LCD	1	25	15.12.2023
21	Castings using metal molds, Gravity die casting.	L+D	BB+LCD	1	26	15.12.2023
22	Pressure Die Casting, Centrifugal Casting.	L+D	BB	Lab session 2 hrs	28	19.12.2023
23	Squeeze Casting, Slush Casting.	L+D	BB+LCD	1	29	20.12.2023
24	Thixocasting, and Continuous Casting	L + D	BB+LCD	1	30	22.12.2023

	Processes.					
25	Introduction of metal forming process	L+D	BB+LCD	1	31	22.12.2023
26	Preparation of green sand molds kept ready for pouring in the following cases: ·1. Incorporating core in the mold.(Core boxes).	L+D	BB	Lab session 2 hrs	33	26.12.2023
27	Mechanical behaviour of metals in elastic and plastic deformation, stress-strain relationships	L+D	BB+LCD	1	34	27.12.2023
28	Yield criteria, Application to tensile testing, train rate and temperature in metal working	L+D	BB+LCD	1	35	29.12.2023
29	Hot deformation, Cold working and annealing.	L+D	BB+LCD	1	36	29.12.2023
30	**Internal Assessment Test-1**			1	37	1.1.2024
31	**Metal Working Processes:** Fundamentals of metal working,	L+D	BB+LCD	1	38	5.1.2024
32	Analysis of bulk forming processes like forging, rolling,	L+D	BB+LCD	1	39	5.1.2024
33	Forging Operations: Use of forging tools and other forging equipment. Preparing minimum three forged models involving upsetting, drawing and bending operations	L+D	BB	Lab session 2 hrs	41	9.1.2024
34	extrusion, wire drawing by slab method,	L+D	BB+LCD	1	42	10.1.2024
35	Sheet metal forming processes	L + D	BB+LCD	1	43	12.1.2024
36	Sheet metal forming processes	L+D	BB+LCD	1	44	12.1.2024
37	Forging Operations: Use of forging tools and other forging equipment.	L+D	BB	Lab session 2 hrs	46	13.1.2024
38	Forging Operations: Use of forging tools and other forging equipment.	L+D	BB·	Lab session 2 hrs	48	16.1.2024
39	High Energy rate forming processes.	L+D	BB+LCD	1	49	17.1.2024

40	Welding process: Definition, Principles, Classification, Application.	L+D	BB+LCD	1	50	19.1.2024
41	Advantages & limitations of welding. Arc welding: Principle, Metal arc welding (MAW).	L+D	BB+LCD	1	51	19.1.2024
42	Flux Shielded Metal Arc Welding (FSMAW),	L+D	BB+LCD	1	52	23.1.2024
43	Inert Gas Welding (TIG & MIG).	L+D	BB+LCD	1	53	
44	Submerged Arc Welding (SAW) and Atomic Hydrogen Welding (AHW).	L+D	BB+LCD	1	54	24.1.2024
45	Special type of welding: Resistance welding principles,	L+D	BB	Lab session 2 hrs	56	30.1.2024
46	Seam welding, Butt welding,	L+D	BB+LCD	1	57	31.1.2024
47	Spot welding and Projection welding.	L+D	BB+LCD	1	58	2.2.2024
48	Friction welding, Explosive welding Thermit welding,	L+D	BB+LCD	1	59	2.2.2024
49	Concept of weldability of materials	L+D	BB+LCD	1	60	6.2.2024
50	Thermal Effects in Welding (Distortion, shrinkage and residual stresses in welded structures)	L+D	BB+LCD	1	61	6.2.2024
51	Welding defects and remedies.	L+D	BB+LCD	1	62	7.2.2024
52	**Internal Assessment Test-2**			1	63	8.2.2024
53	Soldering, Brazing and adhesive bonding Advance welding processes	L+D	BB+LCD	1	64	13.2.2024
54	Resistance welding processes, friction stir welding (FSW).	L+D	BB+LCD	1	65	13.2.2024
55	Revision	L+D	BB+LCD	1	66	14.2.2024
56	Revision	L+D	BB+LCD	1	67	16.2.2024
57	Revision	L+D	BB+LCD	1	68	16.2.2024
58	Revision	L+D	BB+LCD	Lab session 2 hrs	70	20.2.2024

Text Books:
1. Principles of metal casting Rechard W. Heine, Carl R. Loper Jr., Philip C. Rosenthal Tata McGraw Hill Education Private Limited 1976
2. Manufacturing Process-I Dr.K.Radhakrishna Sapna Book House, 5th Revised Edition 2009.
3. Manufacturing Technology- Foundry, Forming and Welding P.N.Rao Tata McGraw Hill 3rd Ed., 2003.

Reference Books:
1. Process and Materials of Manufacturing Roy A Lindberg Pearson Edu 4th Ed. 2006
2. Manufacturing Technology SeropeKalpakjianSteuen. R Sechmid Pearson Education Asia 5th Ed. 2006

Details for the teaching Aids

Use of projector to show videos in order to enhance their perception.

Course incharge

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DEPARTMENT OF MECHANICAL ENGINEERING
LESSON PLAN 2023-24 ODD SEMESTER

COURSE INCHARGE   : Dr.NIRMALA L

COURSE TYPE / CODE / TITLE   : Theory /BME303 /MATERIAL SCIENCE AND ENGINEERING

YEAR/ SEMESTER/SECTION   : II/III

BRANCH   : MECHANICAL ENGINEERING

Sl. No.	Topic to be covered	Mode of Delivery	Teaching Aid	No. of Periods	Cumulative No. of Periods	Proposed Date
1	MODULE-1 Structure of Materials Introduction:	L+PPT	BB	1	1	15.11.2023
2	Placement Training					16.11.2023 to 22.11.2023
3	Classification of materials,	L+PPT	PPT	1	2	23.11.2023
4	crystalline and non-crystalline solids, atomic bonding: Ionic Bonding and Metallic bonding.	L+PPT	PPT	1	3	27.11.2023
5	Crystal Structure: Crystal Lattice, Unit Cell, Planes and directions in a lattice, Planar Atomic Density,	L+PPT	PPT	1	4	29.11.2023
6	Coordination number, atomic Packing Factor of all the Cubic structures and Hexa Close Packed structure. Classification and Coordination of voids,	L+PPT	PPT	1	5	01.12.2023
7	Bragg's Law. Imperfections in Solids: Types of imperfections, Point defects: vacancies, interstitials, line defects, 2-D and 3D-defects,	L+PPT	PPT	1	6	04.12.2023
8	Concept of free volume in amorphous solids. Slip, Twinning.	L+PPT	PPT	1	7	06.12.2023

9	MODULE-2 Physical Metallurgy Alloy Systems: Classification of Solid solutions,	L+PPT	PPT	1	8	07.12.2023
10	Hume- Rothery Rules Diffusion: Diffusion Mechanisms: Vacancy Diffusion and Interstitial Diffusion,	L+PPT	PPT	1	9	08.12.2023
11	Fick's laws of diffusion, Factors affecting diffusion.	L+D	BB	1	10	11.12.2023
12	Phase Diagrams: Gibbs Phase Rule, Solubility limit, phase equilibrium	L+D	BB	1	11	13.12.2023
13	Phase Diagrams: Isomorphous systems, Invariant Binary Reactions: Eutectic reaction, Eutectoid reaction and Peritectic reaction, Lever Rule,	L+PPT	BB	1	12	15.12.2023
14	Iron-Carbon Diagram. Effect of common alloying elements in steel. Numerical on Lever rule.	L+PPT	BB		13	18.12.2023
15	MODULE-3 Nucleation and growth: Introduction to homogeneous and heterogeneous nucleation, critical radius for nucleation	L+D	ppt	1	14	20.12.2023
16	Heat treatment: Annealing, Normalizing, hardening, Tempering,	L+D	ppt	1	15	22.12.2023
17	Nitriding, Cyaniding, Induction Hardening and Flame Hardening,	L+D	BB	1	16	23.12.2023
18	Recent advances in heat treat technology. TTT diagram, Recovery-Recrystallization-Grain Growth.	L+D	BB	1	17	27.12.2023
19	Strengthening mechanisms: Strain hardening, Precipitation hardening (Solid-Solution Strengthening), Grain refinement.	L+D	BB	1	18	29.12.2023
20	MODULE-4 Surface coating technologies: Introduction, coating materials, coating technologies	L+D	BB	1	19	30.12.2023
	IST CIE					01.01.2024 TO 03.01.2024

21	, types of coating: Electro-plating, Chemical Vapor Deposition(CVD), Physical Vapor Deposition(PVD), High Velocity Oxy-Fuel Coating, advantages and disadvantages of surface coating.	L+D	BB	1	20	05.01.2024
22	Powder metallurgy: Introduction, Powder Production Techniques: Different	L+D	BB	1	21	08.01.2024
23	Mechanical methods: Chopping or Cutting, Abrasion methods, Machining methods, Ball Milling and Chemical method: Chemical reduction method.	L+D	BB	1	22	10.01.2024
24	Characterization of powders (Particle Size & Shape Distribution),	L+D	BB	1	23	12.01.2024
25	Powder Shaping: Particle Packing Modifications, Lubricants & Binders,	L+D	BB	1	24	17.01.2024
26	Powder Compaction & Process, Sintering and Application of Powder Metallurgy.	L+D	BB	1	25	19.01.2024
27	MODULE-5 Engineering Materials and Their Properties: Classification,	L+D	BB	1	26	22.01.2024
28	Ferrous materials: Properties, Compositions and uses of Grey cast iron and steel. Non-Ferrous materials: Properties, Compositions and uses of Copper, Brass, Bronze.	L+D	ppt	1	27	24.01.2024
29	Composite materials - Definition, classification, types of matrix materials & reinforcements, Metal Matrix Composites (MMCs),	L+D	BB	1	28	27.01.2024
30	Ceramic Matrix Composites (CMCs) and Polymer Matrix Composites (PMCs),	L+D	BB	1	29	29.01.2024
31	Particulate-reinforced and fiber- reinforced composites, Applications of composite materials	L+D	BB	1	30	31.01.2024
32	Mechanical and functional properties of Engineering Materials. The Design Process	L+D	BB	1	31	02.02.2024
33	Materials Data: Types of design, design tools and materials data	L+D	BB	1	32	05.02.2024
34	processes of obtaining materials data, materials databases.	L+D	BB	1	33	07.02.2024
	II CIE					08.02.2024 TO10.02.2024

37	Material Selection Charts: Selection criteria for materials, material property Charts,	L+D	BB	1	34	16.02.2024
38	deriving property limits and material indices	L+D	BB	1	35	19.02.2024
	Material Testing Laboratory					
39	Specimen preparation for macro and micro structural examinations and study the (laboratory component) macrostructure and microstructure of a sample metal/ alloys.	LAB	EXP	2	37	23.11.2023
40	Study the heat treatment processes (Hardening and tempering) of steel/Aluminium specimens. (laboratory component)	LAB	EXP	2	39	7.12.202323
41	To determine the hardness values of Mild Steel/ Aluminium by Rockwell hardness/Vickers Hardness. (laboratory component)	LAB	EXP	2	41	14.12.2023
42	4 To determine the hardness values of Copper/ Brass by Brinell's Hardness testing machine. (laboratory component)	LAB	EXP	2	43	21.12.2023
43	To determine the tensile strength, modulus of elasticity, yield stress, % of elongation and % of reduction in area of Cast Iron, Mild Steel/Brass/ Aluminium and to observe the necking. (laboratory component)	LAB	EXP	2	45	28.12.2023
44	To conduct a wear test on Mild steel/ Cast Iron/Aluminium/ Copper to find the volumetric wear rate and coefficient of friction. (laboratory component)	LAB	EXP	2	47	04.01.2024
45	To determine the Impact strength of the mild steel using Izod test and Charpy test. (laboratory component)	LAB	EXP	2	49	11.01.2024
46	Study the chemical corrosion and its protection. Demonstration. (laboratory component)	LAB+BB	PPT	2	51	18.01.2024
47	Study the properties of various types of plastics. Demonstration(laboratory component)	LAB+BB	PPT	2	53	25.01.2024
48	Computer Aided Selection of Materials: Application of GRANTA Edupack for material(laboratory component)	LAB+BB	PPT	2	55	01.02.2024

Text Books:

1. Callister Jr, W.D., Rethwisch, D.G., (2018), Materials Science and Engineering: An Introduction, 10th Edition, Hoboken, NJ: Wiley.

2. Ashby, M.F. (2010), Materials Selection in Mechanical Design, 4th Edition, Butterworth- Heinemann.

3. Azaroff, L.V., (2001) Introduction to solids, 1st Edition, McGraw Hill Book Company.

4. Avner, S.H., (2017), Introduction to Physical Metallurgy, 2nd Edition, McGraw Hill Education.

Course Incharge   **Module coordinator**   Head of the Department
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DEPARTMENT OF MECHANICAL ENGINEERING

LESSON PLAN 2023-2024 ODD SEMESTER

COURSE INCHARGE : PRASAD K

COURSE CODE/ TITLE: BASIC THERMODYNAMICS

YEAR/ EMESTER/SECTION: II/III

BRANCH: MECHANICAL ENGINEERING

Sl.No	Topic to be covered	Mode of Delivery	Teaching Aid	No. of Periods	Cumulative No. of Periods	Proposed Date
1	**Module-1** Fundamental Concepts& Definitions: Thermodynamic definition and scope	L+D+S	BB/PPT/LCD	1	1	15/11/23
2	Microscopic and Macroscopic approaches. Some practical applications of engineering thermodynamic Systems	L+D+S	BB/PPT/LCD	1	2	16/11/23
3	Characteristics of system boundary and control surface, examples	L+D+S	BB/PPT/LCD	1	3	17/11/23
4	Thermodynamic properties; definition and units, intensive, extensive properties	L+D+S	BB/PPT/LCD	1	4	20/11/23
5	specific properties, pressure, specific volume, Thermodynamic state, state point, state diagram, path and process	L+D+S	BB/PPT/LCD	1	5	21/11/23
6	quasi-static process, cyclic and non-cyclic processes	L+D+S	BB/PPT/LCD	1	6	22/11/23
7	Thermodynamic equilibrium; definition, mechanical equilibrium; diathermic wall, thermal equilibrium, chemical equilibrium,	L+D+S	BB/PPT/LCD	1	7	23/11/23
8	Zeroth law of thermodynamics, Temperature; concepts, scales	L+D+S	BB/PPT/LCD	1	8	24/11/23
9	international fixed points and measurement of temperature.	L+D+S	BB/PPT/LCD	1	9	25/11/23
10	Constant volume gas thermometer, constant pressure gas thermometer, mercury in glass thermometer	L+D+S	BB/PPT/LCD	1	10	27/11/23
11	Numerical on Temperature scale	L+D+S	BB/PPT/LCD	1	11	28/11/23
12	Numerical on Temperature scale	L+D+S	BB/PPT/LCD	1	12	29/11/23
13	**Module-2** Work and Heat: Mechanics, definition of work and	L+D+S	BB/PPT/LCD	1	13	1/12/23
14	Thermodynamic definition of work; examples, sign convention	L+D+S	BB/PPT/LCD	1	14	4/12/23
15	Displacement work; as a part of a system boundary, as a whole of a system boundary	L+D+S	BB/PPT/LCD	1	15	5/12/23
16	expressions for displacement work in various processes through p-v diagrams	L+D+S	BB/PPT/LCD	1	16	6/12/23
17	Expressions for displacement work in various processes through p-v diagrams	L+D+S	BB/PPT/LCD	1	17	7/12/23
18	Shaft work; Electrical work. Other types of work	L+D+S	BB/PPT/LCD	1	18	8/12/23

19	Heat; definition, units and sign convention. Problems.	L+D+S	BB/PPT/LCD	1	19	9/12/23
20	First Law of Thermodynamics: Joules experiments	L+D+S	BB/PPT/LCD	1	20	11/12/23
21	Equivalence of heat and work. Statement of the First law of thermodynamics,.	L+D+S	BB/PPT/LCD	1	21	12/12/23
22	extension of the First law to non - cyclic processes, energy, energy as a property	L+D+S	BB/PPT/LCD	1	22	13/12/23
	extension of the First law to non - cyclic processes, energy, energy as a property	L+D+S	BB/PPT/LCD	1	23	14/12/23
25	Numerical on closed system	L+D+S	BB/PPT/LCD	1	24	15/12/23
26	Numerical on closed system	L+D+S	BB/PPT/LCD	1	25	18/12/23
27	steady flow energy equation(SFEE),	L+D+S	BB/PPT/LCD	1	26	19/12/23
28	Numerical on open system	L+D+S	BB/PPT/LCD	1	27	20/12/23
29	Numerical on open system	L+D+S	BB/PPT/LCD	1	28	21/12/23
30	Numerical on open system	L+D+S	BB/PPT/LCD	1	29	22/12/21
31	**Module-3** Second Law of Thermodynamics: Limitations of first law of thermo dynamics, Thermal reservoir, heat engine and heat pump	L+D+S	BB/PPT/LCD	1	30	23/12/21 26/12/21
32	Schematic representation, efficiency and COP. Reversed heat engine, schematic representation, importance and superiority of a reversible heat engine and irreversible processes	L+D+S	BB/PPT/LCD	1	32	27/12/21
33	internal and external reversibility. Kelvin - Planck statement of the Second law of Thermodynamics;	L+D+S	BB/PPT/LCD	1	33	28/12/21
34	PMM I and PMM II, Clausius statement of Second law of Thermodynamics,	L+D+S	BB/PPT/LCD	1	34	29/12/21
35	Equivalence of the two statements; Carnot cycle, Carnot principles.	L+D+S	BB/PPT/LCD	1	35	30/12/21
36	TEST –I					2/1/24
37	Numerical on second law of thermodynamics	L+D+S	BB/PPT/LCD	1	36	4/1/24
38	Numerical on second law of thermodynamics	L+D+S	BB/PPT/LCD	1	37	5/1/24
39	Numerical on second law of thermodynamics	L+D+S	BB/PPT/LCD	1	38	8/1/24
40	Numerical on second law of thermodynamics	L+D+S	BB/PPT/LCD	1	39	9/1/24
41	Entropy: Clausius inequality, Statement- proof,	L+D+S	BB/PPT/LCD	1	40	10/1/24
42	Entropy- definition, a property, change of entropy,	L+D+S	BB/PPT/LCD	1	41	11/1/24

43	entropy as a quantitative test for irreversibility,	L+D+S	BB/PPT/LCD	1	42	12/1/24
44	principle of increase in entropy, entropy as a coordinate.	L+D+S	BB/PPT/LCD	1	43	13/1/24
45	Numericals on entropy	L+D+S	BB/PPT/LCD	1	44	16/1/24
46	Numericals on entropy	L+D+S	BB/PPT/LCD	1	45	17/1/24
47	**Module-4** Pure Substances: P-T and P-V diagrams, triple point and critical points. Sub-cooled liquid, saturated liquid	L+D+S	BB/PPT/LCD	1	46	18/1/24
48	Mixture of saturated liquid and vapor, saturated vapor and superheated vapor states of pure substance with water as example	L+D+S	BB/PPT/LCD	1	47	19/1/24
49	Enthalpy of change of phase (Latent heat). Dryness fraction (quality), T-S and H-S diagrams,	L+D+S	BB/PPT/LCD	1	48	22/1/24
50	Throttling calorimeter, separating and throttling calorimeter,	L+D+S	BB/PPT/LCD	1	49	23/1/24
51	Numerical on Pure substance	L+D+S	BB/PPT/LCD	1	50	24/1/24
52	Numerical on Pure substance	L+D+S	BB/PPT/LCD	1	51	25/1/24
53	Availability and irreversibility	L+D+S	BB/PPT/LCD	1	52	27/1/24
54	Thermodynamic relations	L+D+S	BB/PPT/LCD	1	53	29/1/24
55	Gibbs helmotz equations	L+D+S	BB/PPT/LCD	1	54	30/1/22
56	Exegy, Unavailable energy ,Maximum work	L+D+S	BB/PPT/LCD	1	55	34/1/24
57	Maximum useful work for a system and control volume	L+D+S	BB/PPT/LCD	1	56	1/2/24
58	Numericals	L+D+S	BB/PPT/LCD	1	57	2/2/24
59	**Module-5** Ideal gases: Ideal gas mixtures, Daltons law of partial pressures	L+D+S	BB/PPT/LCD	1	58	5/2/24
60	Amagat's law of additive volumes, evaluation of properties of perfect and ideal gases	L+D+S	BB/PPT/LCD	1	59	6/2/24
61	Air- Water mixtures and related properties	L+D+S	BB/PPT/LCD	1	60	7/2/24
62	Numericals on Ideal gases	L+D+S	BB/PPT/LCD	1	61	1/2/24
63			TEST –II			9/2/24
64	Numericals on Ideal gases	L+D+S	BB/PPT/LCD	1	62	16/2/24
65	Real gases – Introduction, Van-der Waal's Equation of state, Van-der Waal's constants in	L+D+S	BB/PPT/LCD	1	63	19/2/24

	terms of critical properties					
66	Numericals on Real gases	L+D+S	BB/PPT/LCD	1	64	20/2/24

Suggested Learning Resources: Books

4. Thermodynamics- An Engineering Approach YunusA.Cenegal and Michael A.Boles Tata McGraw Hill publications 2002
1. Basic and Applied Thermodynamics P.K.Nag, Tata McGraw Hill 2nd Ed., 2002.
2. Basic Engineering Thermodynamics A.Venkatesh Universities Press, 2008.
3. Basic Thermodynamics, B.K Venkanna, Swati B. Wadavadagi PHI, New Delhi 2010.

Web links and Video Lectures (e-Resources):

- https://www.youtube.com/watch?v=9GMBpZZtjXM&list=PLD8E646BAB3366BC8
- https://www.youtube.com/watch?v=jkdMtmXo664&list=PL3zvA_WajfGAwLuULHL0AG9fKDgplYne
- https://www.youtube.com/watch?v=1lk7XLOxtzs&list=PLkn3QlSf55zy2Nlqr5F09oO2qclw NNfrZ&index=3
- https://www.youtube.com/watch?v=Dy2UeVCSRYs&list=PL2_EyjPqHc10CTN7cHiM5xB2q D7BHUry7
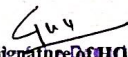
Data Handbooks :
1. Thermodynamic data hand book, B.T. Nijaguna.
2. Properties of Refrigerant & Psychometric (tables & Charts in SI Units),
Dr. S.S. Banwait, Dr. S.C. Laroiya, Birla Pub. Pvt. Ltd., Delhi, 2008

Details of the Teaching Aids: Chalk and talk ,Videos ,ppts animations ,NPTEL videos, NPTEL lectures etc.,

Signature of Course in-Charge   Signature of Module Coordinator   Signature of HOD   Signature of Principal

K.S. INSTITUTE OF TECHNOLOGY BANGALORE

#14, Raghuvanahalli, Kanakapura Main Road, Bengaluru-5600109

DEPARTMENT OF MECHANICAL ENGINEERING

Introduction to Modelling and Design for Manufacturing - Course Plan

COURSE INCHARGE   : Dr. SALEEM KHAN
COURSE CODE/NAME   : BMEL305 / Introduction to Modelling and Design for Manufacturing
SEMESTER/SEC/YEAR   : III 'A'/ II
ACADEMIC YEAR   : 2023-2024

Sl. No.	Topic to be covered	Mode of Delivery	Teaching Aid	No. of Periods	Cumulative No. of Periods	Proposed Date
	Module-1					
1.	**Introduction** to Computer Aided Sketching Review of graphic interface of the software. Review of 2D Sketching, Parametric Solid Modelling, Assembly creation and product rendering. Limits, Fits and Tolerances: Introduction, Fundamental tolerances, Deviations, Methods of placing limit dimensions, Types of fits with symbols and applications, Geometrical tolerances on drawings, Standards followed in industry.	L+AV	LCD	2	2	27/11/2023
2.	**Geometrical Dimensioning and Tolerances (GD&T):** Introduction, Fundamental tolerances, Deviations, Methods of placing limit dimensions, machining symbols, types of fits with symbols and applications, geometrical tolerances on drawings. Standards followed in industry. **(Only for CIE)**	L+D	BB	2	4	28/11/2023
3.	**The basics of sketching and modelling:** Explore Fusion 360 User Interface, Navigation and display settings, create new projects and designs, creating basic 2D sketches, Creating & Modifying a solid 3D body with Sections. **(For SEE)**	L+ D	LCD	2	6	04/12/2023

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Module-2						
4.	Create draft during a feature, create draft as a feature, Add ribs and plastic supports, Create holes and threads.	L+ D	LCD	2	10	05/12/2023
5.	Thread Forms: Terminologies, ISO Metric, BSW, Square & Acme. Seller threads, American Standard Thread. Use a coil feature, Mirrors and patterns.	L+D	LCD+BB	2	12	09/12/2023
6.	Fasteners: 3D & Section views - Hexagonal headed bolt and nut with washer, Square headed bolt and nut with washer. **Keys:** Parallel Key, Taper Key & Feather Key.	L+D	LCD+BB	2	14	11/12/2023
Module-3						
7.	The different ways to create components, Use scripts to create gears, Component color swatch and color cycling, Use McMaster-Carr parts in a design.	L+DE	LCD	2	16	12/12/2023
8.	Assembly of Joints and Coupling using 3D environment. **Joints:** Like Cotter joint (socket and spigot), knuckle joint (pin joint).	L+D	LCD+BB	2	18	18/12/2023
9.	**Couplings:** Like flanged coupling, universal coupling.	L+D	LCD+BB	2	20	19/12/2023
Module-4						
10.	Assembly Drawings: LIFTING DEVICE (Screw Jack)	L+D	LCD	2	26	09/01/2024
11.	BEARINGS (Plumber Block)	L+D	LCD	2	28	13/01/2024
12.	MACHINE TOOL COMPONENT (Machine Vice or Tailstock)	L+D	LCD	2	30	16/01/2024
13.	VALVES (Ram's Bottom Safety Valve)	L+D	LCD	2	32	22/01/2024
14.	IC ENGINE COMPONENTS (Piston or Connecting Rod)	L+D	LCD	2	34	23/01/2024
15.	Revision	L+D	LCD	2	36	27/01/2024
16.	Revision	L+D	LCD	2	38	29/01/2024
17.	Revision	L+D	LCD	2	40	30/01/2024
18.	Revision	L+D	LCD	2	42	05/02/2024
19.	Revision	L+D	LCD	2	44	06/02/2024

20.	Revision		L+D	LCD	2	46	19/02/2024
21.	TEST-1				3	49	20/02/2024

Suggested Learning Resources:
Books
Text Books:
1. K L Narayana, P Kannaiah, K Venkata Reddy, "Machine Drawing", New Age International, 3rd Edition. ISBN-13: 978-81-224-2518-5, 2006
2. N D Bhatt , "Machine Drawing", Charotar Publishing House Pvt. Ltd.,50th Edition, ISBN-13: 978-9385039232, 2014
3. Machine drawing by K R Gopalakrishna, Subhash Publication
.

Web links and Video Lectures (e-Resources):
• Learn Fusion 360 in 90 Minutes
https://www.autodesk.com/certification/learn/course/learn-fusion-360-in-90-minutes
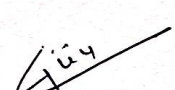
<u>**Details for the teaching Aids**</u>

LCD projectors will be used for creating parts, creating assembly and for drawing views of basic machine components.

Signature of Course In charge   **Signature of Module Coordinator**   Head Signature of HOD
Dept. of Mechanical Engg.
K.S. Institute of Technology
Bengaluru - 560 109

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BENGALURU - 560 109.

3

K.S. INSTITUTE OF TECHNOLOGY BANGALORE-560109

DEPARTMENT OF MECHANICAL ENGINEERING

LESSON PLAN 2023-2024 ODD SEMESTER

COURSE INCHARGE : Dr NAGAPRASAD K S

COURSE CODE/ TITLE: ELECTRIC AND HYBRID VEHICLE TECHNOLOGY

YEAR/ EMESTER/SECTION: II/III

BRANCH: MECHANICAL ENGINEERING

Sl.No	Topic to be covered	Mode of Delivery	Teaching Aid	No. of Periods	Cumulative No. of Periods	Proposed Date
1	Module-1 Introduction to Electric Vehicle (EV)	L+D+S	BB/PPT/LCD	1	1	15/11/23
2	Introduction to Hybrid Electric Vehicle (HEV)	L+D+S	BB/PPT/LCD	1	2	16/11/23
3	basic architecture of hybrid drive train	L+D+S	BB/PPT/LCD	1	3	16/11/23
4	basic architecture of EV drive train	L+D+S	BB/PPT/LCD	1	4	20/11/23
5	types of EV	L+D+S	BB/PPT/LCD	1	5	22/11/23
6	advantages over conventional vehicles	L+D+S	BB/PPT/LCD	1	6	23/11/23
7	types of HEV	L+D+S	BB/PPT/LCD	1	7	23/11/23
8	limitations of EV and HV	L+D+S	BB/PPT/LCD	1	8	25/11/23
9	impact on environment of EV and HV technology	L+D+S	BB/PPT/LCD	1	9	27/11/23
10	impact on environment of EV and HV technology continued with WTW analysis	L+D+S	BB/PPT/LCD	1	10	29/11/23
11	disposal of battery, cell	L+D+S	BB/PPT/LCD	1	11	30/11/23
12	A brief history of Electric and Hybrid vehicles	L+D+S	BB/PPT/LCD	1	12	30/11/23
13	Module-2 Power Management and Energy Sources	L+D+S	BB/PPT/LCD	1	13	4/12/23
14	Management strategies	L+D+S	BB/PPT/LCD	1	14	6/12/23
15	General architecture of EV and HV	L+D+S	BB/PPT/LCD	1	15	7/12/23
16	various battery sources	L+D+S	BB/PPT/LCD	1	16	7/12/23
17	various battery sources continued..	L+D+S	BB/PPT/LCD	1	17	7/12/23
18	Battery Management Systems (BMS)	L+D+S	BB/PPT/LCD	1	18	9/12/23
19	fuel cells concept	L+D+S	BB/PPT/LCD	1	19	9/12/23
20	fuel cells characterstics	L+D+S	BB/PPT/LCD	1	20	11/12/23
21	fuel cells characterstics cont...	L+D+S	BB/PPT/LCD	1	21	13/12/23
22	hybridization of various energy storage devices	L+D+S	BB/PPT/LCD	1	22	14/12/23
23	hybridization of various energy storage devices cont...	L+D+S	BB/PPT/LCD	1	23	18/12/23
24	Selection of the energy storage technology	L+D+S	BB/PPT/LCD	1	24	20/12/23
25	Selection of the energy storage technology	L+D+S	BB/PPT/LCD	1	25	21/12/23

26	**Module-4** Components & Design Considerations of EV & HV	L+D+S	BB/PPT/LCD	1	31	21/12/21
27	Design parameters of batteries, ultra-capacitors	L+D+S	BB/PPT/LCD	1	32	27/12/21
28	Design parameters of batteries, ultra-capacitors continued…	L+D+S	BB/PPT/LCD	1	33	28/12/21
29	Design parameters of fuel cell.	L+D+S	BB/PPT/LCD	1	34	28/12/21
30	aerodynamic considerations	L+D+S	BB/PPT/LCD	1	35	30/12/21
	TEST –I					2/1/24
31	calculation of the rolling resistance and the grade resistance	L+D+S	BB/PPT/LCD	1	36	8/1/24
32	calculation of the rolling resistance and the grade resistance, numericals 2nos.	L+D+S	BB/PPT/LCD	1	37	10/1/24
33	calculation of the rolling resistance and the grade resistance 2 nos.	L+D+S	BB/PPT/LCD	1	38	11/1/24
34	calculation of the rolling resistance and the grade resistance	L+D+S	BB/PPT/LCD	1	39	11/1/24
35	calculation of the acceleration force	L+D+S	BB/PPT/LCD	1	40	13/1/24
36	total tractive effort numericals	L+D+S	BB/PPT/LCD	1	41	17/1/24
37	total tractive effort numericals	L+D+S	BB/PPT/LCD	1	42	18/1/24
38	torque required on the drive wheel numerical	L+D+S	BB/PPT/LCD	1	43	18/1/24
39	torque required on the drive wheel numerical	L+D+S	BB/PPT/LCD	1	44	22/1/24
40	transmission efficiency numericals	L+D+S	BB/PPT/LCD	1	45	24/1/24
41	**Module-3** DC and AC Machines & Drives in EV & HV	L+D+S	BB/PPT/LCD	1	46	25/1/24
42	Various types of motors	L+D+S	BB/PPT/LCD	1	47	25/1/24
43	selection and size of motors ,	L+D+S	BB/PPT/LCD	1	48	27/1/24
44	Induction motor drives and control characteristics	L+D+S	BB/PPT/LCD	1	49	29/1/24
45	Permanent magnet motor drives and characteristics	L+D+S	BB/PPT/LCD	1	50	31/1/24
46	Brushed & Brushless DC motor drive	L+D+S	BB/PPT/LCD	1	51	2/2/24
47	switched reluctance motors and characteristics	L+D+S	BB/PPT/LCD	1	52	2/2/24
48	mechanical and electrical connections of motors.	L+D+S	BB/PPT/LCD	1	53	3/2/24

49	mechanical and electrical connections of motors cont..	L+D+S	BB/PPT/LCD				
50	**Module-5** Electric and Hybrid Vehicles charging architecture	L+D+S	BB/PPT/LCD	1		54	5/2/24
				1		58	7/2/24
51	Smart metering and ancillary services	L+D+S	BB/PPT/LCD	1		59	7/2/24
52	preliminary discussion on vehicle to vehicle and vehicle to personal communication systems	L+D+S	BB/PPT/LCD	1		60	8/2/24
53	battery charging stations and its installation	L+D+S	BB/PPT/LCD	1		61	8/2/24
	TEST –II						9/2/24
54	preliminary discussion on estimation on station capacity	L+D+S	BB/PPT/LCD	1		62	12/2/24
55	Technical issues, different connectors	L+D+S	BB/PPT/LCD	1		63	14/2/24

Suggested Learning Resources: Books

1. Iqbal Hussain, "Electric and Hybrid Vehicles Design Fundamentals", 1st Edition, CRC Press, 2003.
2. James Larminie, John Lowry "Electric Vehicle Technology Explained", 1st Edition, John Wiley and Sons, 2003
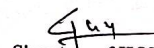
Web links and Video Lectures (e-Resources):

1. Web course on "Introduction to Hybrid and Electric Vehicles" by Dr. Praveenkumar and Prof. S Majhi, IIT Guwahati available on NPTEL at https://nptel.ac.in/courses/108/103/108103009/
2. Video Course on "Electric Vehicles" by Prof. Amitkumar Jain, IIT Delhi available on NPTEL at https://nptel.ac.in/courses/108/102/108102121/

Details of the Teaching Aids: Chalk and talk ,Videos ,ppts animations ,NPTEL videos, NPTEL lectures etc.,

Signature of Course in-Charge   Signature of Module Coordinator   Signature of HOD   Signature of Principal
                                       (Dr. Nagaprasad KS)

K. S. INSTITUTE OF TECHNOLOGY, BENGALURU - 560109
DEPARTMENT OF MECHANICAL ENGINEERING
LESSON PLAN 2023-24 ODD SEMESTER

COURSE INCHARGE   : Dr.NIRMALA L

COURSE TYPE / CODE / TITLE   : Theory /21ME51 /THEORY OF MACHINES

YEAR/ SEMESTER/SECTION   : III/V

BRANCH   : MECHANICAL ENGINEERING

Sl. No.	Topic to be covered	Mode of Delivery	Teaching Aid	No. of Periods	Cumulative No. of Periods	Proposed Date
	Placement Training					25.11.2023 to 01.12.2023
1	Module-1 Introduction: Mechanisms and machines, Kinematic pairs-types, degree of freedom,	L+D	BB	1	1	04.12.2023
2	Kinematic chains and their classification, Kinematic inversions	L+D	BB	2	3	05.12.2023
3	Velocity and Acceleration analysis of planar mechanisms Graphical method: Velocity and Acceleration Analysis of Mechanisms Velocity and acceleration analysis of four bar mechanism,	L+D	BB	1	4	06.12.2023
4	Four bar mechanism	L+D	BB	1	5	08.12.2023
5	Slider crank mechanism	L+D	BB	1	6	11.12.2023

6	Velocity and Acceleration Analysis of Mechanisms (Analytical Method): Velocity and acceleration analysis of four bar mechanism, using complex algebra method.	L+D	BB	2	8	12.12.2023
7	Velocity and Acceleration Analysis of Mechanisms (Analytical Method): Velocity and acceleration analysis slider crank mechanism using complex algebra method.	L+D	BB	1	9	13.12.2023
8	Numerical	L+D	BB	1	10	15.12.2023
9	Module-2 Static force analysis: Static equilibrium, analysis of four bar mechanism	L+D	BB	2	12	19.12.2023
10	Slider Crank mechanism.	L+D	BB	1	13	20.12.2023
11	Numerical	L+D	BB	1	14	22.12.2023
12	Dynamic force analysis: D'Alembert's principle, analysis of four bar and slider crank mechanism.	L+D	BB	1	15	23.12.2023
	First CIE					26.12.2023 to 28.12.2023
13	Flywheel: Introduction to Flywheel and calculation of its size for simple machines like punching machine, shearing machine	L+D	BB	1	16	29.12.2023
14	Numerical	L+D	BB	1	17	30.12.2023
15	Module-3 Spur Gears: Gear terminology, law of gearing, path of contact, arc of contact, contact ratio of spur gear..	L+D	BB	1	18	01.01.2024
16	Interference in involute gears,	L+D	BB	2	20	02.01.2024
17	methods of avoiding interference, condition and expressions for minimum number of teeth to avoid interference	L+D	BB	1	21	03.01.2024
18	Numerical	L+D	BB	1	22	05.01.2024
19	Gear Trains: Simple gear trains, compound gear trains.	L+D	BB	1	23	08.01.2024
	Epicyclic gear trains: Algebraic and tabular methods of finding velocity ratio of epicyclic gear trains	L+D	BB	2	25	09.01.2024

20	torque calculation in epicyclic gear trains. Discussions on applications of gear trains.	L+D	BB	1	26	10.01.2024
21	Numerical	L+D	BB	1	27	12.01.2024
22	Module-4 Balancing of Rotating Masses: Static and Dynamic Balancing,	L+D	BB	2	29	13.01.2024
23	Balancing of single rotating mass by balancing masses in same plane and in different planes. Balancing of several rotating masses by balancing masses in same plane and in different planes	L+D	BB	2	31	16.01.2024
25	numericals	L+D	BB	1	33	17.01.2024
26	Discussions on applications	L+D	BB	1	34	19.01.2024
27	Governors: Types of Governors;	L+D	BB	1	35	22.01.2024
28	Force Analysis of Porter.	L+D	BB	2	37	23.01.2024
29	Effort and Power. Of the governor	L+D	BB	1	38	24.01.2024
30	Numerical	L+D	BB	1	39	27.01.2024
	II CIE					29.01.2024 to 31.01.2024
31	Force Analysis of Hartnell Governors.	L+D	BB	1	40	02.02.2024
32	Controlling Force, Stability, Sensitiveness, Isochronism,	L+D	BB	1	41	05.02.2024
33	Effort and Power. Of the governor	L+D	BB	2	43	06.02.2024
34	Discussion on applications	L+D	ppt	1	44	07.02.2024
35	Balancing of Reciprocating Masses: Inertia Effect of crank and connecting rod,	L+D	BB	1	45	09.02.2024
36	Single cylinder Engine	L+D	BB	1	46	10.02.2024
37	Balancing in multi cylinder-inline engine (primary and secondary forces).	L+D	BB	1	47	12.02.2024

38	Discussions on applications	L+D	BB	2	49	13.02.2024
39	Numerical	L+D	BB	1	50	14.02.2024
40	Module-5 Free vibrations: Basic elements of vibrating system,	L+D	BB	1	51	16.02.2024
41	Types of free vibrations, Longitudinal vibrations- Equilibrium method,	L+D	BB	1	52	19.02.2024
42	D'Alembert's principle,	L+D	BB	2	54	20.02.2024
45	Determination of natural frequency of single degree freedom systems,	L+D	BB	1	55	21.02.2024
46	Damped free vibrations: Under damped, over damped and critically damped systems.	L+D	BB	1	56	23.02.2024
47	Numerical	L+D	BB	1	57	24.02.2024
	III CIE					26.02.2024 to 28.02.2024
48	Logarithmic decrement.	L+D	BB	1	58	01.02.2024
49	Forced vibrations: Undamped forced vibration of spring mass system,	L+D	BB	1	59	04.03.2024
50	Nmerical	L+D	BB	2	61	05.03.2024
51	Revision	L+D	BB	1	62	06.03.2024
52	Revision	L+D	BB	1	63	09.03.2024

Text Books:
1. Modern Machining Process by P.C Pandey and H S Shah McGraw Hill Education India Pvt. Ltd. 2000
2. Production technology HMT McGraw Hill Education India Pvt. Ltd

Course Incharge

Module coordinator

HOD
Head of the Department
Dept. of Mechanical Engg.
K.S. Institute of Technology
Bengaluru - 560 109.

Principal

KS INSTITUTE OF TECHNOLOGY BANGALORE

DEPARTMENT OF MECHANICAL ENGINEERING

LESSON PLAN

NAME OF THE STAFF   : Dr. NAGAPRASAD K S   DATE: 25/11/2023

SUBJECT CODE/NAME   : 21ME52/ THERMO-FLUIDS ENGINEERING

SEMESTER/YEAR   : V / IV

ACADEMIC YEAR   : 2023-2024

Sl No.	Topic to be covered	Mode of Delivery	Teaching Aid	No. of Periods	Cumulative No. of Periods	Proposed Date
	Module-3					
1	Introduction to Turbo machines:,	L+D	BB	1	1	27.11.2023
2	Classification of Turbomachines	L+D	BB	1	2	28.11.2023
3	Basic constructional details, velocity triangles	L+D	BB	1	3	29.11.2023
4	Euler's equation for a Turbo machine- Derivation	L+D	BB	1	4	29.11.2023
5	Alternate form, Degree of reaction	L+D	BB	1	5	29.11.2023
	Inroduction To Lab	L+D	BB+*LAB*	2		*01.12.2023*
6	Impulse & Reaction machine, R =0.5	L+D	BB	1	6	04.12.2023
7	Numericals	L+D	BB	1	7	05.12.2023
8	Numericals 2Nos	L+D	BB	1	8	06.12.2023
9	Numericals 2 Nos.	L+D	BB	1	9	06.12.2023
10	Positive displacement machines	L+D	BB	1	10	07.12.2023
11	Numericals 2 Nos	L+D	BB	1	11	09.12.2023
12	Numericals 2 Nos	L+D	BB	1	12	09.12.2023
	Performance test on Pelton turbine and draw main and operating characteristics.	L+D	BB+ *LAB*	2		*08.12.2023*

13	**Module-5** Steam and gas Turbines- Introduction	L+D	BB	1	13	11.12.2023
14	Impulse turbines, Staging- Sketch	L+D	BB	1	14	12.12.2023
15	Pressure and velocity profile	L+D	BB	1	15	13.12.2023
16	Numerical on single stage	L+D	BB	1	16	13.12.2023
17	Numerical 2 Nos	L+D	BB	1	17	13.12.2023
18	Numerical on two stage	L+D	BB	1	18	18.12.2023
19	Numerical 2 Nos	L+D	BB	1	19	19.12.2023
20	Expression for work done in a 2-stage velocity compounded turbine	L+D	BB	1	20	20.12.2023
	Performance test on Francis turbine and draw main and operating characteristics.	L+D	BB+LAB	2		15.12.2023
21	Reaction staging- sketch	L+D	BB	1	21	23.12.2023
22	Numerical 2 Nos	L+D	BB	1	22	23.12.2023
	Internal Assessment-I					25.12.2023
	Module-2- air + water vapour mixture					
23	Atmospheric air, partial pressure	L+D	BB	1	23	29.12.2023
24	Psychrometric properties: DBT, WBT, DPT, specific and relative humidity	L+D	BB	1	24	30.12.2023
25	Relation between the enthalpy and adiabatic saturation temperatures.	L+D	BB	1	25	30.12.2023
26	Construction and use of psychrometric chart.	L+D	BB	1	26	01.01.2024
27	Analysis of various processes: Heating, cooling, dehumidifying and humidifying.			1	27	02.01.2024
28	Adiabatic mixing of stream of moist air.	L+D	BB	1	28	03.01.2024
29	Numerical	L+D	BB	1	29	03.01.2024
30	Numerical 2 Nos.	L+D	BB	1	30	04.01.2024
31	*Performance test on Air conditioning-test rig- Photo of each devices*	L+D	LAB	1	31	*05.01-2024*
32	Analysis of summer and winter air-conditioning systems.	L+D	BB	1	32	08.01.2024
34	Numerical 2 Nos.	L+D	BB	1	33	09.01.2024
	Module-4- Centrifugal pump					
35	Main Parts of centrifugal pump	L+D	BB	1	34	10.01.2024
36	Various heads and efficiencies	L+D	BB	1	35	16.01.2024
37	Work done	L+D	BB	1	36	17.01.2024
38	Minimum speed for starting centrifugal pump	L+D	BB	1	37	22.01.2024
39	Classifications- Performance characteristics of centrifugal pumps	L+D	BB	1	38	23.01.2024
	Internal Assessment-II					29.01.2024

40	Cavitation in pumps and NPSH.	L+D	BB	1	39	01.02.2024
41	Pumps in series and parallel	L+D	BB	1	40	01.02.2024
42	Numericals	L+D	BB	1	41	02.02.2024
43	Numericals 2 Nos.	L+D	BB	1	42	02.02.2024
	Module-1					
44	Performance Testing of IC Engines	L+D	BB	1	42	05.02.2024
45	Two-stroke and Four-stroke I.C. engines - Measurement of speed	L+D	BB	1	43	06.02.2024
46	Measuring air flow, fuel consumption.	L+D	BB	1	44	07.02.2024
47	Measurement of Brake Power and Indicated Power	L+D	BB	1	45	07.02.2024
48	Performance curves, Numerical 2 Nos	L+D	BB	1	46	08.02.2024
49	Heat Balance sheet	L+D	BB	1	47	10.02.2024
	Performance test on single cylinder engine four/two stroke and draw Heat balance sheet	L+D	BB+LAB	2		09.02.2024
50	Numerical 2 Nos	L+D	BB	1	48	12.02.2024
51	Frictional power: various methods – Willan's line, Morse test, motoring etc	L+D	BB	1	49	13.02.2024
52	Numerical 1 No.				50	14.02.2024
53	Operation of a single stage reciprocating compressors	L+D	BB	1	51	19.02.2024
54	Multi-stage compressor	L+D	BB	1	52	20.02.2024
55	Derivation	L+D	BB	1	53	21.02.2024
	Performance test on single/multi stage Reciprocating compressor.	L+D	BB+LAB	1	54	23.02.2024
56	Module 3: Classification of hydraulic turbines, efficiencies etc	L+D	BB	1	55	24.02.2024
	Internal Assessment-III					26.02.2024
57	Various heads and efficiencies in Pelton wheel	L+D	BB	1	56	04.03.2024
58	working principle and Velocity triangles	L+D	BB	1	57	05.03.2024
59	Francis turbine velocity triangle	L+D	BB	1	59	06-03-2024
	Determination of calorific value of gaseous fuels using Junker's Gas Calorimeter.					07-03-2024

TEXT BOOKS
1. Engineering Thermodynamics P.K. Nag Tata McGraw Hill 6th Edition 2018
2. Applications of Thermodynamics V.Kadambi, T. R.Seetharam, K. B. Subramanya Kumar Wiley Indian Private Ltd 1st Edition 2019

3. Turbo machines M. S. Govindegowda and A. M. Nagaraj M. M. Publications 7Th Ed, 2012
4. Thermodynamics Yunus A, Cengel, Michael A Boles Tata McGraw Hill 7th Edition
5. An Introduction to Energy Conversion, Volume III, Turbo machinery, V. Kadambi and Manohar Prasad New Age International Publishers reprint 2008
6. Turbo Machines B.U.Pai Wiley India Pvt, Ltd 1st Edition

REFERENCE BOOKS
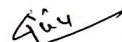
1. Principles of Engineering Thermodynamics Michael J, Moran, Howard N. Shapiro Wiley 8th Edition
2. An Introduction to Thermodynamics, Y.V.C.Rao Wiley Eastern Ltd 2003.
3. Thermodynamics Radhakrishnan PHI 2nd revised edition
4. I.C.Engines M.L.Mathur& Sharma. Dhanpat Rai& sons- India
5. Turbines, Compressors & Fans S. M. Yahya Tata McGraw Hill Co. Ltd 2nd edition, 2002
6. Principals of Turbo machines D. G. Shepherd The Macmillan Company 1964
7. Fluid Mechanics & Thermodynamics of Turbo machines S. L. Dixon Elsevier 2005

Signature of Course In-Charge   Signature of Module Coordinator   Signature of HOD   Signature of Principal

KS INSTITUTE OF TECHNOLOGY BANGALORE

DEPARTMENT OF MECHANICAL ENGINEERING

LESSON PLAN

NAME OF THE STAFF : M.NAGABHUSHANA

DATE: 25/11/2023

SUBJECT CODE/NAME : 21ME53/ FINITE ELEMENT ANALYSIS

SEMESTER/YEAR : V / III

ACADEMIC YEAR : 2023-2024

Sl No.	Topic to be covered	Mode of Delivery	Teaching Aid	No. of Periods	Cumulative No. of Periods	Proposed Date
	Module-1					
1	**Introduction to Finite Element Method** : General description of the finite element method	L+D	BB	1	1	27.11.2023
2	Engineering applications of finite element method	L+D	BB	1	2	28.11.2023
3	Boundary conditions: homogeneous and non homogeneous for structural, heat transfer and fluid flow problems	L+D	BB	1	3	29.11.2023
4	Boundary conditions: homogeneous and non homogeneous for structural, heat transfer and fluid flow problems	L+D	BB	1	4	29.11.2023
5	Boundary conditions: homogeneous and non homogeneous for structural, heat transfer and fluid flow problems	L+D	BB	1	5	29.11.2023
	Potential energy method, Rayleigh Ritz method, Galerkin's method,	L+D	BB+*LAB*	2		*01.12.2023*
6	Potential energy method, Rayleigh Ritz method, Galerkin's method,	L+D	BB	1	6	04.12.2023
7	Displacement method of finite element formulation. Convergence criteria, Discretisation process,	L+D	BB	1	7	05.12.2023
8	Displacement method of finite element formulation. Convergence criteria, Discretisation process,	L+D	BB	1	8	06.12.2023

9	Displacement method of finite element formulation. Convergence criteria, Discretisation process.	L+D	BB	1	9	06.12.2023
10	Plain stress and Plain strain conditions, temperature effects	L+D	BB	1	10	07.12.2023
11	Plain stress and Plain strain conditions, temperature effects- problems	L+D	BB	1	11	09.12.2023
12	**Interpolation models: Simplex, complex and multiplex elements,**	L+D	BB	1	12	09.12.2023
13	Linear interpolation . polynomials in terms of global coordinates 1D, 2D, 3D Simplex Elements.	L+D	BB	1	13	11.12.2023
14	Linear interpolation polynomials in terms of global coordinates 1D, 2D, 3D Simplex Elements.	L+D	BB	1	14	12.12.2023
15	**Interpolation models: Simplex, complex and multiplex elements,**	L+D·	BB	1	15	13.12.2023
16	Plane stress and Plain strain conditions, temperature effects	L+D	BB	1	16	13.12.2023
	Module-2					
17	**One-Dimensional Elements-Analysis of Bars and Trusses:** Linear interpolation polynomials in terms of local coordinate's for 1D, 2D elements	L+D	BB	1	17	13.12.2023
18	Higher order interpolation functions for 1D quadratic and cubic elements in natural coordinates	L+D	BB	1	18	18.12.2023
19	Constant strain triangle, Four-Nodded Tetrahedral Element (TET 4),	L+D	BB	1	19	19.12.2023
20	Eight-Nodded Hexahedral Element (HEXA 8), 2D isoparametric element, Lagrange interpolation functions	L+D	BB	1	20	20.12.2023
21	Numerical Problems: Solution for displacement, stress and strain in 1D straight bars	L+D	BB	1	21	23.12.2023
22	stepped bars and tapered bars using elimination approach and penalty approach	L+D	BB	1	22	23.12.2023
	Internal Assessment-I					25.12.2023
23	stepped bars and tapered bars using elimination approach and penalty approach	L+D	BB	1	23	29.12.2023
24	stepped bars and tapered bars using elimination approach and penalty approach	L+D	BB	1	24	30.12.2023
25	Analysis of trusses.	L+D	BB	· 1	25	30.12.2023
	Module-3					
26	**Beams and Shafts:** Boundary conditions, Load vector, Hermite shape functions	L+D	BB	1	26	01.01.2024

27	Beam stiffness matrix based on Euler-Bernoulli beam theory,			1	27	02.01.2024
28	Examples on cantilever beams, propped cantilever beams,	L+D	BB	1	28	03.01.2024
29	Numerical problems on simply supported, fixed straight and stepped beams using direct stiffness method with concentrated and UDL	L+D	BB	1	29	03.01.2024
30	Numerical problems on simply supported, fixed straight and stepped beams using direct stiffness method with concentrated and UDL	L+D	BB	1	30	04.01.2024
31	Numerical problems on simply supported, fixed straight and stepped beams using direct stiffness method with concentrated and UDL	L+D	LAB	1	31	05.01-2024
32	Numerical problems on simply supported, fixed straight and stepped beams using direct stiffness method with concentrated and UDL	L+D	BB	1	32	08.01.2024
34	**Torsion of Shafts:** Finite element formulation of shafts	L+D	BB	1	33	09.01.2024
35	Determination of stress and twists in circular shafts.	L+D	BB	1	34	10.01.2024
36	Determination of stress and twists in circular shafts.	L+D	BB	1	35	16.01.2024
	Module-4					
37	**Heat Transfer:** Basic equations of heat transfer: Energy balance equation	L+D	BB	1	36	17.01.2024
38	Rate equation: conduction, convection, radiation,	L+D·	BB	1	37	22.01.2024
39	1 D thermal probelms	L+D	BB	1	38	23.01.2024
	Internal Assessment-II					29.01.2024
40	Problems with temperature gradient and heat fluxes, heat transfer in composite sections, straight fins.	L+D	BB	1	39	01.02.2024
41	Problems with temperature gradient and heat fluxes, heat transfer in composite sections, straight fins.	L+D	BB	1	40	01.02.2024
42	Problems with temperature gradient and heat fluxes, heat transfer in composite sections, straight fins.	L+D	BB	1	41	02.02.2024
43	**Fluid Flow:** Flow through a porous medium	L+D	BB	1	42	02.02.2024
	Flow through pipes of uniform and stepped sections.					
44	Flow through pipes of uniform and stepped sections.	L+D	BB	1	42	05.02.2024
	Module-5					
45	**Axi-symmetric Solid Elements:** Derivation of stiffness matrix of axisymmetric bodies with triangular elements,	L+D	BB	1	43	06.02.2024

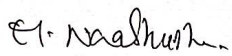| 46	Axi-symmetric Solid Elements: Derivation of stiffness matrix of axisymmetric bodies with triangular elements,	L+D	BB	1	44	07.02.2024
47	Numerical solution of axisymmetric triangular element(s) subjected to point loads.	L+D	BB	1	45	07.02.2024
48	Numerical solution of axisymmetric triangular element(s) subjected to point loads.	L+D	BB	1	46	08.02.2024
49	Numerical solution of axisymmetric triangular element(s) subjected to point loads.	L+D	BB	1	47	10.02.2024
	Dynamic Considerations: Formulation for point mass,	L+D	BB+LAB	2		09.02.2024
50	Consistent element mass matrix of one dimensional bar element,	L+D	BB	1	48	12.02.2024
51	Consistant mass matrix for Truss elements	L+D	BB	1	49	13.02.2024
52	Eigen Value analysis for bars – problem 1				50	14.02.2024
53	Eigen Value analysis for bars – problem 2	L+D	BB	1	51	19.02.2024
54	Eigen Value analysis for Truss – problem 1	L+D	BB	1	52	20.02.2024
55	Eigen Value analysis for Truss – problem2	L+D	BB	1	53	21.02.2024
	Internal Assessment-III					26.02.2024

TEXT BOOKS
1. A first course in the Finite Element Method, Logan, D. L, Cengage Learning, 6th Edition 2016
2. Finite Element Method in Engineering, Rao, S. S, Pergaman Int. Library of Science , 5th Edition 2010
3. Finite Elements in Engineering, Chandrupatla T. R, PHI, 2nd Edition 2013
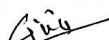
REFERENCE BOOKS
1. Finite Element Method, J.N.Reddy, McGraw -Hill International Edition
2. Finite Elements Procedures, Bathe K. J, PHI Concepts and Application of Finite Elements Analysis , Cook R. D., et al. , Wiley & Sons, 4th Edition 2003

Signature of Course In-Charge   **Signature of Module Coordinator**   **Signature of HOD**   **Signature of Principal**

K.S. INSTITUTE OF TECHNOLOGY BANGALORE

#14, Raghuvanahalli, Kanakapura Main Road, Bengaluru-5600109

DEPARTMENT OF MECHANICAL ENGINEERING

COURSE INCHARGE   : Dr. SALEEM KHAN
COURSE CODE/NAME   : 21ME54/MODERN MOBILITY & AUTOMOTIVE MECHANICS
SEMESTER/SEC/YEAR   : V/A/ III
ACADEMIC YEAR   : 2023-2024

S No	Topic to be covered	Mode of Delivery	Teaching Aid	No. of Periods	Cumulative No. of Periods	Proposed Date
		MODULE 1				
1	Introduction: History of Automobile	L+D	LCD+BB	1	1	25/11/2023
2.	Classification of Automobile w.r.t Usage	L+D	LCD+BB	1	2	27/11/2023
3.	Chassis, Body	L+D	LCD+BB	1	3	28/11/2023
4.	Power Sources, capacity	L+D	LCD+BB	1	4	29/11/2023
5.	Main components of Internal Combustion Engines and their Functions	L+D	LCD+BB	1	5	04/12/2023
6.	Fuel supply system	L+D	LCD+BB	1	6	05/12/2023
7.	Cooling System	L+D	LCD+BB	1	7	06/12/2023

8.	Lubrication System & Ignition System	L+D	LCD+BB	1	8	07/12/2023
9.	Engine Management System	L+D	LCD+BB	1	9	07/12/2023
10.	Super charged engines	L+D	LCD+BB	1	10	09/12/2023
11	Hybrid engines	L+D	LCD+BB	1	11	11/12/2023
12	Modern GT engines	L+D	LCD+BB	1	12	12/12/2023
MODULE 2						
13.	Clutches; Plate Clutches, Cone Clutch	L+D	LCD+BB	1	13	13/12/2023
14.	Centrifugal Clutch, Fluid Flywheel	L+D	LCD+BB	1	14	14/12/2023
15.	Gear Box; Gear Shifting mechanism, synchromesh Gear box	L+D	LCD+BB	1	15	14/12/2023
16.	Torque converter, Automatic Manual Transmission (AMT)	L+D	LCD+BB	1	16	18/12/2023
17.	Automatic Transmission (AT), intelligent manual Transmission (IMT)	L+D	LCD+BB	1	17	19/12/2023
18.	Continuously Variable Transmission (CVT), Infinitely Variable Transmission (IVT)	L+D	LCD+BB	1	18	20/12/2023
19.	Working of Differential, Rear Axle types &construction.	L+D	LCD+BB	1	19	21/12/2023
20.	Suspension – layout & working of Hydraulic& Air suspension	L+D	LCD+BB	1	20	21/12/2023
21.	Independent suspension	L+D	LCD+BB	1	21	23/12/2023
22.	Functions& advantages of Leaf Spring	L+D	LCD+BB	1	22	30/12/2023
23.	Coil Spring, Telescopic Shock Absorber	L+D	LCD+BB	1	23	01/01/2024
24.	Torsion Bar	L+D	LCD+BB	1	24	02/01/2024
MODULE 3						

25	Steering system- mechanisms & Linkages	L+D	LCD+BB	1	25	03/01/2024
26	Steering gear boxes- Rack & pinion	L+D	LCD+BB	1	26	04/01/2024
27	Worm & wheel construction & working,	L+D	LCD+BB	1	27	04/01/2024
28	power Steering construction & working	L+D	LCD+BB	1	28	08/01/2024
29	steering geometry, Wheel balancing	L+D	LCD+BB	1	29	09/01/2024
30	Braking System- Mechanism and Linkages; Mechanical Brakes	L+D	LCD+BB	1	30	10/01/2024
31	Hydraulic Brakes, Power Brakes	L+D	LCD+BB	1	31	11/01/2024
32	Parking brakes, ABS,	L+D	LCD+BB	1	32	11/01/2024
33	Safety system – Safety measures in modern vehicle – safety frames	L+D	LCD+BB	1	33	13/01/2024
34	working of - air bags, seat belt, collapsible steering	L+D	LCD+BB	1	34	16/01/2024
35	working of - spoilers, defoggers	L+D	LCD+BB	1	35	17/01/2024
36	fire safety measures in heavy vehicles, bullet proof vehicles	L+D	LCD+BB	1	36	18/01/2024
MODULE 4						
37	Exhaust gas pollutants and their effects on environment,	L+D	LCD+BB	1	37	18/01/2024
38	Emission norms	L+D	LCD+BB	1	38	22/01/2024
39	IC engine fuels types, extraction & availability,	L+D	LCD+BB	1	39	23/01/2024
40	BIO Fuels – Production and impact	L+D	LCD+BB	1	40	24/01/2024
41	Ethanol engines, CNG vehicles- operation, advantages& disadvantages	L+D	LCD+BB	1	41	25/01/2024
42	over view of Hydrogen - fuel cell vehicles, advantages	L+D	LCD+BB	1	42	25/01/2024

3

		& disadvantages					
	43	IC engine/ electric hybrid vehicles over view	L+D	LCD+BB	1	43	27/01/2024
	44	layout, transmission & control system	L+D	LCD+BB	1	44	01/02/2024
	45	solar powered vehicles	L+D	LCD+BB	1	45	01/02/2024
	46	wind powered vehicles	L+D	LCD+BB	1	46	05/02/2024
	47	super capacitor	L+D	LCD+BB	1	47	06/02/2024
	48	supply rails	L+D	LCD+BB	1	48	07/02/2024
MODULE 5							
	49	Electric vehicles principle and components-	L+D	LCD+BB	1	49	08/02/2024
	50	layout of two & 4 wheeler	L+D	LCD+BB	1	50	08/02/2024
	51	Motors used in Electric vehicles –types	L+D	LCD+BB	1	51	10/02/2024
	52	Over view of construction and working	L+D	LCD+BB	1	52	12/02/2024
	53	Power transmission & control system in Electric vehicles	L+D	LCD+BB	1	53	13/02/2024
	54	Batteries –construction & working principle of Lead acid	L+D	LCD+BB	1	54	14/02/2024
	55	Nickel based	L+D	LCD+BB	1	55	15/02/2024
	56	Sodium based,	L+D	LCD+BB	1	56	15/02/2024
	57	Lithium & Metal Air batteries	L+D	LCD+BB	1	57	19/02/2024

4

58	Battery charging types and requirements	L+D	LCD+BB	1	58	20/02/2024
59	Battery cooling	L+D	LCD+BB	1	59	21/02/2024
60	Fire safety measures in EV vehicles	L+D	LCD+BB	1	60	22/02/2024
61	Revision	L+D	LCD+BB	1	61	22/02/2024
62	Revision	L+D	LCD+BB	1	62	24/02/2024
63	Revision	L+D	LCD+BB	1	63	24/02/2024
64	Revision	L+D	LCD+BB	1	64	06/03/2024
65	Revision	L+D	LCD+BB	1	65	07/03/2024

TEXT BOOKS:

1. Electric Vehicle Technology Explained James Larminie Oxford Brookes University, Oxford, UK John Lowry Acenti Designs Ltd., UK
2. Automobile engineering, Kirpal Singh, Vol I and II (12th Edition) Standard Publishers 2011 2
3. Automotive Mechanics, S. Srinivasan, (2nd Edition) Tata McGraw Hill 2003.
4. Automotive Systems & Modern Mobility by Dr T Madhusudhan, et al., Cengage publications
5. Automotive mechanics, William H Crouse & Donald L Anglin (10th Edition) Tata McGraw Hill Publishing Company Ltd., 2007.
6. Modern Electric, Hybrid Electric, and Fuel Cell Vehicles,MehrdadEhsani, YiminGao, CRC Press, Taylor & Francis Group
7. Automotive mechanics: Principles and Practices, Joseph Heitner, D Van Nostrand Company, Inc
8. Fundamentals of Automobile Engineering, K.K.Ramalingam, Scitech Publications (India) Pvt. Ltd. 4
9. Automobile Engineering, R. B. Gupta, SatyaPrakashan,(4th Edition) 1984.

Web links and Video Lectures (e-Resources):
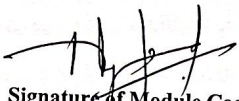
1. https://archive.nptel.ac.in/courses/107/106/107106088/
2. https://onlinecourses.nptel.ac.in/noc20_de06/preview
3. https://www.digimat.in/nptel/courses/video/107106088/L01.html
4. https://nptel.ac.in/courses/107106088
5. https://www.youtube.com/watch?v=LZ82iANWBL0&list=PLbMVogVj5nJTW50jj9_gvJmdwFWHaqR5J

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning:
1. Operate the cut section models of complete vehicle chassis and observe the working of all components
2. Dismantle & Assemble the Automotive Engine, Gear Box, Clutch, brakes
3. Prepare the posters of automobile chassis & display
4. Visit nearby automobile showrooms/ service station
5. Prepare a comparison statement of different automobiles using specification provided by respective manufacturers
6. Visit auto expo

Signature of Course In-Charge   Signature of Module Coordinator   Signature of HOD   Signature of Principal

K.S. INSTITUTE OF TECHNOLOGY, BENGALURU - 560109
DEPARTMENT OF MECHANICAL ENGINEERING
LESSON PLAN 2023-2024 ODD SEMESTER

COURSE INCHARGE   : Dr.Girish TR

COURSE CODE/TITLE   : RESEARCH METHODOLOGY & INTELLECTUAL PROPERTY RIGHTS

YEAR/SEMESTER/SECTION : III/V

BRANCH   : Mechanical

Sl. No.	Topic to be covered	Mode of Delivery	Teaching Aid	No. of Periods	Cumulative No. of Periods	Proposed Date
	Module 1:					
1	Introduction: Meaning of Research	L+D,PS	BB/PPT	1	1	4.12.2023
2	Objectives of Engineering Research, and Motivation in Engineering Research. Types of Engineering Research	L+D,PS	BB/PPT	1	2	8.12.2023
3	Finding and Solving a Worthwhile Problem, Ethics in Engineering Research, Ethics in Engineering Research Practice	L+D,PS	BB/PPT	1	3	11.12.2023
4	Types of Research Misconduct, Ethical Issues Related to Authorship.	L+D,PS	BB/PPT	1	4	15.12.2023
	Module 2:					
5	Literature Review and Technical Reading, New and Existing Knowledge	L+D,PS	BB/PPT	1	5	18.12.2023
6	Analysis and Synthesis of Prior Art Bibliographic Databases	L+D,PS	BB/PPT	1	6	22.12.2023
	Internal Assement -1					
7	Web of Science, Google and Google Scholar, Effective Search: The Way Forward Introduction to Technical	L+D, PS	BB/PPT	1	7	29.12.2023

Reading Conceptualizing Research

No	Topic					
8	Critical and Creative Reading, Taking Notes While Reading, Reading Mathematics and Algorithms, Reading a Datasheet. Citations: Functions and Attributes, Impact of Title	L+D, PS	BB/PPT	1	8	30.12.2023
9	Keywords on Citations, Knowledge Flow through Citation, Citing Datasets, Styles for Citations, Acknowledgments and Attributions, What Should Be Acknowledged, Acknowledgments in, Books Dissertations, Dedication or Acknowledgments.	L+D, PS	BB/PPT	1	9	1.01.2024
	Module 3 :					
10	Introduction To Intellectual Property: Role of IP in the Economic and Cultural Development of the Society	L+D, PS	BB/PPT	1	10	05.01.2024
11	P Governance, IP as a Global Indicator of Innovation, Origin of IP History of IP in India. Major Amendments in IP Laws and Acts in India.	L+D, PS	BB/PPT	1	11	8.01.2024
12	Patents: Conditions for Obtaining a Patent Protection, To Patent or Not to Patent an Invention. Rights Associated with Patents. Enforcement of Patent Rights. Inventions Eligible for Patenting.	L+D, PS	BB/PPT	1	12	12.01.2024
13	Non-Patentable Matters. Patent Infringements. Avoid Public Disclosure of an Invention before Patenting. Process of Patenting. Prior Art Search. Choice of Application to be Filed. Patent Application Forms. Jurisdiction of Filing Patent Application.	L+D, PS	BB/PPT	1	13	19.01.2024
14	Publication. Pre-grant Opposition. Examination. Grant of a Patent. Validity of Patent Protection. Post-grant Opposition. Commercialization of a Patent. Need for a Patent Attorney/Agent. Can a Worldwide Patent be Obtained. Do I Need First to File a Patent in India. Patent Related Forms. Fee Structure.	L+D, PS	BB/PPT	1	26	22.01.2024
15	Types of Patent Applications. Commonly Used Terms in Patenting. National Bodies Dealing with Patent Affairs. Utility Models.	L+D, PS	BB/PPT	1	27	27.01.2024
	Internal Assesment -2					

	Module 4:					
16	Copyrights and Related Rights: Classes of Copyrights. Criteria for Copyright. Ownership of Copyright. Copyrights of the Author. Copyright Infringements. Copyright Infringement is a Criminal Offence. Copyright Infringement is a Cognizable Offence. Fair Use Doctrine.	L+D, PS	BB/PPT	1	28	2.02.2024
17	Copyrights and Internet. Non-Copyright Work. Copyright Registration. Judicial Powers of the Registrar of Copyrights. Fee Structure. Copyright Symbol. Validity of Copyright. Copyright Profile of India. Copyright and the word 'Publish'. Transfer of Copyrights to a Publisher	L+D, PS	BB/PPT	1	29	05.02.2024
18	. Copyrights and the Word 'Adaptation'. Copyrights and the Word 'Indian Work'. Joint Authorship. Copyright Society. Copyright Board. Copyright Enforcement Advisory Council (CEAC).	L+D, PS	BB/PPT	1	30	9.02.2024
19	International Copyright Agreements, Conventions and Treaties. Interesting Copyrights Cases. Trademarks: Eligibility Criteria. Who Can Apply for a Trademark. Acts and Laws. Designation of Trademark Symbols.	L+D, PS	BB/PPT	1	31	10.02.2024
20	Classification of Trademarks. Registration of a Trademark is Not Compulsory. Validity of Trademark. Types of Trademark Registered in India.	L+D, PS	BB/PPT	1	40	12.02.2024
21	Trademark Registry. Process for Trademarks Registration. Prior Art Search. Famous Case Law: Coca-Cola Company vs. Bisleri International Pvt. Ltd	L+D, PS	BB/PPT	1	41	16.02.2024
	Module 5:					
22	Eligibility Criteria. Acts and Laws to Govern Industrial Designs. Design Rights. Enforcement of Design Rights. Non-Protectable Industrial Designs India. Protection Term. Procedure for Registration of Industrial Designs. Prior Art Search. Application for Registration	L+D, PS	BB/PPT			19.02.2024
23	Duration of the Registration of a Design. Importance of Design Registration. Cancellation of the Registered Design. Application Forms. Classification of Industrial Designs. Designs Registration Trend in India. International	L+D, PS	BB/PPT	1	42	23.02.2024

	Treaties. Famous Case Law: Apple Inc. vs. Samsung Electronics Co.					
	Internal Assement -3					
24	Geographical Indications: Acts, Laws and Rules Pertaining to GI. Ownership of GI. Rights Granted to the Holders. Registered GI in India. Identification of Registered GI. Classes of GI. Non-Registerable GI. Protection of GI. Collective or Certification Marks.	L+D, PS	BB/PPT	1	43	01.03.2024
25	Enforcement of GI Rights. Procedure for GI Registration Documents Required for GI Registration. GI Ecosystem in India. Case Studies on Patents. Case study of Curcuma (Turmeric) Patent, Case study of Neem Patent, Case study of Basmati patent. IP Organizations In India. Schemes and Programmes	L+D, PS	BB/PPT	1	44	09.03.2024

Text Books:
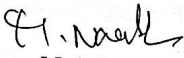
1. Dipankar Deb • Rajeeb Dey, Valentina E. Balas "Engineering Research Methodology", ISSN 1868- 4394 ISSN 1868-4408 (electronic), Intelligent Systems Reference Library, ISBN 978-981-13- 2946-3 ISBN 978-981-13-2947-0 (eBook), https://doi.org/10.1007/978-981-13-2947-0
2. Intellectual Property A Primer for Academia by Prof. Rupinder Tewari Ms. Mamta
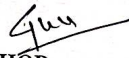
Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

• Quizzes for list, tuple, string dictionary slicing operations using below link: https://github.com/sushantkhara/Data-Structures-And-Algorithms-withPython/raw/main/Python%203%20_%20400%20exercises%20and%20solutions%20for%20beginners.pdf

Details of the teaching aids: Chalk and talk, videos, ppt, animations, NPTEL videos, NPTEL lectures etc.,

Course Incharge   Module coordinator   HOD   Principal

K.S INSTITUTE OF TECHNOLOGY, BANGALORE

DEPARTMENT OF MECHANICAL ENGINEERING

NAME OF THE STAFF   : Dr. UMASHANKAR M / Mr. HARISH U

SUBJECT CODE/NAME   :18ME71/ CONTROL ENGINEERING

SEMESTER/YEAR   : VII / IV

ACADEMIC YEAR   : 2023-2024

Sl No.	Topic to be covered	Mode of Delivery	Teaching Aid	No. of Periods	Cumulative No. of Periods	Proposed Date
	Module-1					
1	Introduction: Components of a control system	L+D	BB	1	1	11.09.2023
2	Open loop and closed loop systems.	L+D	BB	1	2	12.09.2023
3	Types of controllers: Proportional, Integral,	L+D	BB	1	3	13.09.2023
4	Differential, Proportional-Integral, and Proportional- Integral-Differential controllers.	L+D	BB	1	4	14.09.2023
5	Modelling of Physical Systems: Mathematical Models of Mechanical	L+D	BB	1	5	15.09.2023
6	Mathematical Models of Mechanical	L+D	BB	1	6	19.09.2023
7	Mathematical Models of Electrical	L+D	BB	1	7	20.09.2023
8	Mathematical Models of Electrical	L+D	BB	1	8	21.09.2023
9	Mathematical Models of Thermal	L+D	BB	1	9	22.09.2023
10	Mathematical Models of Hydraulic systems	L+D	BB	1	10	23.09.2023
	Module-2					
11	Time domain performance of control systems	L+D	BB	1	11	25.09.2023
12	Typical test signal.	L+D	BB	1	12	26.09.2023

13	Unit step response and time domain specifications of first order	L+D	BB	1	13	27.09.2023
14	Unit step response and time domain specifications of first order	L+D	BB	1	14	29.09.2023
15	second order system	L+D	BB	1	15	30.09.2023
16	Steady state error, error constants.	L+D	BB	1	16	03.10.2023
17	Steady state error, error constants.	L+D	BB	1	17	04.10.2023
18	Numerical Problems	L+D	BB	1	18	05.10.2023
19	Numerical Problems	L+D	BB	1	19	06.10.2023
20	Numerical Problems	L+D	BB	1	20	09.10.2023
	Module-3					
21	Block diagram algebra,	L+D	BB	1	21	10.10.2023
22	Reduction of block diagram	L+D	BB	1	22	11.10.2023
23	Signal flow graphs	L+D	BB	1	23	12.10.2023
24	Signal flow graphs	L+D	BB	1	24	13.10.2023
25	Internal Assessment-I				25	16.10.2023
26	Gain formula for signal flow graphs	L+D	BB	1	26	19.10.2023
27	Gain formula for signal flow graphs	L+D	BB	1	27	20.10.2023
28	State diagram from differential equations	L+D	BB	1	28	25.10.2023
29	Numerical Problems	L+D	LAB	1	29	26.10.2023
30	Numerical Problems	L+D	BB	1	30	27.10.2023
31	Numerical Problems	L+D	BB	1	31	28.10.2023
	Module-4					
32	Stability of linear control systems: Rout's criterion	L+D	BB	1	32	30.10.2023
33	Rout's criterion	L+D	BB	1	33	31.10.2023
35	Root locus	L+D	BB	1	35	02.11.2023
36	Numerical Problems on Root locus	L+D	BB	1	36	03.11.2023
37	Numerical Problems on Root locus	L+D	BB	1	37	06.11.2023
38	Determination of phase margin and gain margin using root locus.	L+D	BB	1	38	07.11.2023
39	Determination of phase margin and gain margin using root locus.	L+D	BB	1	39	08.11.2023
40	Numerical Problems	L+D	BB	1	40	09.11.2023
41	Numerical Problems	L+D	BB	1	41	10.11.2023
42	Numerical Problems	L+D	BB	1	42	11.11.2023

43	Numerical Problems	L+D	BB	1	43	13.11.2023
44	Numerical Problems	L+D	BB	1	44	15.11.2023
	Module-5					
45	Stability analysis using Polar plot	L+D	BB	1	45	16.11.2023
46	Stability analysis using Polar plot	L+D	BB	1	46	17.11.2023
47	Nyquist plot	L+D	BB	1	47	20.11.2023
48	Stability analysis using Polar plot	L+D	BB	1	48	21.11.2023
49	Bode plot	L+D	BB	1	49	22.11.2023
50	Internal Assessment-II				50	23.11.2023
51	Bode plot	L+D	BB	1	51	27.11.2023
52	Determination of phase margin and gain margin using Bode plot	L+D	BB	1	52	28.11.2023
53	Determination of phase margin and gain margin using Bode plot	L+D	BB	1	53	29.11.2023
54	Determination of phase margin and gain margin using Bode plot.	L+D	BB	1	54	01.12.2023
55	Numerical Problems	L+D	BB	1	55	04.12.2023
56	Numerical Problems	L+D	BB	1	56	05.12.2023
57	Numerical Problems	L+D	BB	1	57	06.12.2023
58	Numerical Problems	L+D	BB	1	58	07.12.2023
59	Numerical Problems	L+D	BB	1	59	08.12.2023
60	Numerical Problems	L+D	BB	1	60	09.12.2023
61	Numerical Problems	L+D	BB	1	61	11.12.2023
62	Revision	L+D	BB	1	62	12.12.2023
63	Revision	L+D	BB	1	63	13.12.2023
64	Revision	L+D	BB	1	64	14.12.2023
65	Revision	L+D	BB	1	65	15.12.2023
66	Revision	L+D	BB	1	66	18.12.2023
67	Revision	L+D	BB	1	67	19.12.2023
68	Revision	L+D	BB	1	68	20.12.2023
69	Revision	L+D	BB	1	69	21.12.2023
70	Revision	L+D	BB	1	70	22.12.2023
71	Internal Assessment-III				71	23.12.2023
72	Revision	L+D	BB	1	72	26.12.2023

| 73 | Revision | | | L+D | BB | 1 | 73 | 04.01.2024 |
| 74 | Revision | | | L+D | BB | 1 | 74 | 05.01.2024 |

Signature of HOD
Head of the Department
Dept. of Mechanical Engg.
K.S. Institute of Technology
Bengaluru - 560 109.

Signature of Principal
PRINCIPAL
K.S. INSTITUTE OF TECHNOLOGY
BENGALURU - 560 109.

K.S INSTITUTE OF TECHNOLOGY, BANGALORE
DEPARTMENT OF MECHANICAL ENGINEERING
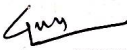
Date: 17-10-2023

NAME OF THE STAFF   : M. Nagabhushana

SUBJECT CODE/NAME   :18ME72/Computer Aided Design and Manufacturing

SEMESTER/YEAR   : VII / IV

ACADEMIC YEAR   : 2023-2024

Sl.No	Topic to be covered	Mode of Delivery	Teaching Aid	No. of Periods	Cumulative No. of Periods	Proposed Date
			Module-1			
1	Introduction to CIM	L	BB	1	1	11/09/23
2	Production support systems	L	BB	1	2	12/09/23
3	Manufacturing support systems	L	BB	1	3	13/09/23
4	Cim & Automation	L	BB	1	4	14/09/23
5	Classification of automated systems	L	BB	1	5	15/09/23
6	Manufacturing Lead time	L	BB	1	6	19/09/23
7	Production capacity	L	BB	1	7	20/09/23
8	Automated flow line	L	BB	1	8	21/09/23
9	Buffer storage	L	BB	1	9	22/09/23

10	Automated Assembly Systems	L	BB	1		10	23/09/23
11	Inline , segmented and rotary assembly systems.	L	LCD	1		11	25/09/23
12	Module 2 Computer aided process planning	L	LCD	1		12	26/09/23
13	Retrieval type and Generate type CAPP	L	BB	1		13	27/09/23
14	Material Resource Planning	L	BB	1		14	29/09/23
15	Production management systems	L	BB	1		15	30/09/23
16	**Shop Floor Control**	L	BB	1		16	03/10/23
17	Computer aided quality control	L	BB	1		17	04/10/23
18	Classification of quality parameters	L	BB	1		18	05/10/23
Module 2							
19	Application of computers in design	L	BB	1		19	06/10/23
20	Software configuration , functions of graphics package	L	LCD	1		20	17/10/23
21	Constructing the geometry, Transformations	L	BB	1		21	18/10/23
22	Translations , rotations and scaling	L	BB	1		22	19/10/23
23	Numerical problems on Transformations	L	BB	1		23	20 /10/23
Internal Assessment-1						24	25 /10/23
24	Numerical problems on Transformations	L	BB	1		25	30/10/23
Module 3							
25	Introduction to FMS, Fundamentals of Group Technology	L	BB	1		26	31/10/23
26	Components of FMS & classification	L	BB	1		27	02/11/23
27	Material handling and storage system	L	BB	1		28	03/11/23
28	Computer control systems	L	BB	1		29	6/11/23
29	FMS planning and design issues	L	BB	1		30	7/11/23
30	Automated storage and Retrieval systems	L	BB	1		31	8/11/23
31	AS/RS and automated parts identification and data capture	L	BB	1		32	9/11/23
32	Introduction to Line Balancing	L	BB	1		33	10/11/23
33	Methods of Line balancing	L	BB	1		34	11/11/23
34	Numerical problems on largest candidate rule,	L	BB	1		35	13/11/23
Internal Assessment-2						36	15/11/23
35	Kilbridge and Wester method, and Ranked	L	BB	1		37	16/11/23

	Positional Weights method,					
36	Mixed Model line balancing, computerized line balancing methods	L	BB	1	38	17/11/23
	Module 4					
37	Introduction to CNC	L	BB	1	39	20/11/23
38	Components of CNC programming, manual part programming	L	BB	1	40	21/11/23
39	G-codes and M-codes	L	BB	1	41	22/11/23
40	Tool changing and special codes	L	BB	1	42	23/11/23
41	Programming of Simple components in turning, drilling and milling systems.	L	BB	1	43	27/11/23
42	Programming with canned cycles	L	BB	1	44	28/11/23
43	Cutter radius compensations	L	BB	1	45	29/11/23
44	Introduction robot technology, nomenclature	L	BB	1	46	01/12/23
45	Robot control systems	L	BB	1	47	4/12/23
46	Robot programming methods	L	BB	1	48	5/12/23
47	Online and off line methods	L	BB	1	49	6/12/23
48	Sensors and programming methods in robots	L	BB	1	50	7/12/23
49	Robot industrial applications	L	BB	1	52	8/12/23
	Module 5					
50	Introduction of additive manufacturing	L	BB	1	52	9/12/23
51	Slicing CAD Models for AM	L	BB	1	53	11/12/23
52	Future of Automated Factory	L	BB	1	54	12/12/23
	Internal Assessment-3				55	25/12/23

Signature of Course Incharge

Signature of HOD
Head of the Department
Dept. of Mechanical Engg.
K.S. Institute of Technology
Bengaluru - 560 109.

Signature of Principal
PRINCIPAL
K.S. INSTITUTE OF TECHNOLOGY
BENGALURU - 560 109.

K S INSTITUTE OF TECHNOLOGY, BANGALORE
DEPARTMENT OF MECHANICAL ENGINEERING
LESSON PLAN 2023-24 ODD SEMESTER

COURSE INCHARGE   : Mr. RAJESH G.L

COURSE TITLE/CODE   : TOTAL QUALITY MANAGEMENT/18ME734

YEAR/ SEMESTER/SECTION   : IV / VII

BRANCH   : MECHANICAL ENGINEERING

Sl. No.	Topic to be covered	Mode of Delivery	Teaching Aid	No. of Periods	Cumulative No. of Periods	Proposed Date
	MODULE 1: PRINCIPLES AND PRACTICE					
1	Introduction to TQM	L+D,PS	LCD	1	1	11-09-2023
2	Basic approaches of TQM with examples	L+D,PS	LCD	1	2	12-09-2023
3	Gurus of TQM and their contribution	L+D,PS	LCD	1	3	13-09-2023
4	Frame work and awareness of TQM	L+D,PS	LCD	1	4	14-09-2023
5	Introduction, states, concept of work, heat	L+D,PS	LCD	1	5	15-09-2023
6	Meaning of quality with examples	L+D,PS	LCD	1	6	19-09-2023
7	Evolution, obstacles and benefits of TQM	L+D,PS	LCD	1	7	20-09-2023
8	Introduction to QMS	L+D,PS	LCD	1	8	21-09-2023
9	ISO registration procedure and its benefits	L+D,PS	LCD	1	9	22-09-2023
10	ISO 9000 series of standards with example	L+D,PS	LCD	1	10	23-09-2023

	MODULE 2: LEADERSHIP					
11	Definition of leader and leadership with examples	L+D,PS	LCD	1	11	25-09-2023
12	Characteristics of quality leaders	L+D,PS	LCD+BB	1	12	26-09-2023
13	Characteristics of quality leader- continued	L+D,PS	LCD	1	13	27-09-2023
14	Features of leadership, leadership concept	L+D,PS	LCD	1	14	29-09-2023
15	Definition of effective people and their characteristics	L+D,PS	LCD	1	15	03-10-2023
16	Ethics, types, causes for unethical behavior in an organization	L+D,PS	LCD	1	16	04-10-2023
17	Demings philosophy with examples, role of TQM leader	L+D,PS	LCD	1	17	05-10-2023
18	Discussion on how to implement TQM in a business firm	L+D,PS	LCD	1	18	06-10-2023
19	Core values and concepts to be followed towards development of organization.	L+D,PS	LCD	1	19	09-10-2023
20	Stages/phases of strategic planning with example	L+D,PS	LCD	1	20	10-10-2023
	MODULE 3: CUSTOMER SATISFACTION & EMPLOYEE INVOLVEMENT					
21	Introduction to customer satisfaction	L+D,PS	LCD	1	21	11-10-2023
22	Types of customers, examples	L+D,PS	LCD+BB	1	22	12-10-2023
23	Customer perception of quality	L+D,PS	LCD	1	23	13-10-2023
24	Customer feedback and its benefits	L+D,PS	LCD	1	24	19-10-2023
25	Methods of obtaining feedback from customer and employees	L+D,PS	LCD	1	25	20-10-2023
26	Customer complaints, elements of customer service	L+D,PS	LCD	1	26	25-10-2023
27	Difference between needs and requirement, Kano model	L+D,PS	LCD	1	27	26-10-2023
28	Kano model with example, customer retention and its benefits	L+D,PS	LCD	1	28	27-10-2023
29	Definition of employee involvement, Maslows hierarchy	L+D,PS	LCD	1	29	28-10-2023

30	Two factor theory, employee surveys	L+D,PS	LCD	1	30	30-10-2023
31	Empowerment, Teams and its types, suggestion system	L+D,PS	LCD	1	31	31-10-2023
MODULE 4: CONTINUOUS PROCESS IMPROVEMENT						
32	Introduction to CPI, Process	L+D,PS	LCD	1	32	02-11-2023
33	Discussion on Juran trilogy with example	L+D,PS	LCD	1	33	03-11-2023
34	Strategies of CPI	L+D,PS	LCD	1	34	06-11-2023
35	Types of problems, PDSA cycle and problem solving methods	L+D,PS	LCD	1	35	07-11-2023
36	Kaizen, re-engineering, six sigma with case studies	L+D,PS	LCD	1	36	08-11-2023
37	Definitions of statistical process control with examples	L+D,PS	LCD	1	37	09-11-2023
38	Pareto diagram and process flow diagram	L+D,PS	LCD	1	38	10-11-2023
39	Cause and effect diagram, check sheets	L+D,PS	LCD	1	39	11-11-2023
40	Histograms, fundamentals of statistics	L+D,PS	LCD	1	40	13-11-2023
41	Discussion on control charts, concept of state of control and out of control process	L+D,PS	LCD	1	41	15-11-2023
MODULE 5: TOTAL PRODUCTIVE MAINTENANCE						
42	Definition of TPM.	L+D,PS	LCD	1	42	16-11-2023
43	Types of maintenance with example	L+D,PS	LCD	1	43	17-11-2023
44	Steps to implement TPM in an organization	L+D,PS	LCD	1	44	22-11-2023
45	Explanation on pillars of TPM	L+D,PS	LCD	1	45	27-11-2023
46	5S, Jishu Hozen, concept of quality maintenance	L+D,PS	LCD	1	46	29-11-2023
47	Difference between quality maintenance and planned	L+D,PS	LCD	1	47	04-12-2023

	maintenance						
48	Definition of quality by design, key components of QbD	L+D,PS	LCD		1	48	05-12-2023
49	Role of QbD in pharmaceutical industry, examples	L+D,PS	LCD		1	49	06-12-2023
50	Benefits and challenges of QbD	L+D,PS	LCD		1	50	07-12-2023
51	Introduction to environmental management systems (EMS)	L+D,PS	BB		1	51	08-12-2023
52	Fundamentals of EMS	L+D,PS	BB		1	52	13-12-2023
53	EMS under ISO 14001 with examples	L+D,PS	BB		1	53	18-12-2023
54	Discussion on cost involved in EMS	L+D,PS	BB		1	54	22-12-2023
55	Process/stages in EMS, Case studies	L+D,PS	BB		1	55	05-01-2024

Text Books (Title of the Book/Name of the author/Name of the publisher/Edition and Year)
- Total Quality Management Dale H. Besterfield Pearson Education India, Edition 03. ISBN: 8129702606
- Total Quality Management for Engineers M. Zairi Wood head Publishing ISBN:185573024

Reference Books:
- Managing for Quality and Performance Excellence James R. Evans and William M Lindsay Cengage Learning. 9th edition
- Four revolutions in management Shoji Shiba, Alan Graham, David Walden Oregon 1990
- Organizational Excellence through TQM H. Lal New age Publications 200864
- Engineering Optimization Methods and Applications A Ravindran, K, M. Ragsdell Willey India Private Limited 2nd Edition,2006

Web Materials:
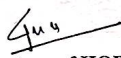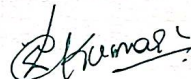- ✓ https://www.azdocuments.in/2021/05/TQM-management-18me734.html

Details of the teaching aids:
1. PPT & Video presentation

Signature of Course In-Charge	Signature of Module Coordinator	Signature of HOD	Signature of Principal

Head of the Department
Dept. of Mechanical Engg.
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Bengaluru - 560 109.

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BENGALURU - 560 109.

KS INSTITUTE OF TECHNOLOGY BANGALORE
DEPARTMENT OF MECHANICAL ENGINEERING

NAME OF THE STAFF : Mr.MANJUNATHA.B.R

COURSE CODE/TITLE 18ME741 / ADDITIVE MANUFACTURING

SEMESTER/YEAR : VII/ IV

ACADEMIC YEAR : 2023-2024

Sl. No.	Topic to be covered	Mode of Delivery	Teaching Aid	No. of Periods	Cumulative No. of Periods	Proposed Date
	Module 1: Introduction and basic principles					
1	Introduction and basic principles: Need for Additive Manufacturing	L+D	BB	1	1	11/09/2023
2	Generic AM process, stereoli tho graphy or 3dprinting, rapid proto typing	L+ D	BB	1	2	12/09/2023
3	The benefits of AM, distinction between AM and CNC machining	L+ D	BB	1	3	13/09/2023
4	Other related technologies- reverse engineering technology.	L+D	BB	1	4	13/09/2023
5	Development of Additive Manufacturing Technology: Introduction, computers	L+ D	BB	1	5	11/09/2023
6	computer-aidedde sign technology ,other associated technologies, the use of layers,	L+ D	BB	1	6	15/09/2023
7	classification of AM processes, metals ystems, hybrid systems, milestones in AM development.	L+D,	BB	1	7	19/09/2023
8	Additive Manufacturing Process chain: Introduction,	L+D	BB	1	8	20/09/2023
9	the eight steps in additive manufacture,,	L+D	BB	1	9	22/09/2023
10	Steps in AM	L+ D	BB	1	10	23/09/2023
11	Variations from one AM machine to another ,metal	L+D	BB	1	11	25/09/2023

	systems					
12	Compressors. Structure of pneumatic control System	L+D	LCD	1	12	26/09/2023
13	Maintenance of equipment, materials handling issues, design for AM, and application areas.	L+D	LCD	1	13	27/09/2023
Module 2: Photo polymerization process						
14	Photo polymerization processes: Stereolitho graphy (SL), Materials, SL resin curing process	L+D,	LCD	1	14	29/09/2023
15	Micro-stereoli thography, Process Benefits and Drawbacks, Applications of Photo polymerization Processes.	L+D,	BB	1	15	03/10/2023
16	Powder bedfusion processes: Introduction, Selective laser Sintering (SLS)	L+D	BB	1	16	04/10/2023
17	Materials, Powder fusion mechanism, SLS Metal and ceramic part creation, Electron Beam melting (EBM), Process Benefits and Drawbacks, Applications of Powder Bed Fusion Processes.	L+D	BB	1	17	04/10/2023
18	Extrusion-based systems: Fused Deposition Modelling (FDM), Principles, Materials, Plotting and path control,	L+D	LCD	1	18	06/10/2023
19	Bio-Extrusion, Process Benefits and Drawbacks	L+D	LCD	1	19	09/10/2023
20	Applications of Extrusion-Based Processes.	L+D	BB	1	20	10/10/2023
21	Printing process modeling, material modification	L+D	BB	1	21	11/10/2023
Module 3: Printing Processes						
22	Printing Processes: evolution of printing as an additive manufacturing process	L+D	BB	1	22	11/10/2023
23	Research achievements in printing deposition, technical challenges of printing	L+D	BB	1	23	13/10/2023
1ST INTERNAL ASSESSMENT						16/10/2023 17/10/2023 18/10/2023
24	Printing process modeling, material modification	L+D	BB	1	24	20/10/2023
25	Three-dimensional printing, advantages of binder printing .	L+D	BB	1	25	25/10/2023

26	Sheet Lamination Processes: Introduction	L+D	BB	1	26	25/10/2023
27	Sheet Lamination Processes: Materials	L+D	BB	1	27	27/10/2023
28	Laminated Object Manufacturing (LOM)	L+D	BB	1	28	28/10/2023
29	Ultrasonic Consolidation (UC),	L+D	BB	1	29	30/10/2023
30	Gluing, Thermal bonding, LOM	L+D	BB	1	30	31/10/2023
31	UC applications.	L+D	BB	1	31	03/11/2023
32	Introduction, general beam deposition process	L+D	BB	1	32	06/11/2023
33	Description material delivery, BD systems	L+D	BB	1	33	07/11/2023
34	Process parameters, typical materials and microstructure	L+D	BB	1	34	08/11/2023
35	Processing–structure–properties relationships, BD benefits and drawbacks	L+D	BB	1	35	08/11/2023
36	Direct Write Technologies: Background ,ink -basedDW,laser transfer	L+D	LCD	1	36	10/11/2023
37	DW beam deposition, DW liquid-phase direct deposition.	L+D	LCD	1	37	13/11/2023
Module 4: Guidelines for Process Selection						
38	Guidelines for Process Selection: Introduction	L+D	BB	1	38	15/11/2023
39	Challenges of selection, example system for preliminary .selection, production planning and control.	L+D	BB	1	39	13/11/2023
40	Software issues for Additive Manufacturing: Introduction, preparation of cad models	L+D	BB	1	40	13/11/2023
41	STL file, problems with STL files, STL file manipulation.	L+D	BB	1	41	17/11/2023
42	Post- Processing: Support material removal, surface texture improvements;	L+D	BB	1	42	20/11/2023
43	Preparation for use as a pattern,	L+D	BB	1	43	21/11/2023
44	Property enhancements using non-thermal techniques and thermal techniques.	L+D	LCD	1	44	22/11/2023
IIND INTERNAL ASSESSMENT						23/11/2023 24/11/2023 25/11/2023
Module 5: The use of multiple materials in additive manufacturing:						
45	The use of multiple materials in additive	L+D	LCD	1	45	27/11/2023

	manufacturing: Introduction,					
46	Multipl ematerial approaches	L+D	BB	1	46	28/11/2023
47	Discrete multiple material processes	L+D	BB	1	47	29/11/2023
48	Porous multiple material processes	L+D	BB	1	48	29/11/2023
49	Blended multiple material processes	L+D	BB	1	49	01/12/2023
50	Commercial applications using multiple materials, futuredirections	L+D	BB	1	50	04/12/2023
51	AM Applications: Functional models	L+D	LCD	1	51	05/12/2023
52	Pattern forinvestment and vacuum casting	L+D	LCD	1	52	06/12/2023
53	Medical models, art models	L+D	LCD	1	53	08/12/2023
54	Engineering analysis models, Rapid tooling, new materials development	L+D	LCD	1	54	09/12/2023
55	Bi-metallic parts, Re- manufacturing. Application	L+D	LCD	1	55	11/12/2023
56	Examples for Aerospace, defense, automobile, Bio-medical and general engineering industries	L+D	LCD	1	56	12/12/2023
57	Align Technology, siemens and phonak	L+D	LCD	1	57	13/12/2023
58	DDM drivers, manufacturing vs. prototyping,	L+D	LCD	1	58	13/12/2023
59	Life-cycle costing, future of direct digital manufacturing	L+D	LCD	1	59	15/12/2023
60	REVISION	L+D	LCD	1	60	18/12/2023
61	REVISION	L+D	LCD	1	61	19/12/2023
62	REVISION	L+D	LCD	1	62	20/12/2023
63	REVISION	L+D	LCD	1	63	20/12/2023

64	REVISION					
		L+D	LCD	1	64	22/12/2023
	3RD INTERNAL ASSESSMENT					26/12/2023 27/12/2023 28/12/2023

Course in charge

Module Cordinator

Head of the Department
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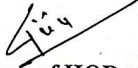
DEPARTMENT OF MECHANICAL ENGINEERING

NAME OF THE STAFF   : HARISH U

SUBJECT CODE/NAME   : 17ME753 / MECHATRONICS

SEMESTER/YEAR   : VII / IV

ACADEMIC YEAR   : 2023-2024

Sl. No.	Topic to be covered	Mode of Delivery	Teaching Aid	No. of Periods	Cumulative No. of Periods	Proposed Date
MODULE 1						
1	Definition, Multidisciplinary Scenario	L+D	BB	1	1	11.09.2023
2	Evolution of Mechatronics, Design of Mechatronics system	L+D	BB	1	2	12.09.2023
3	Objectives, Advantages and disadvantages of Mechatronics.	L+D	BB	1	3	13.09.2023
4	Transducers and sensors: Definition, Classification of transducers	L+D	BB	1	4	14.09.2023
5	Difference between transducer and sensor.	L+D	BB	1	5	19.09.2023
6	Definition and classification of sensors.	L+D	BB	1	6	20.09.2023
7	Principle of working and applications of light sensors	L+D	BB	1	7	21.09.2023
8	Principle of working and applications of proximity switches.	L+D	BB	1	8	23.09.2023
9	Principle of working and applications of Hall Effect sensors.	L+D	BB	1	9	25.09.2023
MODULE 2						
10	Introduction to Microprocessor & Microcontrollers.	L+D	BB	1	10	26.09.2023

11	Microprocessor systems, Basic elements of control systems.	L+D	BB	1	11	27.09.2023
12	Microcontrollers, Difference between Microprocessor and Microcontrollers.	L+D	BB	1	12	30.09.2023
13	Microprocessor architecture.	L+D	BB	1	13	3.10.2023
14	Terminology of Microprocessor - CPU, memory, address and I/O	L+D	BB	1	14	4.10.2023
15	Peripheral devices, Arithmetic Logic Unit (ALU)	L+D	BB	1	15	5.10.2023
16	Instruction and Program of Microprocessor	L+D	BB	1	16	9.10.2023
17	Assembler, Data, Registers and Program Counter	L+D	BB	1	17	10.10.2023
18	Flags, Fetch cycle, write cycle	L+D	BB	1	18	11.10.2023
19	State and bus interrupts	L+D	BB	1	19	12.10.2023
20	Internal Assessment-I				20	18.10.2023
21	Intel's 8085A Microprocessor	L+D	BB	1	21	19.10.2023
MODULE 3						
22	Introduction to Programmable Logic Controller	L+D	BB	1	22	25.10.2023
23	Basic structure and Principle of operation	L+D	BB	1	23	26.10.2023
24	Programming and concept of ladder diagram	L+D	BB	1	24	28.10.2023
25	Programming and concept of ladder diagram	L+D	BB	1	25	30.10.2023
26	Concept of latching & selection of a PLC.	L+D	BB	1	26	31.10.2023
27	Integration: Introduction & background of integration	L+D	BB	1	27	2.11.2023
28	Advanced actuators, Pneumatic actuators	L+D	BB	1	28	6.11.2023
29	Industrial Robot	L+D	BB	1	29	7.11.2023
30	different parts of a Robot-Controller	L+D	BB	1	30	8.11.2023
31	Drive, Arm, End Effectors,	L+D	BB	1	31	9.11.2023
32	Sensor & Functional requirements of robot.	L+D	BB	1	32	11.11.2023
MODULE 4						
33	Mechanical actuation systems: Types of motion	L+D	BB	1	33	13.11.2023
34	Cams, Gear trains	L+D	BB	1	34	15.11.2023
35	Ratchet & Pawl	L+D	BB	1	35	16.11.2023
36	Mechanical aspects of motor selection	L+D	BB	1	36	20.11.2023

37	Electrical actuation systems: Mechanical switches	L+D	BB	1	37	21.11.2023
38	Solenoids and Relays	L+D	BB	1	38	22.11.2023
39	Internal Assessment-II			1	39	25.11.2023
40	Principle of Stepper Motors	L+D	BB	1	40	27.11.2023
41	Principle of servomotors	L+D	BB	1	41	28.11.2023
MODULE 5						
42	Classifications of Valves	L+D	BB	1	42	29.11.2023
43	Pressure relief valves, Pressure regulating/reducing valves	L+D	BB	1	43	4.12.2023
44	Cylinders and rotary actuators	L+D	BB	1	44	5.12.2023
45	DCV & FCV: Principle & construction details,	L+D	BB	1	45	6.12.2023
46	Types of sliding spool valve	L+D	BB	1	46	7.12.2023
47	Solenoid operated valves and Symbols of hydraulic elements	L+D	BB	1	47	9.12.2023
48	Components of hydraulic system	L+D	BB	1	48	11.12.2023
49	Plug or glove valve, Butterfly valve	L+D	BB	1	49	12.12.2023
50	Ball Valve, Balanced valve	L+D	BB	1	50	13.12.2023
51	Functions of various units of hydraulic system	L+D	BB	1	51	14.12.2023
52	Design of simple hydraulic circuits for various applications.	L+D	BB	1	52	18.12.2023
53	Revision	L+D	BB	1	53	19.12.2023
54	Revision	L+D	BB	1	54	20.12.2023
55	Revision	L+D	BB	1	55	21.12.2023
56	Revision	L+D	BB	1	56	23.12.2023
57	Internal Assessment-III			1	57	28.12.2023
58	Revision	L+D	BB	1	58	4.01.2024
59	Revision	L+D	BB	1	59	5.01.2024

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BENGALURU - 560 109.

K. S INSTITUTE OF TECHNOLOGY, BANGALORE

DEPARTMENT OF MECHANICAL ENGINEERING

NAME OF THE STAFF : Mr. HARISH U

SUBJECT CODE/NAME : 18ME751 / ENERGY AND ENVIRONMENT

SEMESTER/YEAR : VII / IV

ACADEMIC YEAR : 2023-2024

Sl No.	Topic to be covered	Mode of Delivery	Teaching Aid	No. of Periods	Cumulative No. of Periods	Proposed Date
	Module-1					
1	Basic Introduction to Energy	L+D	BB	1	1	11.09.2023
2	Energy and power, forms of energy	L+D	BB	1	2	12.09.2023
3	Primary energy sources, energy flows, world energy production and consumption,	L+D	BB	1	3	14.09.2023
4	Key energy trends in India: Demand, Electricity,	L+D	BB	1	4	15.09.2023
5	Access to modern energy	L+D	BB	1	5	19.09.2023
6	Energy production and trade,	L+D	BB	1	6	21.09.2023
7	Factors affecting India's energy development:	L+D	BB	1	7	22.09.2023
8	Economy and demographics Policy and institutional framework	L+D	BB	1	8	23.09.2023
9	Energy prices and affordability,	L+D	BB	1	9	25.09.2023
10	Social and environmental aspects, Investment.	L+D	BB	1	10	26.09.2023
	Module-2					
11	Energy storage systems	L+D	BB	1	11	29.09.2023
12	Thermal energy storage methods,	L+D	BB	1	12	30.09.2023

13	Energy saving,	L+D	BB	1	13	03.10.2023
14	Thermal energy storage systems Energy Management	L+D	BB	1	14	05.10.2023
15	Principles of Energy Management	L+D	BB	1	15	06.10.2023
16	Energy demand estimation,	L+D	BB	1	16	09.10.2023
17	Energy pricing, Energy Audit Purpose,	L+D	BB	1	17	10.10.2023
18	Methodology with respect to process Industries	L+D	BB	1	18	12.10.2023
19	Characteristic method employed in Certain Energy	L+D	BB	1	19	13.10.2023
20	Internal Assessment-I					16.10.2023
21	Intensive Industries	L+D	BB	1	20	19.10.2023
	Module-3					
22	Environment: Introduction	L+D	BB	1	21	20.10.2023
23	Multidisciplinary nature of environmental studies- Definition	L+D	BB	1	22	26.10.2023
24	scope and importance	L+D	BB	1	23	27.10.2023
25	Need for public awareness	L+D	BB	1	24	28.10.2023
26	Ecosystem: Concept,				25	30.10.2023
27	Energy flow, Structure and function of an ecosystem.	L+D	BB	1	26	31.10.2023
28	Food chains, food webs and ecological pyramids	L+D	BB	1	27	02.11.2023
29	Forest ecosystem, Grassland ecosystem,	L+D	BB	1	28	03.11.2023
30	Desert ecosystem and Aquatic ecosystems	L+D	LAB	1	29	06.11.2023
31	Ecological succession.	L+D	BB	1	30	07.11.2023
	Module-4					
32	Environmental Pollution: Definition	L+D	BB	1	31	09.11.2023
33	Cause, effects and control measures of - Air pollution	L+D	BB	1	32	10.11.2023
34	Water pollution, Soil pollution	L+D	BB	1	33	13.11.2023
35	Marine pollution, Noise pollution,	L+D	BB	1	35	16.11.2023
36	Thermal pollution and Nuclear hazards,	L+D	BB	1	36	17.11.2023
37	Solid waste Management,	L+D	BB	1	37	20.11.2023
38	Disaster management Role of an individual in prevention of pollution	L+D	BB	1	38	21.11.2023
39	Pollution case studies.	L+D	BB	1	39	22.11.2023
40	Internal Assessment-II				40	23.11.2023
	Module-5					

41	Social Issues and the Environment	L+D	BB	1	41	27.11.2023
42	Climate change, global warming,	L+D	BB	1	42	28.11.2023
43	acid rain, ozone layer depletion	L+D	BB	1	43	01.12.2023
44	nuclear accidents and holocaust.	L+D	BB	1	44	04.12.2023
45	Case Studies.	L+D	BB	1	45	05.12.2023
46	Wasteland reclamation	L+D	BB	1	46	07.12.2023
47	Consumerism and waste products	L+D	BB	1	47	08.12.2023
48	Environment Protection Act, Air (Prevention and Control of Pollution) Act	L+D	BB	1	48	09.12.2023
49	Water (Prevention and control of Pollution) Act	L+D	BB	1	49	11.12.2023
50	Wildlife Protection Act,				50	12.12.2023
51	Forest Conservation Act	L+D	BB	1	51	14.12.2023
52	Issues involved in enforcement of environmental legislation.	L+D	BB	1	52	15.12.2023
53	Revision	L+D	BB	1	53	18.12.2023
54	Revision	L+D	BB	1	54	19.12.2023
55	Revision	L+D	BB	1	55	21.12.2023
56	Revision	L+D	BB	1	56	22.12.2023
57	Revision	L+D	BB	1	57	23.12.2023
58	Internal Assessment-III				58	26.12.2023
59	Revision	L+D	BB	1	59	4.1.2024
60	Revision	L+D	BB	1	60	5.1.2024

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K.S. INSTITUTE OF TECHNOLOGY, BENGALURU - 560109
DEPARTMENT OF MECHANICAL ENGINEERING
LESSON PLAN 2023-2024 ODD SEMESTER

COURSE INCHARGE : Dr.Girish TR

COURSE CODE/TITLE : 18CS752 Python Application Programming

YEAR/SEMESTER/SECTION : IV /VII

BRANCH :Mechanical Engineering

Sl. No.	Topic to be covered	Mode of Delivery	Teaching Aid	No. of Periods	Cumulative No. of Periods	Proposed Date
	Module 1: Python Basics					
1	**Python Basics:** Entering Expressions into the Interactive Shell,	L+D,PS	BB/PPT	1	1	11-09-2023
2	The Integer, Floating-Point, and String Data Types,	L+D,PS	BB/PPT	1	2	13-09-2023
3	String Concatenation and Replication, Storing Values in Variables	L+D,PS	BB/PPT	1	3	14-09-2023
4	**Flow control:** Boolean Values, Comparison Operators,	L+D,PS	BB/PPT	1	4	14-09-2023
5	Boolean Operators, Mixing Boolean and Comparison Operators	L+D,PS	BB/PPT	1	5	20-09-2023
6	Elements of Flow Control, Program Execution,	L+D,PS	BB/PPT	1	6	21-09-2023
7	Flow Control Statements, Importing Modules	L+D,PS	BB/PPT	1	7	21-09-2023
8	**Functions:** def Statements with Parameters	L+D, PS	BB/PPT	1	8	23-09-2023
9	Return Values and return Statements	L+D, PS	BB/PPT	1	9	25-09-2023
10	The None Value, Keyword Arguments and print(),	L+D, PS	BB/PPT	1	10	27-09-2023

11	Local and Global Scope,	L+D, PS	BB/PPT	1	11	30-09-2023
12	The global Statement	L+D, PS	BB/PPT	1	12	30-09-2023
Module 2 Iteration , Strings, Files						
13	Introduction to Iterations	L+D,PS	BB/PPT	1	13	16--10-2023
14	While and For loops	L+D,PS	BB/PPT	1	14	18-10-2023
15	Programs on While and for loops	L+D,PS	BB/PPT	1	15	19-10-2023
16	Programs on While and for loops	L+D,PS	BB/PPT	1	16	19-10-2023
INTERNAL ASSESSMENT - 1						
17	Working with Strings, Useful String Methods	L+D,PS	BB/PPT	1	17	30-10-2023
18	Working with Strings, Useful String Methods	L+D,PS	BB/PPT	1	18	2-11-2023
19	Working with Strings, Useful String Methods	L+D,PS	BB/PPT	1	19	3-11-2023
20	**Reading and Writing Files:** Files and File Paths	L+D, PS	BB/PPT	1	20	3-11-2023
21	The os.path Module	L+D, PS	BB/PPT	1	21	6-11-2023
22	The File Reading/Writing Process	L+D, PS	BB/PPT	1	22	8-11-2023
Module 3: : Lists & Dictionaries ,Tuples, Regular Expressions						
23	**Lists:** The List Data Type, Working with Lists	L+D, PS	BB/PPT	1	23	9-11-2023
24	The List Data Type, Working with Lists	L+D, PS	BB/PPT	1	24	9-11-2023
25	List-like Types: Tuples, References	L+D, PS	BB/PPT	1	25	11-11-2023
26	The Dictionary Data Type	L+D, PS	BB/PPT	1	26	13-11-2023
27	Programs on List	L+D, PS	BB/PPT	1	27	15-11-2023

28	Programs on List	L+D, PS	BB/PPT	1	28	16-11-2023
29	Programs on Tuples	L+D, PS	BB/PPT	1	29	16-11-2023
30	Programs on Dictionaries	L+D, PS	BB/PPT	1	30	20-11-2023
31	Programs on Dictionaries	L+D, PS	BB/PPT	1	31	22-11-2023
	INTERNAL ASSESSMENT - 2					
	Module 4: : Classes and Objects , Classes and Function, Classes Methods					
32	Programmer-defined types	L+D, PS	BB/PPT	1	32	27-11-2023
33	Attributes, Rectangles	L+D, PS	BB/PPT	1	33	29-11-2023
34	**Classes and functions:** Time, Pure functions	L+D, PS	BB/PPT	1	34	4-12-2023
35	Modifiers, Prototyping versus planning	L+D, PS	BB/PPT	1	35	6-12-2023
36	Printing objects, Another example, A more complicated example	L+D, PS	BB/PPT	1	36	7-12-2023
37	Operator overloading, Type-based dispatch	L+D, PS	BB/PPT	1	37	7-12-2023
38	Polymorphism, Interface and implementation	L+D, PS	BB/PPT	1	38	11-12-2023
	Module 5: Networked Program, Using Web Services , Using databases and SQL					
39	Hypertext Transfer Protocol -HTTP	L+D, PS	BB/PPT	1	39	13-12-2023
40	Simplest web browser	L+D, PS	BB/PPT	1	40	14-12-2023
41	Retrieving an image over HTTP	L+D, PS	BB/PPT	1	41	18-12-2023
42	Parsing HTML and scraping the web	L+D, PS	BB/PPT	1	42	20-12-2023
43	eXtensible Markup Language –XML	L+D, PS	BB/PPT	1	43	21-12-2023
44	Parsing XML	L+D, PS	BB/PPT	1	44	22-12-2023
45	Database concepts	L+D, PS	BB/PPT	1	45	23-12-2023
	INTERNAL ASSESSMENT - 3					

| 46 | Database Browser for SQLite | L+D, PS | BB/PPT | 1 | 44 | 04-01-2024 |
| 47 | Creating a database table | L+D, PS | BB/PPT | 1 | 45 | 04-01-2024 |

Text Books:

1. Charles R Severance 'Python for Everybody : Exploring Data Using Python 3' 1st Edition CreateSpace Independent Publishing Platform 2016

2. Allen B. Downey, "Think Python: How to Think Like a Computer Scientist", 2nd Edition, Green Tea Press, 2015. (Available under CC-BY-BY-NC license at http://greenteapress.com/thinkpython2/thinkpython2.pdf (Chapters 13, 15, 16, 17, 18) (Download pdf/html files from the above link)

Web links and Video Lectures (e-Resources):

1. https://www.learnbyexample.org/python/
2. https://www.learnpython.org/
3. https://pythontutor.com/visualize.html#mode=edit

Activity Based Learning (Suggested Activities in Class)/ Practical Based learning

- Quizzes for list, tuple, string dictionary slicing operations using below link:
  https://github.com/sushantkhara/Data-Structures-And-Algorithms-withPython/raw/main/Python%203%20_%20400%20exercises%20and%20solutions%20for%20beginners.pdf
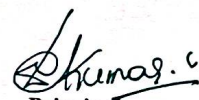
Details of the teaching aids: Chalk and talk, videos, ppt, animations, NPTEL videos, NPTEL lectures etc.,

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