SPINTRONIC TECHNOLOGY AND ADVANCE RESEARCH

SUBJECT-AUTOMOBILE ENGINEERING

LESSON PLAN SESSION 2022-23 SEM-6TH

NAME OF FACULTY-Er. D. Gochikar (Asst. Prof.)

SL. NO.	NO OF PERIOD (TOPIC WISE)	TOTAL NO PERIOD	Cumulative no of periods
1	Definition, need and classification	1	1
2	Layout of automobile chassis with major components	1	2
3	Clutch System: Need, Types (Single & Multiple)	1	3
4	Working principle of clutch with sketch	1	4
5	Gear Box: Purpose of gear box	1	5
6	Concept of automatic gear changing mechanisms	1	6
7	Differential: Need, Types and Working principle	1	7
8	Propeller shaft: Constructional features	1	8
9	Differential: Need, Types	1	9
10	Working principle of differential	1	10
11	Braking systems in automobiles:	1	11
12	Need and types of braking system	1	12
13	Mechanical Brake construction	1	13
14	Mechanical Brake working	1	14
15	Hydraulic Brake construction	1	15
16	Hydraulic brake working	1	16
17	Air Brake construction	1	17
18	Air Brake working	1	18
19	Air assisted Hydraulic Brake construction	1	19
20	Air assisted Hydraulic Brake working	1	20
21	Vacuum Brake construction	1	21
22	Vacuum Brake working	1	22
23	Describe the Battery ignition	1	23
24	Magnet ignition system	1	24
25	Spark plugs: Purpose, construction	1	25
26	and specifications	1	26
27	State the common ignition troubles and its remedies	1	27
28	Description of the conventional suspension system for Rear axle	1	28
29	Description of the conventional suspension system for front axle	1	29
30	Description of independent suspension system used in cars	1	30
31	coil spring and tension bars	1	31
32	Constructional features and working of a telescopic shock absorber	1	32
33	Engine cooling: Need and classification	1	33
34	Describe defects of cooling	1	34
35	remedial measures of cooling	1	35
36	Describe the Function of lubrication	1	36
37	Describe the lubrication System of I.C. engine	1	37

SPINTRONIC TECHNOLOGY AND ADVANCE RESEARCH

SUBJECT-AUTOMOBILE ENGINEERING
LESSON PLAN SESSION 2022-23 SEM-6TH
NAME OF FACULTY-Er. D. Gochikar (Asst. Prof.)

38	Describe Air fuel ratio Carburetion process for Petrol Engine	1	38
39	construction of Carburetion process for petrol engine	1	39
40	Working of carburetion process for petrol engine	1	40
41	Construction of Multipoint fuel injection system for Petrol Engine	1	41
42	Working of Multipoint fuel injection system for Petrol engine	1	42
43	Describe the construction of fuel injection system for multi cylinder Engine	1	43
44	Working of fuel injection system	1	44
45	Filter for Diesel engine	1	45
46	Describe the working principle of Fuel feed pump	1	46
47	Describe the working principle of fuel injector	1	47
48	Introduction, Social and Environmental	1	48
49	importance of Hybrid and Electric Vehicles	1	49
50	Description of Electric Vehicles	1	50
51	operational advantages, present performance and applications of Electric Vehicles	1	51
52	Battery for Electric Vehicles	1	52
53	Battery types and fuel cells	1	53
54	Hybrid vehicles, Types of Hybrid and Electric Vehicles	1	54
55	Parallel, Series, Parallel and Series configurations	1	55
56	Solar powered vehicles	1	56
57	Doubt clearing class	1	57
58	Assignment question	1	58
59	Question paper discussion	1	59
60	Question paper discussion	1	**60**

Reference Books . AUTOMOBILE ENGINEERING VOL-1 &2 Dr Kirpal Singh
AUTOMOBILE ENGINEERING BY R. B. GUPTA
AUTOMOBILE ENGINEERING BY C. P. NAKRA

SPINTRONIC TECHNOLOGY AND ADVANCE RESEARCH

SUBJECT-ADVANCED MANUFACTURING PROCESS

LESSON PLAN SESSION-2022/23 SEM-6TH

NAME OF FACULTY-Er. S.S. Behera (ASST. PROF.)

SL. NO.	NO OF PERIOD (TOPIC WISE)	TOTAL NO PERIOD	Cumulative no of periods
1	Introduction – comparison with traditional machining.	1	1
2	Ultrasonic Machining: principle,	1	2
3	Description of equipment, applications	1	3
4	Electric Discharge Machining: Principle, Description of equipment	1	4
5	Dielectric fluid, tools (electrodes)	1	5
6	Process parameters, Output characteristics, applications.	1	6
7	Wire cut EDM: Principle, Description of equipment	1	7
8	parameters; applications.	1	8
9	Abrasive Jet Machining: principle, description of equipment,	1	9
10	Material removal rate, application	1	10
11	Laser Beam Machining: principle, description of equipment	1	11
12	Material removal rate, application.	1	12
13	Electro Chemical Machining: principle, description of equipment	1	13
14	Material removal rate, application	1	14
15	Plasma Arc Machining – principle, description of equipment	1	15
16	Material removal rate, Process parameters, performance characterization, Applications.	1	16
17	Electron Beam Machining - principle, description of equipment	1	17
18	Material removal rate, Process parameters, performance characterization, Applications	1	18
19	Processing of plastics.	1	19
20	Moulding processes: Injection moulding	1	20
21	Compression moulding	1	21
22	Transfer moulding.	1	22
23	Extruding; Casting	1	23
24	Calendering.	1	24
25	Fabrication methods-Sheet forming,	1	25
26	Blow moulding	1	26
27	Laminating plastics (sheets, rods & tubes)	1	27
28	Reinforcing	1	28
29	Applications of Plastics	1	29
30	Introduction, Need for Additive Manufacturing	1	30
31	Fundamentals of Additive Manufacturing, AM Process Chain	1	31
32	Advantages and Limitations of AM, Commonly used Terms	1	32
33	Classification of AM process, Fundamental Automated Processes	1	33
34	Distinction between AM and CNC, other related technologies.	1	34

SPINTRONIC TECHNOLOGY AND ADVANCE RESEARCH

SUBJECT-ADVANCED MANUFACTURING PROCESS

LESSON PLAN SESSION-2022/23 SEM-6TH

NAME OF FACULTY-Er. S.S. Behera (ASST. PROF.)

35	Application –Application in Design, Aerospace Industry	1	35
36	Automotive Industry, Jewelry Industry, Arts and Architecture. RP Medical and Bioengineering Applications	1	36
37	Web Based Rapid Prototyping Systems	1	37
38	Concept of Flexible manufacturing process, concurrent engineering	1	38
39	production tools like capstan and turret lathes, rapid prototyping processes	1	39
40	Concept, General elements of SPM,	1	40
41	Productivity improvement by SPM	1	41
42	Principles of SPM design	1	42
43	Types of maintenance, Repair cycle analysis	1	43
44	Repair complexity	1	44
45	Maintenance manual	1	45
46	Maintenance records	1	46
47	Productive Maintenance (TPM).	1	47

Reference Books . Production technology –Vol-II by O.P. Khanna

Workshop Technology vol I & II by Raghuvanshi

Production Technology by HMT Bangalore

Spintronic Technology and Advance Research

SUBJECT-FLUID MECHANICS

LESSON PLAN SESSION-2022/23 SEM-4TH

NAME OF THE FACULTY- Dipti Laxmi Mohanty (Asst. prof.)

SL. NO.	NO OF PERIOD (TOPIC WISE)	TOTAL NO PERIOD	Cumulative no of periods	Remark
1	Define fluid	1	1	
2	Description of fluid properties like Density, Specific weight, specific gravity, specific volume	1	2	
3	Solve problems	1	3	
4	Definitions and Units of Dynamic viscosity, kinematic viscosity	1	4	
5	surface tension Capillary phenomenon	1	5	
6	Problems	1	6	
7	Definitions and units of fluid pressure, pressure intensity and pressure head.	1	7	
8	Statement of Pascal's Law.	1	8	
9	Concept of atmospheric pressure, gauge pressure,	1	9	
10	vacuum pressure and absolute pressure	1	10	
11	Pressure measuring instruments	1	11	
12	Manometers (Simple and Differential)	1	12	
13	Bourdon tube pressure gauge(Simple Numerical)	1	13	
14	Solve simple problems on Manometer	1	14	
15	Definition of hydrostatic pressure	1	15	
16	Total pressure and centre of pressure on immersed bodies(Horizontal bodies)	1	16	
17	Total pressure and centre of pressure on immersed bodies (vertical bodies)	1	17	
18	Solve Simple problems.	1	18	
19	Archimedes 'principle, concept of buoyancy	1	19	
20	meta center and meta centric height (Definition only)	1	20	
21	Concept of floatation	1	21	
22	Types of fluid flow	1	22	
23	Continuity equation(Statement)	1	23	
24	Continuity equation (proof for one dimensional flow)	1	24	
25	Bernoulli's theorem(Statement)	1	25	
26	Bernoulli's theorem (proof)	1	26	
27	Applications of Bernoulli's theorem (Venturimeter)	1	27	
28	Limitations of Bernoulli's theorem (Venturimeter)	1	28	
29	Pitot tube	1	29	
30	Solve simple problems	1	30	
31	Define orifice	1	31	
32	Flow through orifice	1	32	
33	Orifices coefficient	1	33	
34	the relation between the orifice coefficients	1	34	

Spintronic Technology and Advance Research

SUBJECT-FLUID MECHANICS

LESSON PLAN SESSION-2022/23 SEM-4TH

NAME OF THE FACULTY- Dipti Laxmi Mohanty (Asst. prof.)

35	Classifications of notches	1	35	
36	Classifications of weirs	1	36	
37	Discharge over a rectangular notch	1	37	
38	Discharge over a triangular weir	1	38	
39	Simple problems on above	1	39	
40	Definition of pipe.	1	40	
41	Loss of energy in pipes	1	41	
42	Head loss due to friction	1	42	
43	Darcy's and Chezy's formula (Expression only)	1	43	
44	Solve Problems using Darcy's formula	1	44	
45	Solve Problems using and Chezy's formula	1	45	
46	Hydraulic gradient and total gradient line	1	46	
47	Impact of jet on fixed vertical flat plates	1	47	
48	Impact of jet on moving vertical flat plates	1	48	
49	Derivation of work done on series of vanes	1	49	
50	condition for maximum efficiency.	1	50	
51	Impact of jet on moving curved vanes	1	51	
52	illustration using velocity triangles,	1	52	
53	derivation of work done,	1	53	
54	derivation of efficiency	1	54	
55	problems	1	55	
56	problems	1	56	
57	Doubt clearing class	1	57	
58	Doubt clearing class	1	58	
59	Question paper discussion	1	59	
60	Question paper discussion	1	60	

Reference Book- Hydraulics and fluid mechanics by Modi Seth

Fluid Mechanics & Hydraulic Machines

By R. K. Bansal

SPINTRONIC TECHNOLOGY AND ADVANCE RESEARCH

SUBJECT- INDUSTRIAL ENGG. & MANAGEMENT

LESSON PLAN SESSION-2022/23 SEM -6TH

NAME OF FACULTY-Er. D. Mohanty(Asst. Prof.)

SL. NO.	NO OF PERIOD (TOPIC WISE)	TOTAL NO PERIOD	Cumulative no of periods
1	**PLANT ENGINEERING:** Selection of Site of Industry	1	1
2	Define plant layout	1	2
3	Describe the objective and principles of plant layout.	1	3
4	Explain Process Layout, Product Layout and Combination Layout	1	4
5	Techniques to improve layout	1	5
6	Principles of material handling equipment	1	6
7	Plant maintenance.	1	7
8	Importance of plant maintenance	1	8
9	Break down maintenance.	1	9
10	Preventive maintenance	1	10
11	Scheduled maintenance	1	11
12	**OPERATIONS RESEARCH:** Introduction to Operations Research and its applications	1	12
13	Define Linear Programming Problem	1	13
14	Solution of L.P.P. by graphical method	1	14
15	Evaluation of Project completion time by Critical Path Method and PERT (Simple problems)	1	15
16	Explain distinct features of PERT with respect to CPM	1	16
17	**INVENTORY CONTROL:** Classification of inventory	1	17
18	Objective of inventory control	1	18
19	Describe the functions of inventories	1	19
	Benefits of inventory control	1	
	Costs associated with inventory	1	
20	Terminology in inventory control**.**	1	20
21	Explain and Derive economic order quantity for Basic model.	1	21
22	Define and Explain ABC analysis	1	22
23	**INSPECTION AND QUALITY CONTROL:** Define Inspection and Quality control	1	23
24	Describe planning of inspection.	1	24
25	Describe types of inspection	1	25
26	Advantages and disadvantages of quality control	1	26
27	Study of factors influencing the quality of manufacture	1	27
28	Explain the Concept of statistical quality control, Control charts	1	28
29	(X, R, P and C - charts).	1	29
30	Methods of attributes.	1	30
31	Concept of ISO 9001-2008. Quality management system	1	31
32	Registration /certification procedure.	1	32
33	Benefits of ISO to the organization.	1	33

SPINTRONIC TECHNOLOGY AND ADVANCE RESEARCH

SUBJECT- INDUSTRIAL ENGG. & MANAGEMENT

LESSON PLAN SESSION-2022/23 SEM -6TH

NAME OF FACULTY-Er. D. Mohanty(Asst. Prof.)

34	JIT, Six sigma	1	34
35	7S, Lean manufacturing	1	35
36	Solve related problems.	1	36
37	**PRODUCTION PLANNING AND CONTROL**	1	37
38	Introduction	1	38
39	Major functions of production planning and control	1	39
40	Methods of forecasting	1	40
41	Routing	1	41
42	Scheduling	1	42
43	Dispatching	1	43
44	Controlling	1	44
45	Types of production	1	45
46	Mass production	1	46
47	Batch production	1	47
48	Job order production	1	48
49	Principles of product and process planning.	1	49
50	Doubt clearing class	1	50
51	Assignment question	1	51
52	Question paper discussion	1	52
53	Question paper discussion	1	53

Reference Book : INDUSTRIAL ENGINEERING & MANAGEMENT BY O.P.KHANNA
INDUSTRIAL ENGG & PRODUCTION MANAGEMENT BY MARTAND TELSAND
STATISTICAL QUALITY CONTROL BY M.MAHAJAN

Spintronic Technology and Advance Research

SUBJECT-Manufacturing Engg.

LESSON PLAN SESSION-2022-23 SEM-4TH

NAME OF THE FACULTY- Er. B.B. Sahoo (Asst. Prof.)

SL. NO.	NO OF PERIOD (TOPIC WISE)	TOTAL NO PERIOD	Cumulative no of periods	Remark
1	**Tool Materials**	1	1	
2	Composition of various tool materials	1	2	
3	Physical properties & uses of such tool materials	1	3	
4	**Cutting Tools**	1	4	
5	Cutting action of various hand tools such as Chisel, hack saw blade, dies and reamer	1	5	
6	Turning tool geometry and purpose of tool angle	1	6	
7	Machining process parameters (Speed, feed and depth of cut)	1	7	
8	Coolants and lubricants in machining and purpose	1	8	
9	**Lathe Machine**	1	9	
10	Construction and working of lathe	1	10	
11	Major components of a lathe and their function	1	11	
12	Operations carried out in a lathe (Turning, thread cutting, taper turning, internal machining, parting off, facing, knurling)	1	12	
13	Capstan lathe	1	13	
14	Difference with respect to engine lathe	1	14	
15	Major components and their function	1	15	
16	Define multiple tool holders	1	16	
17	Turret Lathe	1	17	
18	Difference with respect to capstan lathe	1	18	
19	Major components and their function	1	19	
20	Draw the tooling lay out for preparation of a hexagonal bolt & bush	1	20	
21	**Shaper**	1	21	
22	Potential application areas of a shaper machine	1	22	
23	Major components and their function	1	23	
24	Explain the automatic table feed mechanism	1	24	
25	Explain the construction & working of tool head	1	25	
26	Explain the quick return mechanism through sketch	1	26	
27	State the specification of a shaping machine	1	27	
28	**Planning Machine**	1	28	
29	Application area of a planar and its difference with respect to shaper	1	29	
30	Major components and their functions	1	30	
31	The table drive mechanism	1	31	
32	Working of tool and tool support	1	32	
33	Clamping of work through sketch	1	33	
34	**Milling Machine**	1	34	
35	Types of milling machine and operations performed by them	1	35	
36	Explain work holding attachment	1	36	

Spintronic Technology and Advance Research

SUBJECT-Manufacturing Engg.

LESSON PLAN SESSION-2022-23 SEM-4TH

NAME OF THE FACULTY- Er. B.B. Sahoo (Asst. Prof.)

37	Construction & working of simple dividing head, universal dividing head Procedure of simple and compound indexing	1	37	
38	Illustration of different indexing methods	1	38	
39	**Slotter**	1	39	
40	Major components and their function	1	40	
41	Construction and working of slotter machine	1	41	
42	Tools used in slotter	1	42	
43	**Grinding**	1	43	
44	Significance of grinding operations	1	44	
45	Manufacturing of grinding wheels	1	45	
46	Criteria for selecting of grinding wheels	1	46	
47	Specification of grinding wheels with example	1	47	
48	Working of Cylindrical Grinder	1	48	
49	Surface Grinder	1	49	
50	Centre less Grinder	1	50	
51	**Internal Machining operations** 6 Classification of drilling machines	1	51	
52	Working of Bench drilling machine	1	52	
53	Pillar drilling machine	1	53	
54	Radial drilling machine	1	54	
55	Boring Basic Principle of Boring	1	55	
56	Different between Boring and drilling	1	56	
57	Broaching Types of Broaching (pull type, push type)	1	57	
58	**Surface finish, lapping** Definition of Surface finish	1	58	
59	Define super finishing	1	59	
60	Description of lapping & explain their specific cutting	1	60	

Reference Books . Work shop Technology Part-I & II by W.A.S Chapman

Manufacturing Technology by P. N. Rao, Vol.- I, Vol.- II

Work shop Technology Part-I & II by W.A.S Chapman

SPINTRONIC TECHNOLOGY AND ADVANCE RESEARCH

SUBJECT-DESIGN OF MACHINE ELEMENTS (DME)

LESSON PLAN SESSION-2023-24 (WINTER- 23) SEM-5TH

NAME OF THE FACULTY-Er. S. S.Behera(Asst. prof.)

MODULE NO	NO OF PERIOD (TOPIC WISE)	TOTAL NO PERIOD	TENTATIVE DATE COMPLETE
1.1	Introduction to Machine Design and Classify it.	1	1
1.2	Different mechanical engineering materials used in design with their uses and their mechanical and physical properties	1	2
1.3	Different mechanical engineering materials used in design with their uses and their mechanical and physical properties	1	3
1.4	Define working stress, yield stress, ultimate stress & factor of safety and stress –strain curve for M.S & C.I.	1	4
1.5	Modes of Failure (By elastic deflection, general yielding & fracture)	1	5
1.6	Modes of Failure (By elastic deflection, general yielding & fracture)	1	6
1.7	State the factors governing the design of machine elements	1	7
1.8	State the factors governing the design of machine elements	1	8
1.9	Describe design procedure.	1	9
1.10	Describe design procedure.	1	10
1.11	Describe design procedure.	1	11
1.12	problem	1	12
2.1	Joints and their classification	1	13
2.2	State types of welded joints	1	14
2.3	State advantages of welded joints over other joints	1	15
2.4	Design of welded joints for eccentric loads	1	16
2.5	Design of welded joints for eccentric loads	1	17
2.6	State types of riveted joints and types of rivets	1	18
2.7	Describe failure of riveted joints	1	19
2.8	Describe failure of riveted joints	1	20
2.9	Determine strength & efficiency of riveted joints	1	21
2.10	Design riveted joints for pressure vessel.	1	22
2.11	Solve numerical on Welded Joint and Riveted Joints.	1	23
2.12	Solve numerical on Welded Joint and Riveted Joints.	1	24
3.1	State function of shafts. State materials for shafts	1	25
3.2	Design solid & hollow shafts to transmit a given power at given rpm based on a) Strength: (i) Shear stress, (ii) Combined bending tension; b) Rigidity: (i) Angle of twist, (ii) Deflection, (iii) Modulus of rigidity	1	26
3.3	Design solid & hollow shafts to transmit a given power at given rpm based on a) Strength: (i) Shear stress, (ii) Combined bending tension; b) Rigidity: (i) Angle of twist,	1	27

SPINTRONIC TECHNOLOGY AND ADVANCE RESEARCH

SUBJECT-DESIGN OF MACHINE ELEMENTS (DME)

LESSON PLAN SESSION-2023-24 (WINTER- 23) SEM-5TH

NAME OF THE FACULTY-Er. S. S.Behera(Asst. prof.)

	(ii) Deflection, (iii) Modulus of rigidity		
3.4	State standard size of shaft as per I.S.	1	28
3.5	State function of keys, types of keys & material of keys.	1	29
3.6	Describe failure of key, effect of key way	1	30
3.7	Describe failure of key, effect of key way	1	31
3.8	Design rectangular sunk key considering its failure against shear & crushing.	1	32
3.9	Design rectangular sunk key by using empirical relation for given diameter of shaft	1	33
3.10	State specification of parallel key, gib-head key, taper key as per I.S.	1	34
3.11	Solve numerical on Design of Shaft and keys	1	35
3.12	Solve numerical on Design of Shaft and keys	1	36
4.1	Design of Shaft Coupling	1	37
4.2	Requirements of a good shaft coupling	1	38
4.3	Types of Coupling	1	39
4.4	Types of Coupling	1	40
4.5	Design of Sleeve or Muff-Coupling	1	41
4.6	Design of Sleeve or Muff-Coupling	1	42
4.7	Design of Clamp or Compression Coupling	1	43
4.8	Design of Clamp or Compression Coupling	1	44
4.9	Solve simple numerical on above	1	45
4.10	Solve simple numerical on above	1	46
4.11	Solve simple numerical on above	1	47
4.12	Solve simple numerical on above	1	48
5.1	Materials used for helical spring	1	49
5.2	Standard size spring wire. (SWG).	1	50
5.3	Terms used in compression spring	1	51
5.4	Stress in helical spring of a circular wire	1	52
5.5	Stress in helical spring of a circular wire	1	53
5.6	Deflection of helical spring of circular wire	1	54
5.7	Deflection of helical spring of circular wire	1	55
5.8	Surge in spring	1	56
5.9	Solve numerical on design of closed coil helical compression spring	1	57
5.10	Solve numerical on design of closed coil helical compression spring	1	58
5.11	Solve numerical on design of closed coil helical compression spring	1	59

SPINTRONIC TECHNOLOGY AND ADVANCE RESEARCH

SUBJECT-DESIGN OF MACHINE ELEMENTS (DME)

LESSON PLAN SESSION-2023-24 (WINTER- 23) SEM-5TH

NAME OF THE FACULTY-Er. S. S.Behera(Asst. prof.)

5.12	Solve numerical on design of closed coil helical compression spring	1	60

Reference Books: PANDYA AND SHAH MACHINE DESIGN CHAROTAR PP
V.B.BHANDARI DESIGNOF MACHINE ELEMENTS TMH

SPINTRONIC TECHNOLOGY AND ADVANCE RESEARCH

SUBJECT-ENGINEERING MATERIAL (EM)

LESSON PLAN SESSION-2023-24 (WINTER -23) SEM-3RD

NAME OF THE FACULTY-Er. A. Das (Sr. Lecturer)

SL NO.	NO OF PERIOD (TOPIC WISE)	TOTAL NO PERIOD	Cumulative no of periods
1.1	Material classification into ferrous and non ferrous category and alloys	1	1
1.2	Properties of Materials: Physical , Chemical and Mechanical	1	2
	Properties of Materials: Physical , Chemical and Mechanical	1	3
1.3	Performance requirements	1	4
1.4	Material reliability and safety	1	5
2.1	Characteristics and application of ferrous materials	1	6
2.2	Classification, composition and application of low carbon steel, medium carbon steel and High carbon steel	1	7
2.3	Alloy steel: Low alloy steel, high alloy steel, tool steel and stainless steel	1	8
2.4	Tool steel: Effect of various alloying elements such as Cr, Mn, Ni, V, Mo,	1	9
	Tool steel: Effect of various alloying elements such as Cr, Mn, Ni, V, Mo,	1	10
3.1	Concept of phase diagram and cooling curves	1	11
	Concept of phase diagram and cooling curves	1	12
	Concept of phase diagram and cooling curves	1	13
	Concept of phase diagram and cooling curves	1	14
3.2	Features of Iron-Carbon diagram with salient micro-constituents of Iron and Steel	1	15
	Features of Iron-Carbon diagram with salient micro-constituents of Iron and Steel	1	16
	Features of Iron-Carbon diagram with salient micro-constituents of Iron and Steel	1	17
	Features of Iron-Carbon diagram with salient micro-constituents of Iron and Steel	1	18
4.1	Crystal defines, classification of crystals, ideal crystal and crystal imperfections	1	19
	Crystal defines, classification of crystals, ideal crystal and crystal imperfections	1	20
4.2	Classification of imperfection: Point defects, line defects, surface defects and volume defects	1	21
4.3	Types and causes of point defects: Vacancies, Interstitials and impurities	1	22
4.4	Types and causes of line defects: Edge dislocation and screw dislocation	1	23

SPINTRONIC TECHNOLOGY AND ADVANCE RESEARCH

SUBJECT-ENGINEERING MATERIAL (EM)

LESSON PLAN SESSION-2023-24 (WINTER -23) SEM-3RD

NAME OF THE FACULTY-Er. A. Das (Sr. Lecturer)

4.4	Types and causes of line defects: Edge dislocation and screw dislocation	1	24
4.5	Effect of imperfection on material properties	1	25
4.6	Deformation by slip and twinning	1	26
4.7	Effect of deformation on material properties	1	27
	Effect of deformation on material properties	1	28
5.1	Purpose of Heat treatment	1	29
	Purpose of Heat treatment.	1	30
5.2	Process of heat treatment: Annealing, normalizing, hardening, tampering, stress relieving measures.	1	31
	Process of heat treatment: Annealing, normalizing, hardening, tampering, stress relieving measures	1	32
5.3	Surface hardening: Carburizing and Nitriding	1	33
	Surface hardening: Carburizing and Nitriding	1	34
5.4	Effect of heat treatment on properties of steel	1	35
	Effect of heat treatment on properties of steel	1	36
5.5	Hardenability of steel	1	37
	Hardenability of steel	1	38
6.1	Aluminum alloys: Composition, property and usage of Duralmin, y- alloy.	1	39
	Aluminum alloys: Composition, property and usage of Duralmin, y- alloy.	1	40
6.2	Copper alloys: Composition, property and usage of CopperAluminum, Copper-Tin, Babbit , Phosperous bronze, brass, Copper- Nickel	1	41
	Copper alloys: Composition, property and usage of CopperAluminum, Copper-Tin, Babbit , Phosperous bronze, brass, Copper- Nickel	1	42
	Copper alloys: Composition, property and usage of CopperAluminum, Copper-Tin, Babbit , Phosperous bronze, brass, Copper- Nickel	1	43
6.3	Predominating elements of lead alloys, Zinc alloys and Nickel alloys	1	44
	Predominating elements of lead alloys, Zinc alloys and Nickel alloys	1	45
6.4	Low alloy materials like P-91, P-22 for power plants and other 10 high temperature services. High alloy materials like stainless steel grades of duplex, super duplex materials etc.	1	46
	Low alloy materials like P-91, P-22 for power plants and other 10 high temperature services. High alloy materials like stainless steel grades of duplex, super duplex materials etc.	1	47

SPINTRONIC TECHNOLOGY AND ADVANCE RESEARCH

SUBJECT-ENGINEERING MATERIAL (EM)

LESSON PLAN SESSION-2023-24 (WINTER -23) SEM-3RD

NAME OF THE FACULTY-Er. A. Das (Sr. Lecturer)

	Low alloy materials like P-91, P-22 for power plants and other 10 high temperature services. High alloy materials like stainless steel grades of duplex, super duplex materials etc.	1	48
7.1	Classification, composition, properties and uses of Copper base, Tin Base, Lead base, Cadmium base bearing materials.	1	49
	Classification, composition, properties and uses of Copper base, Tin Base, Lead base, Cadmium base bearing materials.	1	50
	Classification, composition, properties and uses of Copper base, Tin Base, Lead base, Cadmium base bearing materials	1	51
8.1	Classification, composition, properties and uses of Iron base and Copper base spring material	1	52
	Classification, composition, properties and uses of Iron base and Copper base spring material	1	53
	Classification, composition, properties and uses of Iron base and Copper base spring material	1	54
9.1	Properties and application of thermosetting and thermoplastic polymers	1	55
	Properties and application of thermosetting and thermoplastic polymers	1	56
9.2	Properties of elastomers	1	57
10.1	Classification, composition, properties and uses of particulate based and fiber reinforced composites	1	58
	Classification, composition, properties and uses of particulate based and fiber reinforced composites	1	59
10.2	Classification and uses of ceramics	1	60

Reference Books: O P Khanna A Textbook of Material Science and Metallurgy Dhantpat Rai
R K Rajput Engineering materials and Metallurgy S.Chand
S K Hazra choudhry Material science & process Imdian Book Distrubuting

SPINTRONIC TECHNOLOGY AND ADVANCE RESEARCH

SUBJECT-EM & ST

LESSON PLAN SESSION-2023-24 (WINTER-23) SEM-5TH

NAME OF THE FACULTY-Er. S.S. Behera(Asst. prof.)

SL NO.	NO OF PERIOD (TOPIC WISE)	TOTAL NO PERIOD	Cumulative no of periods
1.1	Concept /Meaning of Entrepreneurship	1	1
1.2	Need of Entrepreneurship	1	2
1.3	Characteristics, Qualities and Types of entrepreneur, Functions	1	3
1.4	Barriers in entrepreneurship	1	4
1.5	Entrepreneurs vrs. Manager.	1	5
1.6	Forms of Business Ownership: Sole proprietorship, partnership forms and others	1	6
1.7	Types of Industries, Concept of Start-ups	1	7
1.8	Entrepreneurial support agencies at National, State, District Level(Sources): DIC, NSIC,OSIC, SIDBI, NABARD, Commercial Banks, KVIC etc.	1	8
1.9	Technology Business Incubators (TBI) and Science and Technology Entrepreneur Parks	1	9
	Technology Business Incubators (TBI) and Science and Technology Entrepreneur Parks	1	10
2.1	Business Planning	1	11
2.2	SSI, Ancillary Units, Tiny Units, Service sector Units	1	12
2.3	Time schedule Plan, Agencies to be contacted for Project Implementation	1	13
2.4	Assessment of Demand and supply and Potential areas of Growth	1	14
2.5	Identifying Business Opportunity	1	15
2.6	Final Product selection	1	16
3.1	Preliminary project report	1	17
3.2	Detailed project report, Techno economic Feasibility	1	18
3.3	Project Viability	1	19
4.1	Definitions of management	1	20
4.2	Principles of management	1	21
4.3	Functions of management (planning, organising, staffing, directing and controlling etc.)	1	22
4.4	Level of Management in an Organisation	1	23
5.1	Production management	1	24
	Production management	1	25
5.2	Inventory Management	1	26
	Inventory Management	1	27
5.3	Financial Management	1	28
	Financial Management.	1	29

SPINTRONIC TECHNOLOGY AND ADVANCE RESEARCH

SUBJECT-EM & ST

LESSON PLAN SESSION-2023-24 (WINTER-23) SEM-5TH

NAME OF THE FACULTY-Er. S.S. Behera(Asst. prof.)

	Financial Management	1	30
5.4	Marketing Management	1	31
	Marketing Management	1	32
5.5	Human Resource Management Functions of Personnel Management	1	33
	Human Resource Management Functions of Personnel Management	1	34
6.1	Leadership and Motivation	1	35
	Leadership and Motivation	1	36
6.2	Motivation	1	37
	Motivation	1	38
	Motivation	1	39
6.3	Methods of Improving Motivation	1	40
6.4	Importance of Communication in Business	1	41
6.5	Types and Barriers of Communication	1	42
7.1	Work Culture, TQM & Safety	1	43
7.2	Human relationship and Performance in Organization	1	44
7.3	TQM concepts: Quality Policy, Quality Management, Quality system	1	45
7.4	Accidents and Safety, Cause, preventive measures, General Safety Rules , Personal Protection Equipment(PPE)	1	46
	Accidents and Safety, Cause, preventive measures, General Safety Rules , Personal Protection Equipment(PPE)	1	47
8.1	Intellectual Property Rights(IPR), Patents, Trademarks, Copyrights	1	48
8.2	Features of Factories Act 1948 with Amendment (only salient points).	1	49
8.3	Features of Payment of Wages Act 1936 (only salient points)	1	50
	Features of Payment of Wages Act 1936 (only salient points)	1	51
	Assignment	1	52
9.1	Concept of IOT, How IOT works	1	53
	Concept of IOT, How IOT works	1	54
9.2	Components of IOT, Characteristics of IOT, Categories of IOT	1	55
	Components of IOT, Characteristics of IOT, Categories of IOT	1	56
	Components of IOT, Characteristics of IOT, Categories of IOT	1	57
9.3	Applications of IOT- Smart Cities, Smart Transportation, Smart Home, Smart Healthcare, Smart Industry, Smart	1	58

SPINTRONIC TECHNOLOGY AND ADVANCE RESEARCH

SUBJECT-EM & ST

LESSON PLAN SESSION-2023-24 (WINTER-23) SEM-5TH

NAME OF THE FACULTY-Er. S.S. Behera(Asst. prof.)

	Agriculture, Smart Energy Management etc.		
	Applications of IOT- Smart Cities, Smart Transportation, Smart Home, Smart Healthcare, Smart Industry, Smart Agriculture, Smart Energy Management etc.	1	59
	Applications of IOT- Smart Cities, Smart Transportation, Smart Home, Smart Healthcare, Smart Industry, Smart Agriculture, Smart Energy Management etc.	1	60

Reference Books: Entrepreneurship Development and Management by R.K Singhal, Katson Books., New Delhi
Entrepreneurship Development and Management by U Saroj and V Mahendiratta, Abhishek Publications, Chandigarh

SPINTRONIC TECHNOLOGY AND ADVANCE RESEARCH

SUBJECT-HM & IFP

LESSON PLAN SESSION-2023-24 (WINTER -23) SEM-5TH

NAME OF THE FACULTY-Er. P.M. Padhi (Asst. prof.)

SL NO.	NO OF PERIOD (TOPIC WISE)	TOTAL NO PERIOD	Cumulative no of periods
1.1	Definition and classification of hydraulic turbines	1	1
1.2	Construction and working principle of impulse turbine	1	2
1.3	Velocity diagram of moving blades, work done and derivation of various efficiencies of impulse turbine	1	3
	Velocity diagram of moving blades, work done and derivation of various efficiencies of impulse turbine.	1	4
1.4	Velocity diagram of moving blades, work done and derivation of various efficiencies of Francis turbine.	1	5
	Velocity diagram of moving blades, work done and derivation of various efficiencies of Francis turbine.	1	6
	Velocity diagram of moving blades, work done and derivation of various efficiencies of Francis turbine. Problem	1	7
1.5	Velocity diagram of moving blades, work done and derivation of various efficiencies of Kaplan turbine	1	8
	Velocity diagram of moving blades, work done and derivation of various efficiencies of Kaplan turbine	1	9
	Velocity diagram of moving blades, work done and derivation of various efficiencies of Kaplan turbine	1	10
1.6	Numerical on above	1	11
	Numerical on above	1	12
1.7	Distinguish between impulse turbine and reaction turbine.	1	13
	Distinguish between impulse turbine and reaction turbine.	1	14
	Assignment	1	15
2.1	Construction and working principle of centrifugal pumps	1	16
	Construction and working principle of centrifugal pumps	1	17
2.2	Work done and derivation of various efficiencies of centrifugal pumps.	1	18
	Work done and derivation of various efficiencies of centrifugal pumps.	1	19
2.3	Numerical on above	1	20
3.1	Describe construction & working of single acting reciprocating pump.	1	21
	Describe construction & working of single acting reciprocating pump.	1	22
	Describe construction & working of single acting reciprocating pump.	1	23
3.2	Describe construction & working of double acting	1	24

SPINTRONIC TECHNOLOGY AND ADVANCE RESEARCH

SUBJECT-HM & IFP

LESSON PLAN SESSION-2023-24 (WINTER -23) SEM-5TH

NAME OF THE FACULTY-Er. P.M. Padhi (Asst. prof.)

	reciprocating pump.		
	Describe construction & working of double acting reciprocating pump.	1	25
	Describe construction & working of double acting reciprocating pump.	1	26
3.3	Derive the formula foe power required to drive the pump (Single acting & double acting)	1	27
	Derive the formula foe power required to drive the pump (Single acting & double acting)	1	28
	Derive the formula foe power required to drive the pump (Single acting & double acting)	1	29
	Derive the formula foe power required to drive the pump (Single acting & double acting) with Problems	1	30
3.4	Define slip.	1	31
3.5	State positive & negative slip & establish relation between slip & coefficient of discharge	1	32
3.6	Solve numerical on above	1	33
4.1	Elements –filter-regulator-lubrication unit	1	34
4.2	Pressure control valves	1	35
4.3	Direction control valves	1	36
4.4	ISO Symbols of pneumatic components	1	37
4.5	Pneumatic circuits	1	38
	Direct control of single acting cylinder	1	39
	Operation of double acting cylinder with metering in and metering out control	1	40
5.1	Hydraulic system, its merit and demerits	1	41
5.2	Hydraulic accumulators	1	42
5.2.1	Pressure control valves	1	43
5.2.2	Pressure relief valves	1	44
5.2.3	Pressure regulation valves	1	45
5.3	Direction control valves	1	46
5.3.1	3/2DCV,5/2 DCV,5/3DCV	1	47
5.3.2	Flow control valves	1	48
5.3.3	Throttle valves	1	49
5.4	Fluid power pumps.	1	50
5.4.1	External and internal gear pumps	1	51
5.4.2	Vane pump	1	52
5.4.3	Radial piston pumps	1	53
5.5	ISO Symbols for hydraulic components.	1	54
5.6	Actuators	1	55

SPINTRONIC TECHNOLOGY AND ADVANCE RESEARCH

SUBJECT-HM & IFP

LESSON PLAN SESSION-2023-24 (WINTER -23) SEM-5TH

NAME OF THE FACULTY-Er. P.M. Padhi (Asst. prof.)

5.7	Hydraulic circuits	1	56
5.7.1	Direct control of single acting cylinder	1	57
5.7.2	Operation of double acting cylinder	1	58
5.7.3	Operation of double acting cylinder with metering in and metering out control	1	59
5.8	Comparison of hydraulic and pneumatic system	1	60

Reference Books: J.F. BLACKBURN, G.REETHOF &J.L SHEARER FLUID POWER CONTROL
K SHANMUGA, SUNDARAM HYDRAULIC &PNEUMATIC CONTROL S.CHAND
MAJUMDAR HYDRAULIC &PNEUMATIC CONTROL TMH

SPINTRONIC TECHNOLOGY AND ADVANCE RESEARCH

SUBJECT-MECHATRONICS

LESSON PLAN SESSION-2023-24 (WINTER-23) SEM-5TH

NAME OF THE FACULTY-Er. D. Gochikar (Sr.Lecturer)

SL NO.	NO OF PERIOD (TOPIC WISE)	TOTAL NO PERIOD	Cumulative no of periods
1.1	Definition of Mechatronics	1	1
1.2	Advantages & disadvantages of Mechatronics	1	2
1.3	Application of Mechatronics	1	3
1.4	Scope of Mechatronics in Industrial Sector	1	4
1.5	Components of a Mechatronics System.	1	5
1.6	Importance of mechatronics in automation	1	6
2.1	Defination of Transducers	1	7
2.2	Classification of Transducers	1	8
2.3	Electromechanical Transducers	1	9
2.4	Transducers Actuating Mechanisms	1	10
2.5	Displacement &Positions Sensors	1	11
	Displacement &Positions Sensors	1	12
2.6	Velocity, motion, force and pressure sensors	1	13
2.7	Temperature and light sensors.	1	14
	Temperature and light sensors.	1	15
3.1	Mechanical Actuators	1	16
3.1.1	Machine, Kinematic Link, Kinematic Pair	1	17
3.1.2	Mechanism, Slider crank Mechanism	1	18
3.1.3	Gear Drive, Spur gear, Bevel gear, Helical gear, worm gear	1	19
3.1.4	Belt & Belt drive, Bearings	1	20
3.2	Electrical Actuator	1	21
3.2.1	Switches and relay	1	22
3.2.2	Solenoid	1	23
3.2.3	Specification and control of stepper motors	1	24
3.2.4	Servo Motors D.C & A.C	1	25
4.1	PROGRAMMABLE LOGIC CONTROLLERS(PLC)	1	26
4.2	Advantages of PLC	1	27
4.3	Selection and uses of PLC	1	28
4.4	Architecture basic internal structures	1	29
4.5	Input/output Processing and Programming	1	30
4.6	Mnemonics	1	31
	Mnemonics	1	32
4.7	Master and Jump Controllers	1	33
	Master and Jump Controllers	1	34
	Master and Jump Controllers	1	35
	Class Test	1	36

SPINTRONIC TECHNOLOGY AND ADVANCE RESEARCH

SUBJECT-MECHATRONICS

LESSON PLAN SESSION-2023-24 (WINTER-23) SEM-5TH

NAME OF THE FACULTY-Er. D. Gochikar (Sr.Lecturer)

5.1	Introduction to Numerical Control of machines and CAD/CAM	1	37
5.1.1	NC machines	1	38
5.1.2	CNC machines	1	39
5.1.3	CAD/CAM	1	40
5.1.3.1	CAD	1	41
5.1.3.2	CAM	1	42
5.1.3.3	Software and hardware for CAD/CAM	1	43
5.1.3.4	Functioning of CAD/CAM system	1	44
5.1.3.5	Features and characteristics of CAD/CAM system	1	45
	Features and characteristics of CAD/CAM system	1	46
5.2	elements of CNC machines	1	47
5.2.1	Introduction	1	48
5.2.2	Machine Structure	1	49
5.2.3	Guideways/Slide ways	1	50
	Guideways/Slide ways	1	51
5.2.4	Drives	1	52
	Drives	1	53
5.2.5	Spindle and Spindle Bearings	1	54
	Spindle and Spindle Bearings	1	55
6.1	Definition, Function and laws of robotics	1	56
	Definition, Function and laws of robotics	1	57
6.2	Types of industrial robots	1	58
6.3	Robotic systems.	1	59
6.4	Advantages and Disadvantages of robots	1	60

Reference Books: R. RADHAKRISHNA, S, SUBRAMANIAN CAD/CAM/CIM NEW AGE INTERNATIONAL PVT.LTD
W. Bolton Mechatronics Pearson Education India

SPINTRONIC TECHNOLOGY AND ADVANCE RESEARCH

SUBJECT-PRODUCTION TECHNOLOGY

LESSON PLAN **SESSION-2023-24 (WINTER)** **SEM-3RD**

NAME OF THE FACULTY- Er. S. Mohapatra (Asst. Prof.)

SL NO.	NO OF PERIOD (TOPIC WISE)	TOTAL NO PERIOD	Cumulative no of periods
1.1	Extrusion: Definition & Classification	1	1
1.2	Explain direct, indirect and impact extrusion process.	1	2
1.2	Explain direct, indirect and impact extrusion process	1	3
1.3	Define rolling. Classify it.	1	4
1.4	Differentiate between cold rolling and hot rolling process.	1	5
1.5	List the different types of rolling mills used in Rolling process.	1	6
	Assignment	1	7
2.1	Define welding and classify various welding processes.	1	8
2.2	Explain fluxes used in welding.	1	9
2.3	Explain Oxy-acetylene welding process	1	10
2.3	Explain Oxy-acetylene welding process	1	11
2.4	Explain various types of flames used in Oxy-acetylene welding process	1	12
2.4	Explain various types of flames used in Oxy-acetylene welding process	1	13
2.5	Explain Arc welding process.	1	14
2.6	Specify arc welding electrodes	1	15
2.7	Define resistance welding and classify it.	1	16
2.8	Describe various resistance welding processes such as butt welding,	1	17
2.8	Describe various resistance welding processes such as butt welding,	1	18
2.8	spot welding, flash welding	1	19
2.8	Projection welding and seam welding.	1	20
2.9	Explain TIG and MIG welding process	1	21
2.10	State different welding defects with causes and remedies	1	22
3.1	Define Casting and Classify the various Casting processes	1	23
3.2	Explain the procedure of Sand mould casting	1	24
3.3	Explain different types of molding sands with their composition and properties	1	25
3.4	Classify different pattern and state various pattern allowances.	1	26
3.4	Classify different pattern and state various pattern allowances.	1	27
3.5	Classify core	1	28
3.6	Describe construction and working of cupola and crucible furnace	1	29
3.6	Describe construction and working of cupola and crucible furnace	1	30
3.7	Explain die casting method.	1	31

SPINTRONIC TECHNOLOGY AND ADVANCE RESEARCH

SUBJECT-PRODUCTION TECHNOLOGY

LESSON PLAN **SESSION-2023-24 (WINTER)** **SEM-3RD**

NAME OF THE FACULTY- Er. S. Mohapatra (Asst. Prof.)

3.7	Explain die casting method.	1	32
3.8	Explain centrifugal casting such as true centrifugal casting, centrifuging with advantages, limitation and area of application.	1	33
3.8	Explain centrifugal casting such as true centrifugal casting, centrifuging with advantages, limitation and area of application.	1	34
3.9	Explain various casting defects with their causes and remedies.	1	35
3.9	Explain various casting defects with their causes and remedies.	1	36
3.9	Explain various casting defects with their causes and remedies.	1	37
	Class Test/ Assignment	1	38
4.1	Define powder metallurgy process	1	39
4.2	State advantages of powder metallurgy technology technique.	1	40
4.3	Describe the methods of producing components by powder metallurgy technique.	1	41
4.3	Describe the methods of producing components by powder metallurgy technique.	1	42
4.4	Explain sintering.	1	43
4.4	Explain sintering.	1	44
4.5	Economics of powder metallurgy	1	45
5.1	Describe Press Works: blanking, piercing and trimming	1	46
5.2	List various types of die and punch	1	47
5.2	List various types of die and punch	1	48
5.3	Explain simple, Compound & Progressive dies.	1	49
5.3	Explain simple, Compound & Progressive dies.	1	50
5.4	Describe the various advantages & disadvantages of above dies	1	51
5.4	Describe the various advantages & disadvantages of above dies	1	52
6.1	Define jigs and fixtures	1	53
6.2	State advantages of using jigs and fixtures	1	54
6.3	State the principle of locations	1	55
6.3	State the principle of locations	1	56
6.4	Describe the methods of location with respect to 3-2-1 point location of rectangular jig	1	57
6.4	Describe the methods of location with respect to 3-2-1 point location of rectangular jig	1	58
6.5	List various types of jig and fixtures.	1	59

SPINTRONIC TECHNOLOGY AND ADVANCE RESEARCH

SUBJECT-PRODUCTION TECHNOLOGY

LESSON PLAN **SESSION-2023-24 (WINTER)** **SEM-3RD**

NAME OF THE FACULTY- Er. S. Mohapatra (Asst. Prof.)

6.5	List various types of jig and fixtures.	1	60

Reference Books: O.P. Khanna Production Technology, Vol- I& II Dhanpat Rai Publication
P.C.Sharma Manufacturing technology, Vol- I S. Chand

SPINTRONIC TECHNOLOGY AND ADVANCE RESEARCH

SUBJECT-RAC

LESSON PLAN SESSION-2023-24(WINTER-23) SEM-5TH

NAME OF THE FACULTY-Er. B.B.Sahoo (Asst. prof.)

SL NO.	NO OF PERIOD (TOPIC WISE)	TOTAL NO PERIOD	Cumulative no of periods
1.1	Definition of refrigeration and unit of refrigeration.	1	1
1.2	Definition of COP, Refrigerating effect (R.E)	1	2
1.3	Principle of working of open and closed air system of refrigeration.	1	3
	Principle of working of open and closed air system of refrigeration.	1	4
1.3.1	Calculation of COP of Bell-Coleman cycle and numerical on it.	1	5
2.1	schematic diagram of simple vapors compression refrigeration system'	1	6
2.2	Types	1	7
2.2.1	Cycle with dry saturated vapors after compression	1	8
	Cycle with dry saturated vapors after compression	1	9
2.2.2	Cycle with wet vapors after compression	1	10
2.2.3	Cycle with superheated vapors after compression	1	11
2.2.4	Cycle with superheated vapors before compression.	1	12
2.2.5	Cycle with sub cooling of refrigerant	1	13
2.2.6	Representation of above cycle on temperature entropy and pressure enthalpy diagram	1	14
2.2.7	Numerical on above (determination of COP, mass flow)	1	15
3.1	Simple vapor absorption refrigeration system	1	16
	Simple vapor absorption refrigeration system	1	17
3.2	Practical vapor absorption refrigeration system	1	18
	Practical vapor absorption refrigeration system	1	19
3.3	COP of an ideal vapor absorption refrigeration system	1	20
3.4	Numerical on COP.	1	21
	Numerical on COP.	1	22
4.1	REFRIGERANT COMPRESSORS	1	23
4.1.1	Principle of working and constructional details of reciprocating and rotary compressors.	1	24
4.1.2	Centrifugal compressor only theory	1	25
4.1.3	Important terms.	1	26
4.2	CONDENSERS	1	27
4.2.1	Principle of working and constructional details of air cooled and water cooled condenser	1	28
4.2.2	Heat rejection ratio.	1	29
4.2.3	Cooling tower and spray pond.	1	30

SPINTRONIC TECHNOLOGY AND ADVANCE RESEARCH

SUBJECT-RAC

LESSON PLAN SESSION-2023-24(WINTER-23) SEM-5TH

NAME OF THE FACULTY-Er. B.B.Sahoo (Asst. prof.)

4.3	Principle of working and constructional details of an evaporator	1	31
4.3.1	Types of evaporator.	1	32
4.3.2	Bare tube coil evaporator, finned evaporator, shell and tube evaporator.	1	33
5.1	EXPANSION VALVES	1	34
	EXPANSION VALVES	1	35
5.2	REFRIGERANTS	1	36
5.2.1	Classification of refrigerants	1	37
5.2.2	Desirable properties of an ideal refrigerant.	1	38
5.2.3	Designation of refrigerant	1	39
5.2.4	Thermodynamic Properties of Refrigerants.	1	40
5.2.5	Chemical properties of refrigerants.	1	41
5.2.6	commonly used refrigerants, R-11, R-12, R-22, R-134a, R-717	1	42
5.2.7	Substitute for CFC	1	43
5.3	Applications of refrigeration	1	44
6.1	Psychometric terms	1	45
6.2	Adiabatic saturation of air by evaporation of water	1	46
6.3	Psychometric chart and uses.	1	47
6.4	Psychometric processes	1	48
	Psychometric processes	1	49
6.5	Effective temperature and Comfort chart.	1	50
7.1	Factors affecting comfort air conditioning.	1	51
	Factors affecting comfort air conditioning. .	1	52
7.2	Equipment used in an air-conditioning	1	53
7.3	Equipment used in an air-conditioning	1	54
7.4	Winter Air Conditioning System	1	55
	Winter Air Conditioning System	1	56
7.5	Summer air-conditioning system.	1	57
	Summer air-conditioning system.	1	58
7.6	Numerical on above	1	59
	Numerical on above	1	60

Reference Books: C.P ARRORA REFRIGERATION AND AIR CONDITIONING TMH
P.L BALLANY REFRIGERATION AND AIR CONDITIONING KHANNA PUBLISHER

SPINTRONIC TECHNOLOGY AND ADVANCE RESEARCH

SUBJECT-STRENGTH OF MATERIAL

LESSON PLAN SESSION-2023-24 (WINTER -23) SEM-3RD

NAME OF THE FACULTY-Er. P.M.Padhi (Asst. prof.)

SL NO.	NO OF PERIOD (TOPIC WISE)	TOTAL NO PERIOD	Cumulative no of periods
1.1	Types of load, stresses & strains,(Axial and tangential) Hooke's law,	1	1
	Types of load, stresses & strains,(Axial and tangential) Hooke's law,	1	2
	Young's modulus, bulk modulus, modulus of rigidity, Poisson's ratio, derive the relation between three elastic constants,	1	3
	Problem	1	4
1.2	Principle of super position, stresses in composite section	1	5
1.3	Temperature stress, determine the temperature stress in composite bar (single core)	1	6
	Temperature stress, determine the temperature stress in composite bar (single core)	1	7
1.4	Strain energy and resilience, Stress due to gradually applied, suddenly applied and impact load	1	8
	Strain energy and resilience, Stress due to gradually applied, suddenly applied and impact load	1	9
1.5	Simple problems on above.	1	10
2.1	Definition of hoop and longitudinal stress, strain	1	11
2.2	Derivation of hoop stress, longitudinal stress, hoop strain, longitudinal strain and volumetric strain	1	12
	Derivation of hoop stress, longitudinal stress, hoop strain, longitudinal strain and volumetric strain	1	13
2.3	Computation of the change in length, diameter and volume	1	14
	Computation of the change in length, diameter and volume	1	15
	Computation of the change in length, diameter and volume	1	16
2.4	Simple problems on above.	1	17
	Simple problems on above	1	18
3.1	Determination of normal stress, shear stress and resultant stress on oblique plane	1	19
	Determination of normal stress, shear stress and resultant stress on oblique plane	1	20
	Determination of normal stress, shear stress and resultant stress on oblique plane.	1	21
3.2	Location of principal plane and computation of principal stress	1	22
	Location of principal plane and computation of principal	1	23

SPINTRONIC TECHNOLOGY AND ADVANCE RESEARCH

SUBJECT-STRENGTH OF MATERIAL

LESSON PLAN SESSION-2023-24 (WINTER -23) SEM-3RD

NAME OF THE FACULTY-Er. P.M.Padhi (Asst. prof.)

	stress		
	Location of principal plane and computation of principal stress	1	24
3.3	Location of principal plane and computation of principal stress and Maximum shear stress using Mohr's circle	1	25
	Location of principal plane and computation of principal stress and Maximum shear stress using Mohr's circle	1	26
	Location of principal plane and computation of principal stress and Maximum shear stress using Mohr's circle	1	27
	Solve the problem	1	28
4.1	Types of beam and load.	1	29
	Types of beam and load	1	30
4.2	Concepts of Shear force and bending moment	1	31
	Concepts of Shear force and bending moment	1	32
	Problem.	1	33
4.3	Shear Force and Bending moment diagram and its salient features illustration in cantilever beam,	1	34
	Shear Force and Bending moment diagram and its salient features illustration in cantilever beam,	1	35
	simply supported beam and over hanging beam under point load and uniformly distributed load	1	36
	simply supported beam and over hanging beam under point load and uniformly distributed load	1	37
	Solve the problem	1	38
5.1	Assumptions in the theory of bending	1	39
	Assumptions in the theory of bending	1	40
5.2	Bending equation, Moment of resistance,	1	41
	Bending equation, Moment of resistance,	1	42
	Bending equation, Moment of resistance,	1	43
	Section modulus& neutral axis.	1	44
	Section modulus& neutral axis.	1	45
	Section modulus& neutral axis.	1	46
5.3	Solve simple problems.	1	47
	Solve simple problems.	1	48
6.1	Define column	1	49
6.2	Axial load, Eccentric load on column,.	1	50
6.3	Direct stresses, Bending stresses, Maximum& Minimum stresses. Numerical problems on above.	1	51
	Direct stresses, Bending stresses, Maximum& Minimum stresses. Numerical problems on above.	1	52

SPINTRONIC TECHNOLOGY AND ADVANCE RESEARCH

SUBJECT-STRENGTH OF MATERIAL

LESSON PLAN SESSION-2023-24 (WINTER -23) SEM-3RD

NAME OF THE FACULTY-Er. P.M.Padhi (Asst. prof.)

6.4	Buckling load computation using Euler's formula (no derivation) in Columns with various end conditions	1	53
	Buckling load computation using Euler's formula (no derivation) in Columns with various end conditions	1	54
7.0	Assumption of pure torsion	1	55
7.1	The torsion equation for solid and hollow circular shaft	1	56
	The torsion equation for solid and hollow circular shaft	1	57
7.2	Comparison between solid and hollow shaft subjected to pure torsion	1	58
	Comparison between solid and hollow shaft subjected to pure torsion	1	59
	Problem	1	60

Reference Books: S Ramamrutham Strength of Materials Dhanpat Rai
R K Rajput Strength of Materials S.Chand
G H Ryder Strength of Materials Mc millon and co. lmtd

SPINTRONIC TECHNOLOGY AND ADVANCE RESEARCH

SUBJECT-THERMAL ENGINEERING I

LESSON PLAN SESSION-2023-24 (WINTER-23) SEM-3RD

NAME OF THE FACULTY-Er. D.Mohanty (Sr.Lecturer)

SL NO.	NO OF PERIOD (TOPIC WISE)	TOTAL NO PERIOD	Cumulative no of periods
1.1	Thermodynamic Systems (closed, open, isolated)	1	1
1.2	Thermodynamic properties of a system (pressure, volume, temperature, entropy, enthalpy, Internal energy and units of measurement).	1	2
1.3	Intensive and extensive properties	1	3
1.4	Define thermodynamic processes, path, cycle, state, path function, point function.	1	4
1.5	Thermodynamic Equilibrium.	1	5
1.6	Quasi-static Process.	1	6
1.7	Conceptual explanation of energy and its sources	1	7
	Conceptual explanation of energy and its sources	1	8
1.8	Work , heat and comparison between the two.	1	9
1.9	Mechanical Equivalent of Heat.	1	10
1.10	Work transfer, Displacement work	1	11
	Solve the problems	1	12
2.1	State & explain Zeroth law of thermodynamics.	1	13
	State & explain Zeroth law of thermodynamics.	1	14
2.2	State & explain First law of thermodynamics.	1	15
	State & explain First law of thermodynamics.	1	16
2.3	Limitations of First law of thermodynamics	1	17
2.4	Application of First law of Thermodynamics (steady flow energy equation and its application to turbine and compressor)	1	18
	Application of First law of Thermodynamics (steady flow energy equation and its application to turbine and compressor)	1	19
	Second law of thermodynamics (Claucius & Kelvin Plank statements).	1	20
	Second law of thermodynamics (Claucius & Kelvin Plank statements).	1	21
	Problems	1	22
2.5	Application of second law in heat engine, heat pump, refrigerator & determination of efficiencies & C.O.P (solve simple numerical)	1	23
	Application of second law in heat engine, heat pump, refrigerator & determination of efficiencies & C.O.P (solve simple numerical)	1	24

SPINTRONIC TECHNOLOGY AND ADVANCE RESEARCH

SUBJECT-THERMAL ENGINEERING I

LESSON PLAN SESSION-2023-24 (WINTER-23) SEM-3RD

NAME OF THE FACULTY-Er. D.Mohanty (Sr.Lecturer)

3.1	Laws of perfect gas: Boyle's law, Charle's law, Avogadro's law, Dalton's law of partial pressure, Guy lussac law, General gas equation, characteristic gas constant, Universal gas constant	1	25
	Laws of perfect gas: Boyle's law, Charle's law, Avogadro's law, Dalton's law of partial pressure, Guy lussac law, General gas equation, characteristic gas constant, Universal gas constant	1	26
3.2	Explain specific heat of gas (Cp and Cv)	1	27
3.3	Relation between Cp & Cv.	1	28
3.4	Enthalpy of a gas.	1	29
3.5	Work done during a non- flow process	1	30
3.6	Application of first law of thermodynamics to various non flow process (Isothermal, Isobaric, Isentropic and polytrophic process)	1	31
	Solve simple problems on above.	1	32
	Solve simple problems on above.	1	33
3.7	Free expansion & throttling process	1	34
4.1	Explain & classify I.C engine.	1	35
4.2	Terminology of I.C Engine such as bore, dead centers, stroke volume, piston speed &RPM	1	36
	Terminology of I.C Engine such as bore, dead centers, stroke volume, piston speed &RPM	1	37
4.3	Explain the working principle of 2-stroke & 4- stroke engine C.I & S.I engine.	1	38
	Explain the working principle of 2-stroke & 4- stroke engine C.I & S.I engine.	1	39
	Explain the working principle of 2-stroke & 4- stroke engine C.I & S.I engine.	1	40
4.4	Differentiate between 2-stroke & 4- stroke engine C.I & S.I engine.	1	41
	Differentiate between 2-stroke & 4- stroke engine C.I & S.I engine.	1	42
5.1	Carnot cycle	1	43
	Carnot cycle	1	44
5.2	Otto cycle	1	45
	Otto cycle	1	46
5.3	Diesel cycle.	1	47
	Diesel cycle.	1	48
5.4	Dual cycle..	1	49

SPINTRONIC TECHNOLOGY AND ADVANCE RESEARCH

SUBJECT-THERMAL ENGINEERING I

LESSON PLAN SESSION-2023-24 (WINTER-23) SEM-3RD

NAME OF THE FACULTY-Er. D.Mohanty (Sr.Lecturer)

5.4	Dual cycle.	1	50
5.5	Solve simple numerical.	1	51
	Solve simple numerical.	1	52
6.1	Define Fuel.	1	53
6.2	Types of fuel.	1	54
6.3	Application of different types of fuel.	1	55
	Application of different types of fuel.	1	56
6.4	Heating values of fuel	1	57
	Heating values of fuel	1	58
6.5	Quality of I.C engine fuels Octane number, Cetane number.	1	59
	Quality of I.C engine fuels Octane number, Cetane number.	1	60

Reference Books: R.S. Khurmi Thermal Engineering S.Chand
Mahesh M Rathore Thermal Engineering TMH
P.K.Nag Engineering Thermodynamics TMH

SPINTRONIC TECHNOLOGY AND ADVANCE RESEARCH

SUBJECT-POWER STATION ENGINEERING

LESSON PLAN SESSION-2022/23 SEM-6TH

NAME OF FACULTY- Er. Amrit Das(Sr. Lecturer)

SL. NO.	NO OF PERIOD (TOPIC WISE)	TOTAL NO PERIOD	Cumulative no of periods
1	Describe sources of energy	1	1
2	Explain concept of Central and Captive power station	1	2
3	Classify power plants.	1	3
4	Importance of electrical power in day today life.	1	4
5	Overview of method of electrical power generation.	1	5
6	Layout of steam power stations.	1	6
7	Steam power cycle	1	7
8	Explain Carnot vapour power cycle with P-V, T-s diagram	1	8
9	thermal efficiency of carnot cycle	1	9
10	Explain Rankine cycle with P-V, T-S & H-s diagram	1	10
11	determine thermal efficiency	1	11
12	Work done, work ratio, and specific steam Consumption	1	12
13	Solve Simple Problems	1	13
14	List of thermal power stations in the state with their capacities.	1	14
15	Boiler Accessories: Operation of Air pre heater,	1	15
16	Operation of Economiser	1	16
17	Operation Electrostatic precipitator and Operation of super heater	1	17
18	Need of boiler mountings and operation of boiler	1	18
19	Draught systems (Natural draught, Forced draught)	1	19
20	Balanced Draught with their advantages & disadvantages.	1	20
21	Steam prime movers: Advantages & disadvantages of steam turbine	1	21
22	Elements of steam turbine, governing of steam turbine	1	22
23	Performance of steam turbine: Explain Thermal efficiency, Stage efficiency and Gross efficiency	1	23
24	Classification of condenser. function of condenser auxiliaries such as hot well, condenser extraction pump	1	24
25	Function of air extraction pump, and circulating pump.	1	25
26	Cooling Tower: Function and types of cooling tower	1	26
27	spray ponds	1	27
28	Selection of site for thermal power stations	1	28
29	Classify nuclear fuel (Fissile & fertile material	1	29
30	Explain fusion and fission reaction	1	30
31	Explain working of nuclear power plants with block diagram	1	31
32	Explain the working and construction of nuclear reactor	1	32
33	Compare the nuclear and thermal plants	1	33
34	Explain the disposal of nuclear waste.	1	34
35	Selection of site for nuclear power stations.	1	35
36	List of nuclear power stations.	1	36

SPINTRONIC TECHNOLOGY AND ADVANCE RESEARCH

SUBJECT-POWER STATION ENGINEERING

LESSON PLAN SESSION-2022/23 SEM-6TH

NAME OF FACULTY- Er. Amrit Das(Sr. Lecturer)

37	State the advantages and disadvantages of diesel electric power stations.	1	37
38	Explain briefly different systems of diesel electric power stations	1	38
39	Fuel storage and fuel supply system	1	39
40	Fuel injection system	1	40
41	Air supply system	1	41
42	Exhaust system	1	42
43	cooling system	1	43
44	Lubrication system	1	44
45	starting system	1	45
46	governing system.	1	46
47	Selection of site for diesel electric power stations	1	47
48	Performance and thermal efficiency of diesel electric power stations	1	48
49	State advantages and disadvantages of hydroelectric power plant.	1	49
50	Classify and explain the general arrangement of storage type hydroelectric project and explain its operation	1	50
51	Selection of site of hydel power plant.	1	51
52	List of hydro power stations with their capacities and number of units in the state	1	52
53	Types of turbines and generation used	1	53
54	Simple problems	1	54
55	Selection of site for gas turbine stations	1	55
56	Fuels for gas turbine	1	56
57	Elements of simple gas turbine power plants	1	57
58	Merits, demerits and application of gas turbine power plants	1	58
59	Doubt clearing class	1	59
60	Question paper discussion	1	60

Reference Books - Power Plant Engineering by R.K. Rajput

Power Plant Engineering by P.K. Nag

Power plant Engineering by Nag pal G,R

SPINTRONIC TECHNOLOGY AND ADVANCE RESEARCH

SUBJECT-THEORY OF MACHINE

LESSON PLAN SESSION -2022 SEM-4TH

NAME OF FACULTY-Er. P.M. Padhi (Asst. Prof.)

SL. NO.	NO OF PERIOD (TOPIC WISE)	TOTAL NO PERIOD	Cumulative no of periods
1	Link, kinematic chain, mechanism, machine	1	1
2	Inversion, four bar link mechanism and its inversion	1	2
3	Lower pair and higher pair	1	3
4	Cam and followers	1	4
5	Revision of topic previously taught	1	5
6	Friction between nut and screw for square thread, screw jack	1	6
7	Bearing and its classification, Description of roller, needle roller & ball bearings	1	7
8	Torque transmission in flat pivot & conical pivot bearings	1	8
9	Flat collar bearing of single and multiple types	1	9
10	Torque transmission for single and multiple clutches	1	10
11	Working of simple frictional brakes	1	11
12	Working of Absorption type of dynamometer	1	12
13	Concept of power transmission	1	13
14	Type of drives, belt, gear and chain drive	1	14
15	Computation of velocity ratio, length of belts (open&cross) with and without slip	1	15
16	Ratio of belt tensions, centrifugal tension and initial tension	1	16
17	Power transmitted by the belt	1	17
18	V-belts and V-belts pulleys.	1	18
19	Concept of crowning of pulleys.	1	19
20	Gear drives and its terminology.	1	20
21	Gear trains, Working principle of simple, compound, reverted and epicyclic gear trains	1	21
22	Function of governor	1	22
23	Classification of governor	1	23
24	Working of Watt, Porter, Proel and Hartnel l governors	1	24
25	Conceptual explanation of sensitivity, stability and isochronism	1	25
26	Function of flywheel	1	26
27	Comparison between flywheel & governor	1	27
28	Fluctuation of energy and coefficient of fluctuation of speed	1	28
29	**Balancing of Machine** Concept of static and dynamic balancing	1	29
30	Static balancing of rotating parts.	1	30
31	Principles of balancing of reciprocating parts.	1	31

SPINTRONIC TECHNOLOGY AND ADVANCE RESEARCH

SUBJECT-THEORY OF MACHINE

LESSON PLAN SESSION -2022 SEM-4TH

NAME OF FACULTY-Er. P.M. Padhi (Asst. Prof.)

32	Causes and effect of unbalance.	1	32
33	Difference between static and dynamic balancing	1	33
34	**Vibration of machine partS**	1	34
35	Introduction to Vibration and related terms (Amplitude, time period and frequency, cycle)	1	35
36	Classification of vibration	1	36
37	Basic concept of natural, forced & damped vibration Basic concept of natural, forced & damped vibration	1	37
38	Torsional and Longitudinal vibration	1	38
39	Causes & remedies of vibration	1	39

Reference Book –

Theory of Machines by Khurmi & Gupta

Theory of Machines by R K Rajput

Theory of Machines by S R Rattan