CAPITAL SCHOOL OF ENGINEERING

PLOT NO. 1288, MAHATAPALLA, BAJAPUR, KHURDA,PIN-752060
Session: 2023-2024

Course Name: DIPLOMA
Theory/Practical: Theory
Section : A
Semester : 3

Branch Name: MECHANICAL
Subject Name: TH 3 : Engineering. Material
Teacher Name: DEBANANDA BEHERA

Credit " External Evaluation(Marked) " Internal Evaluation(Marked) "

Text Books:

Sl.No	Text Books
1	O P Khanna/ A Textbook of Material Science and Metallurgy/ Dhantpat Rai

Reference books:

Sl.No	Reference books
1	R K Rajput/ Engineering materials and Metallurgy /S.Chand

Course Outcomes:

Sl.No	Course Outcomes
1	Realizing material requirements
2	Realizing application area of ferrous, non ferrous and alloys
3	Comprehending micro-structural changes during iron-carbon phase transformation process
4	Comprehending effect of heat treatment and its effect towards change in material properties
5	Comprehending continuity during evolution in engineering materials and development of modern engineering materials.

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
1	1	Module - I	Engineering materials and their properties	Cos 1	
2	2	Module - I	Material classification into ferrous and non ferrous category and alloys	Cos 1	
3	3	Module - I	Material classification into ferrous and non ferrous category and alloys	Cos 1	
4	4	Module - I	Properties of Materials: Physical , Chemical and Mechanical Performance requirements	Cos 1	
5	5	Module - I	Material reliability and safety	Cos 1	

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
6	6	Module - I	Crystal imperfections	Cos 1	
7	7	Module - I	Crystal defines, classification of crystals, ideal crystal and crystal imperfections	Cos 1	
8	8	Module - I	Classification of imperfection: Point defects, line defects, surface defects and volume defects	Cos 1	
9	9	Module - I	Types and causes of point defects: Vacancies, Interstitials and impurities	Cos 1	
10	10	Module - I	Types and causes of line defects: Edge dislocation and screw dislocation	Cos 1	
11	11	Module - I	Effect of imperfection on material properties Deformation by slip and twinning	Cos 1	
12	12	Module - I	Effect of deformation on material properties	Cos 1	
13	13	Module - II	Ferrous Materials and alloys	Cos 2	
14	14	Module - II	Characteristics and application of ferrous materials	Cos 2	
15	15	Module - II	Classification, composition and application of low carbon steel, medium carbon steel and High carbon steel	Cos 2	
16	16	Module - II	Alloy steel: Low alloy steel, high alloy steel, tool steel and stainless steel	Cos 2	
17	17	Module - II	Tool steel: Effect of various alloying elements such as Cr, Mn, Ni, V, Mo	Cos 2	
18	18	Module - II	Non-ferrous alloys	Cos 2	
19	19	Module - II	Aluminum alloys: Composition, property and usage of	Cos 2	

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
			Duralmin, y- alloy.		
20	20	Module - II	Copper alloys: Composition, property and usage of Copper-Aluminum, Copper-Tin, Babbit , Phosperous bronze, brass, Copper- Nicke	Cos 2	
21	21	Module - II	Predominating elements of lead alloys, Zinc alloys and Nickel alloys	Cos 2	
22	22	Module - II	Low alloy materials like P-91, P-22 for power plants and other	Cos 2	
23	23	Module - III	Iron – Carbon system	Cos 3	
24	24	Module - III	Iron – Carbon system	Cos 3	
25	25	Module - III	Iron – Carbon system	Cos 3	
26	26	Module - III	Concept of phase diagram and cooling curves	Cos 3	
27	27	Module - III	Concept of phase diagram and cooling curves	Cos 3	
28	28	Module - III	Concept of phase diagram and cooling curves	Cos 3	
29	29	Module - III	Features of Iron-Carbon diagram with salient micro-constituents of Iron and Steel	Cos 3	
30	30	Module - III	Features of Iron-Carbon diagram with salient micro-constituents of Iron and Steel	Cos 3	
31	31	Module - III	Features of Iron-Carbon diagram with salient micro-constituents of Iron and Steel	Cos 3	
32	23	Module - IV	Heat Treatment	Cos 4	
33	33	Module - IV	Purpose of Heat treatment	Cos 4	
34	34	Module - IV	Process of heat	Cos 4	

Sl. No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
			treatment: Annealing, normalizing,		
35	35	Module - IV	hardening, tampering	Cos 4	
36	36	Module - IV	stress relieving measures	Cos 4	
37	37	Module - IV	Surface hardening: Carburizing and Nitriding	Cos 4	
38	38	Module - IV	Effect of heat treatment on properties of steel	Cos 4	
39	39	Module - IV	Effect of heat treatment on properties of steel	Cos 4	
40	40	Module - IV	Hardenability of steel	Cos 4	
41	41	Module - IV	Hardenability of steel	Cos 4	
42	42	Module - V	Bearing Material Classification, composition,	Cos 5	
43	43	Module - V	properties and uses of Copper base, Tin Base, Lead base	Cos 5	
44	44	Module - V	Cadmium base bearing materials	Cos 5	
45	45	Module - V	Spring materials Classification	Cos 5	
46	46	Module - V	Spring materials composition	Cos 5	
47	47	Module - V	Spring materials composition	Cos 5	
48	48	Module - V	properties and uses of Iron-base and Copper base spring material	Cos 5	
49	49	Module - V	Polymers Properties of thermosetting and thermoplastic polymers	Cos 5	
50	50	Module - V	Polymers application of thermosetting and thermoplastic polymers	Cos 5	
51	51	Module - V	Properties of elastomers	Cos 5	
52	52	Module - V	Properties of elastomers	Cos 5	
53	53	Module - V	Composites	Cos 5	
54	54	Module - V	Ceramics	Cos 5	

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
			Classification, composition		
55	55	Module - V	properties and uses of particulate based	Cos 5	
56	56	Module - V	properties and uses of particulate based	Cos 5	
57	57	Module - V	fiber reinforced composites	Cos 5	
58	58	Module - V	Ceramics Classification and uses of ceramics	Cos 5	
59	59	Module - V	Ceramics Classification and uses of ceramics	Cos 5	
60	60	Module - I,II,III,IV,V	TUTORIAL	Cos 1	

Subject Teacher

HOD

Principal

CAPITAL SCHOOL OF ENGINEERING

PLOT NO. 1288, MAHATAPALLA, BAJAPUR, KHURDA,PIN-752060
Session: 2023-2024

Course Name: DIPLOMA
Theory/Practical: Theory
Section : A
Semester : 3

Branch Name: MECHANICAL
Subject Name: TH 5 :Environmental studies
Teacher Name: SUPRIYA PRADHAN

Credit " External Evaluation(Marked) '80' Internal Evaluation(Marked) '20'

Text Books:

Sl.No	Text Books
1	"Textbook of Environmental studies ,Erach Bharucha"
2	"Fundamental concepts in Environmental Studies, D.D. Mishra"
3	"Text book of Environmental Studies, K.Raghavan Nambiar"
4	"Text book of Environmental Studies, H D Sharma"

Reference books:

Sl.No	Reference books
1	"Textbook of Environmental studies, Dr. D.K Asthana, S.CHAND publication"

Course Outcomes:

Sl.No	Course Outcomes
1	Students are able to adequate knowlodge on our Environments
2	Develop awareness towards preservation of environment
3	Gather adequate knowledge of different pollutants
4	Pollution sources and shall be aware of solid waste management systems
5	Able to aware about Hazardous waste and their effects

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
1	01	I	The Multidisciplinary nature of environmental studies	Cos 1	
2	02	I	Definition, scope and importance	Cos 1	
3	03	I	Scope and importance	Cos 1	
4	04	I	Need for public awareness	Cos 1	
5	05	II	Renewable and non renewable resources	Cos 1	
6	06	II	Natural resources and associated problems	Cos 1	
7	07	II	Forest resources	Cos 1	
8	08	II	Water resources	Cos 1	

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
9	09	II	Mineral Resources	Cos 2	
10	10	II	Food Resources:	Cos 2	
11	11	II	Energy Resources	Cos 2	
12	12	II	Land Resources	Cos 2	
13	13	II	Role of individual in conservation of natural resources.	Cos 2	
14	14	II	Equitable use of resources for sustainable life styles	Cos 2	
15	15	III	Concept of an eco system,Structure and function of an eco system.	Cos 2	
16	16	III	Producers, consumers, decomposers	Cos 2	
17	17	III	Energy flow in the eco systems	Cos 2	
18	18	III	Ecological succession.	Cos 2	
19	19	III	Food chains, food webs and ecological pyramids.	Cos 2	
20	20	III	Introduction, types, characteristic features, structure and function of the following eco system:	Cos 2	
21	21	III	Forest ecosystem	Cos 3	
22	22	III	Aquatic eco systems (ponds, streams, lakes, rivers, oceans,estuaries).	Cos 3	
23	23	IV	Biodiversity and it's Conservation: Introduction	Cos 3	
24	24	IV	Definition: genetics, species and ecosystem diversity	Cos 3	
25	25	IV	Biogeographically classification of India.	Cos 3	
26	26	IV	Value of biodiversity: consumptive use, productive use	Cos 3	
27	27	IV	Social ethical, aesthetic and optin	Cos 3	

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
			values.		
28	28	IV	Biodiversity at global, national and local level.	Cos 3	
29	29	IV	Threats to biodiversity: Habitats loss	Cos 3	
30	30	IV	Poaching of wild life, man wildlife conflicts.	Cos 3	
31	31	V	Environmental Pollution:Introduction	Cos 3	
32	32	V	Definition Causes, effects and control measures of: Air pollut ionEnvironmental Pollution:Introduction	Cos 3	
33	33	V	Water pollution	Cos 3	
34	34	V	Soil pollution	Cos 3	
35	35	V	Marine pollution	Cos 4	
36	36	V	Noise pollution.	Cos 4	
37	37	V	Thermal pollution	Cos 4	
38	38	V	Nuclear hazards.	Cos 4	
39	39	V	Solid waste Management: Causes, effects and control measures of urban and industrial wastes.	Cos 4	
40	40	V	Role of an individual in prevention of pollution.	Cos 4	
41	41	V	Disaster management: Floods, earth quake, cyclone and landslides.	Cos 4	
42	42	V	Disaster management: Floods, earth quake, cyclone and landslides.	Cos 4	
43	43	VI	Social issues and the Environment: Introduction	Cos 4	
44	44	VI	Form unsustainable to sustainable development.	Cos 4	
45	45	VI	Urban problems related to energy	Cos 4	

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
46	46	VI	Water conservation, rain water harvesting, water shed management.	Cos 4	
47	47	VI	Resettlement and rehabilitation of people; its problems and concern.	Cos 4	
48	48	VI	Environmental ethics: issue and possible solutions.	Cos 4	
49	49	VI	Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies.	Cos 4	
50	50	VI	Air (prevention and control of pollution) Act.	Cos 5	
51	51	VI	Water (prevention and control of pollution) Act.	Cos 5	
52	52	VI	Public Awareness	Cos 5	
53	53	VII	Human population and the environment: Introduction	Cos 5	
54	54	VII	Population growth and variation among nations.	Cos 5	
55	55	VII	Population explosion-family welfare program.	Cos 5	
56	56	VII	Environment and human health.	Cos 5	
57	57	VII	Human rights.	Cos 5	
58	58	VII	Value education	Cos 5	
59	59	VII	Role of information technology in environment and human health.	Cos 5	
60	60	VII	Role of information technology in environment and human health.	Cos 5	

Subject Teacher

HOD

Principal

CAPITAL SCHOOL OF ENGINEERING

PLOT NO. 1288, MAHATAPALLA, BAJAPUR, KHURDA,PIN-752060

Session: 2023-2024

Course Name: DIPLOMA
Theory/Practical: Theory
Section : A
Semester : 3

Branch Name: MECHANICAL
Subject Name: TH 1 : Production Technology
Teacher Name: RUDRANARAYAN BEHERA

Credit " External Evaluation(Marked) '80' Internal Evaluation(Marked) '20'

Text Books:

Sl.No	Text Books
1	Production Technology, Vol- I& II,O.P. Khanna,Dhanpat Rai Publication
2	Manufacturing technology, Vol- I&II,P.N. Rao,TMH

Reference books:

Sl.No	Reference books
1	Manufacturing technology, Vol- I,P.C.Sharma,S. Chand

Course Outcomes:

Sl.No	Course Outcomes
1	Understand the different components and processes involved in press tool operation.
2	Understand how to minimize the job setting and tool setting times in mass production.
3	Understand the industrial requirements of fabrication systems.
4	Understand the manufacturing processes like casting and powder metallurgy

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
1	1	1	Metal Forming Processes,Extrusion: Definition & Classification	Cos 1	
2	2	1	Explain direct, indirect and impact extrusion process.	Cos 1	
3	3	1	Define rolling. Classify it. different processes	Cos 1	
4	4	1	Differentiate between cold rolling and hot rolling process.Explaination with example	Cos 1	
5	5	1	List the different types of rolling mills used in Rolling process.	Cos 1	
6	6	1	List the different types of rolling mills used in	Cos 1	

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
			Rolling process.		
7	7	1	quiestion and answars	Cos 1	
8	8	2	Welding-Define welding and classify various welding processes.	Cos 3	
9	9	2	Explain fluxes used in welding.	Cos 3	
10	10	2	Explain Oxy-acetylene welding process.	Cos 3	
11	11	2	Explain various types of flames used in Oxy-acetylene welding process.	Cos 3	
12	12	2	Explain Arc welding process.	Cos 3	
13	13	2	Specify arc welding electrodes.	Cos 3	
14	14	2	Define resistance welding and classify it.	Cos 3	
15	15	2	Describe various resistance welding processes such as butt welding,	Cos 3	
16	16	2	spot welding, flash welding	Cos 3	
17	17	2	projection welding and seam welding.	Cos 3	
18	18	2	Explain TIG welding process	Cos 3	
19	19	2	Detail process of TIG welding with sketch	Cos 3	
20	20	2	Detail Process of MIG	Cos 3	
21	21	2	Difference between TIG and MIG	Cos 3	
22	22	2	Explain various casting defects with their causes and remedies.	Cos 3	
23	23	2	Explain various casting defects with their causes and remedies.	Cos 3	
24	24	3	Casting-Define Casting and Classify the various Casting processes.	Cos 4	

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
25	25	3	Explain the procedure of Sand mould casting.	Cos 4	
26	26	3	Explain different types of molding sands with their composition and properties.	Cos 4	
27	27	3	Classify different pattern and state various pattern allowances.Classify core.	Cos 4	
28	28	3	Classify core.Fuction of core	Cos 4	
29	29	3	Describe construction and working of cupola and crucible furnace furnace.	Cos 4	
30	30	3	Explain die casting method.	Cos 4	
31	31	3	Explain centrifugal casting such as true centrifugal casting,	Cos 4	
32	32	3	centrifuging with advantages	Cos 4	
33	33	3	limitation and area of application.	Cos 4	
34	34	3	Explain various casting defects with their causes and remedies.	Cos 4	
35	35	3	Explain various casting defects with their causes and remedies.	Cos 4	
36	36	3	various casting defects with their causes and remedies.	Cos 4	
37	37	3	various casting defects with their causes and remedies.	Cos 4	
38	38	3	Explain various casting defects with their causes and remedies.	Cos 4	
39	39	3	Question and answar	Cos 4	
40	40	4	Powder	Cos 4	

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
			Metallurgy.Define powder metallurgy process.		
41	41	4	State advantages of powder metallurgy technology technique	Cos 4	
42	42	4	Describe the methods of producing components by powder metallurgy technique.	Cos 4	
43	43	4	Describe the methods of producing components by powder metallurgy technique.	Cos 4	
44	44	4	Explain sintering.	Cos 4	
45	45	4	Economics of powder metallurgy.	Cos 4	
46	46	4	quistion and answars	Cos 4	
47	47	5	Press Work-Describe Press Works: blanking, piercing and trimming.	Cos 1	
48	48	5	Describe Press Works: blanking, piercing and trimming.	Cos 1	
49	49	5	List various types of die and punch	Cos 1	
50	50	5	Explain simple, Compound & Progressive dies	Cos 1	
51	51	5	Explain simple, Compound & Progressive dies	Cos 1	
52	52	5	Describe the various advantages & disadvantages of above dies	Cos 1	
53	53	5	question and answars	Cos 1	
54	54	6	Jigs and fixtureDefine jigs and fixturess .	Cos 2	
55	55	6	State advantages of using jigs and fixtures	Cos 2	
56	56	6	State the principle of locations	Cos 2	
57	57	6	State the principle of	Cos 2	

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
			locations		
58	58	6	Describe the methods of location with respect to 3-2-1 point.location of rectangular jig	Cos 2	
59	59	6	Describe the methods of location with respect to 3-2-1 point location of rectangular jig	Cos 2	
60	60	6	List various types of jig and fixtures.	Cos 2	

Subject Teacher **HOD** **Principal**

CAPITAL SCHOOL OF ENGINEERING

PLOT NO. 1288, MAHATAPALLA, BAJAPUR, KHURDA,PIN-752060

Session: 2023-2024

Course Name: DIPLOMA
Theory/Practical: Theory
Section : A
Semester : 3

Branch Name: MECHANICAL
Subject Name: TH 2 : Strength of Material
Teacher Name: RAKESH KU SAHU

Credit " External Evaluation(Marked) '80' Internal Evaluation(Marked) '20'

Text Books:

Sl.No	Text Books
1	Strength of Materials, Dhanpat Rai, S Ramamrutham
2	Strength of Materials, S.Chand, R K Rajput
3	Strength of Materials, S.Chand, R.S khurmi

Reference books:

Sl.No	Reference books
1	Strength of Materials, Mc millon and co. lmtd, G H Ryder
2	Strength of Materials, TMH, S Timoshenko and D H Young

Course Outcomes:

Sl.No	Course Outcomes
1	Determination of stress, strain under uniaxial loading (due to static or impact load and temperature) in simple and single core
2	Determination of stress, strain and change in geometrical parameters of cylindrical and spherical shells due to pressure
3	Realization of shear stress besides normal stress and computation of resultant stress in two dimensional objects.
4	Drawing bending moment and shear force diagram and locating points in a beam where the effect is maximum or minimum
5	Determination of bending stress and torsional shear stress in simple cases
6	Understanding of critical load in slender columns thus realizing combined effect of axial and bending load.

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
1	1	1	Simple stress& strain	Cos 1	
2	2	1	Types of load, stresses & strains,(Axial and tangential) Hooke's law	Cos 1	
3	3	1	Young's modulus, bulk modulus, modulus of rigidity, Poisson's ratio	Cos 1	

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
4	4	1	derive the relation between three elastic constants,	Cos 1	
5	5	1	Principle of super position, stresses in composite section	Cos 1	
6	6	1	Temperature stress, determine the temperature stress in composite bar	Cos 1	
7	7	1	Temperature stress, determine the temperature stress in composite bar	Cos 1	
8	8	1	Strain energy and resilience, Stress due to gradually applied, suddenly applied and impact load	Cos 1	
9	9	1	Strain energy and resilience, Stress due to gradually applied, suddenly applied and impact load	Cos 1	
10	10	1	Simple problems on above	Cos 1	
11	11	2	Thin cylinder and spherical shell under internal pressure	Cos 2	
12	12	2	Definition of hoop and longitudinal stress, strain	Cos 2	
13	13	2	Derivation of hoop stress, longitudinal stress, hoop strain, longitudinal strain and volumetric strain	Cos 2	
14	14	2	Derivation of hoop stress, longitudinal stress, hoop strain, longitudinal strain and volumetric strain	Cos 2	
15	15	2	Computation of the change in length, diameter and volume	Cos 2	
16	16	2	Computation of the change in length, diameter and volume	Cos 2	

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
17	17	2	Simple problems on above	Cos 2	
18	18	2	Simple problems on above	Cos 2	
19	19	3	Two dimensional stress systems	Cos 3	
20	20	3	Determination of normal stress, shear stress and resultant stress on oblique plane	Cos 3	
21	21	3	Determination of normal stress, shear stress and resultant stress on oblique plane	Cos 3	
22	22	3	Determination of normal stress, shear stress and resultant stress on oblique plane	Cos 3	
23	23	3	Location of principal plane and computation of principal stress	Cos 3	
24	24	3	Location of principal plane and computation of principal stress	Cos 3	
25	25	3	Location of principal plane and computation of principal stress	Cos 3	
26	26	3	Location of principal plane and computation of principal stress and Maximum shear stress using Mohr's circle	Cos 3	
27	27	3	Location of principal plane and computation of principal stress and Maximum shear stress using Mohr's circle	Cos 3	
28	28	3	Location of principal	Cos 3	

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
			plane and computation of principal stress and Maximum shear stress using Mohr's circle		
29	29	4	Bending moment& shear force	Cos 4	
30	30	4	Types of beam and load	Cos 4	
31	31	4	Concepts of Shear force and bending moment	Cos 4	
32	32	4	Concepts of Shear force and bending moment	Cos 4	
33	33	4	Shear Force and Bending moment diagram and its salient features illustration in cantilever beam, simply supported beam and over	Cos 4	
34	34	4	Shear Force and Bending moment diagram and its salient features illustration in cantilever beam, simply supported beam and over	Cos 4	
35	35	4	Shear Force and Bending moment diagram and its salient features illustration in cantilever beam, simply supported beam and over	Cos 4	
36	36	4	Shear Force and Bending moment diagram and its salient features illustration in cantilever beam, simply supported beam and over	Cos 4	

Sl. No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
37	37	4	Shear Force and Bending moment diagram and its salient features illustration in cantilever beam, simply supported beam and over	Cos 4	
38	38	4	Shear Force and Bending moment diagram and its salient features illustration in cantilever beam, simply supported beam and over	Cos 4	
39	39	5	Theory of simple bending	Cos 6	
40	40	5	Assumptions in the theory of bending	Cos 6	
41	41	5	Bending equation, Moment of resistance, Section modulus& neutral axis.	Cos 6	
42	42	5	Bending equation, Moment of resistance, Section modulus& neutral axis.	Cos 6	
43	43	5	Bending equation, Moment of resistance, Section modulus& neutral axis.	Cos 6	
44	44	5	Bending equation, Moment of resistance, Section modulus& neutral axis.	Cos 6	
45	45	5	Solve simple problems	Cos 6	
46	46	5	Solve simple problems	Cos 6	
47	47	5	Solve simple problems	Cos 6	
48	48	5	Solve simple problems	Cos 6	
49	49	6	Combined direct & bending stresses	Cos 6	
50	50	6	Define column	Cos 6	

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
51	51	6	Axial load, Eccentric load on column	Cos 6	
52	52	6	Direct stresses, Bending stresses, Maximum& Minimum stresses. Numerical problems on above	Cos 6	
53	53	6	Direct stresses, Bending stresses, Maximum& Minimum stresses. Numerical problems on above	Cos 6	
54	54	6	Buckling load computation using Euler's formula (no derivation) in Columns with various end conditions	Cos 6	
55	55	7	Torsion: Assumption of pure torsion	Cos 5	
56	56	7	The torsion equation for solid and hollow circular shaf	Cos 5	
57	57	7	The torsion equation for solid and hollow circular shaf	Cos 5	
58	58	7	Comparison between solid and hollow shaft subjected to pure torsion	Cos 5	
59	59	7	Comparison between solid and hollow shaft subjected to pure torsion	Cos 5	
60	60	7	Comparison between solid and hollow shaft subjected to pure torsion	Cos 5	

Subject Teacher **HOD** **Principal**

CAPITAL SCHOOL OF ENGINEERING

PLOT NO. 1288, MAHATAPALLA, BAJAPUR, KHURDA,PIN-752060
Session: 2023-2024

Course Name: DIPLOMA
Theory/Practical: Theory
Section : A
Semester : 3

Branch Name: MECHANICAL
Subject Name: TH 4 : Thermal Engineering-I
Teacher Name: RAJALAXMI DAS

Credit " External Evaluation(Marked) '80' Internal Evaluation(Marked) '20'

Text Books:

Sl.No	Text Books
1	Thermal Engineering by R.S. Khurmi
2	Engineering Thermodynamics by P.K.Nag

Reference books:

Sl.No	Reference books
1	Thermal Engineering by Mahesh M Rathore

Course Outcomes:

Sl.No	Course Outcomes
1	Comprehending significance of thermodynamics properties in order to analyze a Thermodynamic system.
2	Comprehending & applying first & second law of thermodynamics in closed & open system
3	Comprehending & applying gas laws applicable to perfect gas in order to determine Thermodynamic properties.
4	Comprehending the concept of I.C engine and gas power cycle & computing work done & efficiency thereof.

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
1	1	1	Thermodyna Thermodynamic Systems (closed, open, isolated)mic concept & Terminology,	Cos 1	
2	2	1	Thermodynamic properties of a system (pressure, volume, temperature, entropy,	Cos 1	
3	3	1	Thermodynamic properties of a system (pressure Internal energy and units of measurement).	Cos 1	

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
4	4	1	Intensive and extensive properties	Cos 1	
5	5	1	Define thermodynamic processes, path, cycle , state, path function, point function.	Cos 1	
6	6	1	Thermodynamic Equilibrium	Cos 1	
7	7	1	Quasi-static Process.	Cos 1	
8	8	1	Conceptual explanation of energy and its sources	Cos 1	
9	9	1	Work , heat and comparison between the two.	Cos 1	
10	10	1	Mechanical Equivalent of Heat	Cos 1	
11	11	1	Work transfer, Displacement work	Cos 1	
12	12	1	Numericals	Cos --Select--	
13	13	2	Laws of Thermodynamics, State & explain Zeroth law of thermodynamics.	Cos 2	
14	14	2	State & explain First law of thermodynamics.	Cos 2	
15	15	2	Limitations of First law of thermodynamics	Cos 2	
16	16	2	Application of First law of Thermodynamics (steady flow energy equation	Cos 2	
17	17	2	Application of First law of Thermodynamics turbine and compressor)	Cos 2	
18	18	2	Second law of thermodynamics (Claucius & Kelvin Plank statements)	Cos 2	

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
19	19	2	Second law of thermodynamics (Claucius & Kelvin Plank statements)	Cos 2	
20	20	2	Application of second law in heat engine, h	Cos 2	
21	21	2	Application of second law in heat pump	Cos 2	
22	22	2	Application of second law in refrigerator	Cos 2	
23	23	2	Application of second law determination of efficiencies & C.O.P	Cos 2	
24	24	2	Application of second law in heat engine, heat pump, refrigerator & determin(solve simple numerical)	Cos --Select--	
25	25	3	Properties Processes of perfect gas	Cos 3	
26	26	3	1 Laws of perfect gas: Boyle's law, Charle's law, Avogadro's law, Dalton's law of partial pressure,	Cos 3	
27	27	3	Guy lussac law, General gas equation, characteristic gas constant, Universal gas constant.	Cos 3	
28	28	3	Explain specific heat of gas (Cp and Cv)	Cos 3	
29	29	3	Relation between Cp & Cv.	Cos 3	
30	30	3	Enthalpy of a gas	Cos 3	
31	31	3	Application of first law of thermodynamics to various non flow process (Isothermal	Cos 3	
32	32	3	Application of first law of thermodynamics to various non flow process (Isobaric, Isentropic process)	Cos 3	
33	33	3	Application of first law of thermodynamics to	Cos 3	

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
			various non flow process (polytrophic process)		
34	34	3	Solve simple problems on above	Cos 3	
35	35	3	Free expansion & throttling process	Cos 3	
36	36	4	. Internal combustion ,Explain & classify I.C engine.engine	Cos 4	
37	37	4	Terminology of I.C Engine such as bore, dead centers, stroke volume, piston speed &RPM	Cos 4	
38	38	4	Explain the working principle of 2-stroke C.I engine	Cos 4	
39	39	4	Explain the working principle of 2-stroke & 4- stroke engine S.I engine.	Cos 4	
40	40	4	Differentiate between 2-stroke & 4- stroke engine C.I. engine.	Cos 4	
41	41	4	Differentiate between 2-stroke & 4- stroke engine S.I engine.	Cos 4	
42	42	5	Gas Power Cycle,Carnot cycle	Cos 4	
43	43	5	Otto cycle.	Cos 4	
44	44	5	Otto cycle.	Cos 4	
45	45	5	Diesel cycle	Cos 4	
46	46	5	Diesel cycle.	Cos 4	
47	47	5	Dual cycle	Cos 4	
48	48	5	Dual cycle	Cos 4	
49	49	5	Solve simple numerical	Cos --Select--	
50	50	5	Solve simple numerical	Cos --Select--	
51	51	6	Fuels and Combustion	Cos 4	
52	52	6	Define Fuel.	Cos 4	
53	53	6	Types of fuel.	Cos 4	
54	54	6	Application of different types of fuel.	Cos 4	
55	55	6	Application of different	Cos 4	

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
			types of fuel.		
56	56	6	Heating values of fuel.	Cos 4	
57	57	6	Heating values of fuel.	Cos 4	
58	58	6	Numericals	Cos --Select--	
59	59	6	Quality of I.C engine fuels Octane number, Cetane number.	Cos 4	
60	60	6	Quality of I.C engine fuels Octane number, Cetane number.	Cos 4	

Subject Teacher **HOD** **Principal**

CAPITAL SCHOOL OF ENGINEERING

PLOT NO. 1288, MAHATAPALLA, BAJAPUR, KHURDA,PIN-752060
Session: 2023-2024

Course Name: DIPLOMA
Theory/Practical: Theory
Section : B
Semester : 3

Branch Name: MECHANICAL
Subject Name: TH 3 : Engineering. Material
Teacher Name: DEBANANDA BEHERA

Credit " External Evaluation(Marked) " Internal Evaluation(Marked) "

Text Books:

Sl.No	Text Books
1	O P Khanna/ A Textbook of Material Science and Metallurgy/ Dhantpat Rai

Reference books:

Sl.No	Reference books
1	R K Rajput/ Engineering materials and Metallurgy /S.Chand

Course Outcomes:

Sl.No	Course Outcomes
1	Realizing material requirements
2	Realizing application area of ferrous, non ferrous and alloys
3	Comprehending micro-structural changes during iron-carbon phase transformation process
4	Comprehending effect of heat treatment and its effect towards change in material properties
5	Comprehending continuity during evolution in engineering materials and development of modern engineering materials.

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
1	1	Module - I	Engineering materials and their properties	Cos 1	
2	2	Module - I	Material classification into ferrous and non ferrous category and alloys	Cos 1	
3	3	Module - I	Material classification into ferrous and non ferrous category and alloys	Cos 1	
4	4	Module - I	Properties of Materials: Physical , Chemical and Mechanical Performance requirements	Cos 1	
5	5	Module - I	Material reliability and safety	Cos 1	

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
6	6	Module - I	Crystal imperfections	Cos 1	
7	7	Module - I	Crystal defines, classification of crystals, ideal crystal and crystal imperfections	Cos 1	
8	8	Module - I	Classification of imperfection: Point defects, line defects, surface defects and volume defects	Cos 1	
9	9	Module - I	Types and causes of point defects: Vacancies, Interstitials and impurities	Cos 1	
10	10	Module - I	Types and causes of line defects: Edge dislocation and screw dislocation	Cos 1	
11	11	Module - I	Effect of imperfection on material properties Deformation by slip and twinning	Cos 1	
12	12	Module - I	Effect of deformation on material properties	Cos 1	
13	13	Module - II	Ferrous Materials and alloys	Cos 2	
14	14	Module - II	Characteristics and application of ferrous materials	Cos 2	
15	15	Module - II	Classification, composition and application of low carbon steel, medium carbon steel and High carbon steel	Cos 2	
16	16	Module - II	Alloy steel: Low alloy steel, high alloy steel, tool steel and stainless steel	Cos 2	
17	17	Module - II	Tool steel: Effect of various alloying elements such as Cr, Mn, Ni, V, Mo	Cos 2	
18	18	Module - II	Non-ferrous alloys	Cos 2	
19	19	Module - II	Aluminum alloys: Composition, property and usage of	Cos 2	

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
			Duralmin, y- alloy.		
20	20	Module - II	Copper alloys: Composition, property and usage of Copper-Aluminum, Copper-Tin, Babbit , Phosperous bronze, brass, Copper- Nicke	Cos 2	
21	21	Module - II	Predominating elements of lead alloys, Zinc alloys and Nickel alloys	Cos 2	
22	22	Module - II	Low alloy materials like P-91, P-22 for power plants and other	Cos 2	
23	23	Module - III	Iron – Carbon system	Cos 3	
24	24	Module - III	Iron – Carbon system	Cos 3	
25	25	Module - III	Iron – Carbon system	Cos 3	
26	26	Module - III	Concept of phase diagram and cooling curves	Cos 3	
27	27	Module - III	Concept of phase diagram and cooling curves	Cos 3	
28	28	Module - III	Concept of phase diagram and cooling curves	Cos 3	
29	29	Module - III	Features of Iron-Carbon diagram with salient micro-constituents of Iron and Steel	Cos 3	
30	30	Module - III	Features of Iron-Carbon diagram with salient micro-constituents of Iron and Steel	Cos 3	
31	31	Module - III	Features of Iron-Carbon diagram with salient micro-constituents of Iron and Steel	Cos 3	
32	23	Module - IV	Heat Treatment	Cos 4	
33	33	Module - IV	Purpose of Heat treatment	Cos 4	
34	34	Module - IV	Process of heat	Cos 4	

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
			treatment: Annealing, normalizing,		
35	35	Module - IV	hardening, tampering	Cos 4	
36	36	Module - IV	stress relieving measures	Cos 4	
37	37	Module - IV	Surface hardening: Carburizing and Nitriding	Cos 4	
38	38	Module - IV	Effect of heat treatment on properties of steel	Cos 4	
39	39	Module - IV	Effect of heat treatment on properties of steel	Cos 4	
40	40	Module - IV	Hardenability of steel	Cos 4	
41	41	Module - IV	Hardenability of steel	Cos 4	
42	42	Module - V	Bearing Material Classification, composition,	Cos 5	
43	43	Module - V	properties and uses of Copper base, Tin Base, Lead base	Cos 5	
44	44	Module - V	Cadmium base bearing materials	Cos 5	
45	45	Module - V	Spring materials Classification	Cos 5	
46	46	Module - V	Spring materials composition	Cos 5	
47	47	Module - V	Spring materials composition	Cos 5	
48	48	Module - V	properties and uses of Iron-base and Copper base spring material	Cos 5	
49	49	Module - V	Polymers Properties of thermosetting and thermoplastic polymers	Cos 5	
50	50	Module - V	Polymers application of thermosetting and thermoplastic polymers	Cos 5	
51	51	Module - V	Properties of elastomers	Cos 5	
52	52	Module - V	Properties of elastomers	Cos 5	
53	53	Module - V	Composites	Cos 5	
54	54	Module - V	Ceramics	Cos 5	

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
			Classification, composition		
55	55	Module - V	properties and uses of particulate based	Cos 5	
56	56	Module - V	properties and uses of particulate based	Cos 5	
57	57	Module - V	fiber reinforced composites	Cos 5	
58	58	Module - V	Ceramics Classification and uses of ceramics	Cos 5	
59	59	Module - V	Ceramics Classification and uses of ceramics	Cos 5	
60	60	Module - I,II,III,IV,V	TUTORIAL	Cos 1	

Subject Teacher **HOD** **Principal**

CAPITAL SCHOOL OF ENGINEERING

PLOT NO. 1288, MAHATAPALLA, BAJAPUR, KHURDA,PIN-752060
Session: 2023-2024

Course Name: DIPLOMA
Theory/Practical: Theory
Section : B
Semester : 3

Branch Name: MECHANICAL
Subject Name: TH 5 :Environmental studies
Teacher Name: NAYAN MEHER

Credit " External Evaluation(Marked) '80' Internal Evaluation(Marked) '20'

Text Books:

Sl.No	Text Books
1	"Textbook of Environmental studies ,Erach Bharucha"
2	"Fundamental concepts in Environmental Studies, D.D. Mishra"
3	"Text book of Environmental Studies, K.Raghavan Nambiar"
4	"Text book of Environmental Studies, H D Sharma"

Reference books:

Sl.No	Reference books
1	"Textbook of Environmental studies, Dr. D.K Asthana, S.CHAND publication"

Course Outcomes:

Sl.No	Course Outcomes
1	Students are able to adequate knowlodge on our Environments
2	Develop awareness towards preservation of environment
3	Gather adequate knowledge of different pollutants
4	Pollution sources and shall be aware of solid waste management systems
5	Able to aware about Hazardous waste and their effects

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
1	01	I	The Multidisciplinary nature of environmental studies	Cos 1	
2	02	I	Definition, scope and importance	Cos 1	
3	03	I	Scope and importance	Cos 1	
4	04	I	Need for public awareness	Cos 1	
5	05	II	Renewable and non renewable resources	Cos 1	
6	06	II	Natural resources and associated problems	Cos 1	
7	07	II	Forest resources	Cos 1	
8	08	II	Water resources	Cos 1	

Sl. No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
9	09	II	Mineral Resources	Cos 2	
10	10	II	Food Resources:	Cos 2	
11	11	II	Energy Resources	Cos 2	
12	12	II	Land Resources	Cos 2	
13	13	II	Role of individual in conservation of natural resources.	Cos 2	
14	14	II	Equitable use of resources for sustainable life styles	Cos 2	
15	15	III	Concept of an eco system,Structure and function of an eco system.	Cos 2	
16	16	III	Producers, consumers, decomposers	Cos 2	
17	17	III	Energy flow in the eco systems	Cos 2	
18	18	III	Ecological succession.	Cos 2	
19	19	III	Food chains, food webs and ecological pyramids.	Cos 2	
20	20	III	Introduction, types, characteristic features, structure and function of the following eco system:	Cos 2	
21	21	III	Forest ecosystem	Cos 3	
22	22	III	Aquatic eco systems (ponds, streams, lakes, rivers, oceans,estuaries).	Cos 3	
23	23	IV	Biodiversity and it's Conservation: Introduction	Cos 3	
24	24	IV	Definition: genetics, species and ecosystem diversity	Cos 3	
25	25	IV	Biogeographically classification of India.	Cos 3	
26	26	IV	Value of biodiversity: consumptive use, productive use	Cos 3	
27	27	IV	Social ethical, aesthetic and optin	Cos 3	

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
			values.		
28	28	IV	Biodiversity at global, national and local level.	Cos 3	
29	29	IV	Threats to biodiversity: Habitats loss	Cos 3	
30	30	IV	Poaching of wild life, man wildlife conflicts.	Cos 3	
31	31	V	Environmental Pollution:Introduction	Cos 3	
32	32	V	Definition Causes, effects and control measures of: Air pollut ionEnvironmental Pollution:Introduction	Cos 3	
33	33	V	Water pollution	Cos 3	
34	34	V	Soil pollution	Cos 3	
35	35	V	Marine pollution	Cos 4	
36	36	V	Noise pollution.	Cos 4	
37	37	V	Thermal pollution	Cos 4	
38	38	V	Nuclear hazards.	Cos 4	
39	39	V	Solid waste Management: Causes, effects and control measures of urban and industrial wastes.	Cos 4	
40	40	V	Role of an individual in prevention of pollution.	Cos 4	
41	41	V	Disaster management: Floods, earth quake, cyclone and landslides.	Cos 4	
42	42	V	Disaster management: Floods, earth quake, cyclone and landslides.	Cos 4	
43	43	VI	Social issues and the Environment: Introduction	Cos 4	
44	44	VI	Form unsustainable to sustainable development.	Cos 4	
45	45	VI	Urban problems related to energy	Cos 4	

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
46	46	VI	Water conservation, rain water harvesting, water shed management.	Cos 4	
47	47	VI	Resettlement and rehabilitation of people; its problems and concern.	Cos 4	
48	48	VI	Environmental ethics: issue and possible solutions.	Cos 4	
49	49	VI	Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies.	Cos 4	
50	50	VI	Air (prevention and control of pollution) Act.	Cos 5	
51	51	VI	Water (prevention and control of pollution) Act.	Cos 5	
52	52	VI	Public Awareness	Cos 5	
53	53	VII	Human population and the environment: Introduction	Cos 5	
54	54	VII	Population growth and variation among nations.	Cos 5	
55	55	VII	Population explosion-family welfare program.	Cos 5	
56	56	VII	Environment and human health.	Cos 5	
57	57	VII	Human rights.	Cos 5	
58	58	VII	Value education	Cos 5	
59	59	VII	Role of information technology in environment and human health.	Cos 5	
60	60	VII	Role of information technology in environment and human health.	Cos 5	

Subject Teacher

HOD

Principal

CAPITAL SCHOOL OF ENGINEERING

PLOT NO. 1288, MAHATAPALLA, BAJAPUR, KHURDA,PIN-752060

Session: 2023-2024

Course Name: DIPLOMA
Theory/Practical: Theory
Section : B
Semester : 3

Branch Name: MECHANICAL
Subject Name: TH 1 : Production Technology
Teacher Name: RUDRANARAYAN BEHERA

Credit " External Evaluation(Marked) '80' Internal Evaluation(Marked) '20'

Text Books:

Sl.No	Text Books
1	Production Technology, Vol- I& II,O.P. Khanna,Dhanpat Rai Publication
2	Manufacturing technology, Vol- I&II,P.N. Rao,TMH

Reference books:

Sl.No	Reference books
1	Manufacturing technology, Vol- I,P.C.Sharma,S. Chand

Course Outcomes:

Sl.No	Course Outcomes
1	Understand the different components and processes involved in press tool operation.
2	Understand how to minimize the job setting and tool setting times in mass production.
3	Understand the industrial requirements of fabrication systems.
4	Understand the manufacturing processes like casting and powder metallurgy

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
1	1	1	Metal Forming Processes,Extrusion: Definition & Classification	Cos 1	
2	2	1	Explain direct, indirect and impact extrusion process.	Cos 1	
3	3	1	Define rolling. Classify it. different processes	Cos 1	
4	4	1	Differentiate between cold rolling and hot rolling process.Explaination with example	Cos 1	
5	5	1	List the different types of rolling mills used in Rolling process.	Cos 1	
6	6	1	List the different types of rolling mills used in	Cos 1	

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
			Rolling process.		
7	7	1	quiestion and answars	Cos 1	
8	8	2	Welding-Define welding and classify various welding processes.	Cos 3	
9	9	2	Explain fluxes used in welding.	Cos 3	
10	10	2	Explain Oxy-acetylene welding process.	Cos 3	
11	11	2	Explain various types of flames used in Oxy-acetylene welding process.	Cos 3	
12	12	2	Explain Arc welding process.	Cos 3	
13	13	2	Specify arc welding electrodes.	Cos 3	
14	14	2	Define resistance welding and classify it.	Cos 3	
15	15	2	Describe various resistance welding processes such as butt welding,	Cos 3	
16	16	2	spot welding, flash welding	Cos 3	
17	17	2	projection welding and seam welding.	Cos 3	
18	18	2	Explain TIG welding process	Cos 3	
19	19	2	Detail process of TIG welding with sketch	Cos 3	
20	20	2	Detail Process of MIG	Cos 3	
21	21	2	Difference between TIG and MIG	Cos 3	
22	22	2	Explain various casting defects with their causes and remedies.	Cos 3	
23	23	2	Explain various casting defects with their causes and remedies.	Cos 3	
24	24	3	Casting-Define Casting and Classify the various Casting processes.	Cos 4	

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
25	25	3	Explain the procedure of Sand mould casting.	Cos 4	
26	26	3	Explain different types of molding sands with their composition and properties.	Cos 4	
27	27	3	Classify different pattern and state various pattern allowances.Classify core.	Cos 4	
28	28	3	Classify core.Fuction of core	Cos 4	
29	29	3	Describe construction and working of cupola and crucible furnace furnace.	Cos 4	
30	30	3	Explain die casting method.	Cos 4	
31	31	3	Explain centrifugal casting such as true centrifugal casting,	Cos 4	
32	32	3	centrifuging with advantages	Cos 4	
33	33	3	limitation and area of application.	Cos 4	
34	34	3	Explain various casting defects with their causes and remedies.	Cos 4	
35	35	3	Explain various casting defects with their causes and remedies.	Cos 4	
36	36	3	various casting defects with their causes and remedies.	Cos 4	
37	37	3	various casting defects with their causes and remedies.	Cos 4	
38	38	3	Explain various casting defects with their causes and remedies.	Cos 4	
39	39	3	Question and answar	Cos 4	
40	40	4	Powder	Cos 4	

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
			Metallurgy.Define powder metallurgy process.		
41	41	4	State advantages of powder metallurgy technology technique	Cos 4	
42	42	4	Describe the methods of producing components by powder metallurgy technique.	Cos 4	
43	43	4	Describe the methods of producing components by powder metallurgy technique.	Cos 4	
44	44	4	Explain sintering.	Cos 4	
45	45	4	Economics of powder metallurgy.	Cos 4	
46	46	4	quistion and answars	Cos 4	
47	47	5	Press Work-Describe Press Works: blanking, piercing and trimming.	Cos 1	
48	48	5	Describe Press Works: blanking, piercing and trimming.	Cos 1	
49	49	5	List various types of die and punch	Cos 1	
50	50	5	Explain simple, Compound & Progressive dies	Cos 1	
51	51	5	Explain simple, Compound & Progressive dies	Cos 1	
52	52	5	Describe the various advantages & disadvantages of above dies	Cos 1	
53	53	5	question and answars	Cos 1	
54	54	6	Jigs and fixtureDefine jigs and fixturess .	Cos 2	
55	55	6	State advantages of using jigs and fixtures	Cos 2	
56	56	6	State the principle of locations	Cos 2	
57	57	6	State the principle of	Cos 2	

Sl. No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
			locations		
58	58	6	Describe the methods of location with respect to 3-2-1 point.location of rectangular jig	Cos 2	
59	59	6	Describe the methods of location with respect to 3-2-1 point location of rectangular jig	Cos 2	
60	60	6	List various types of jig and fixtures.	Cos 2	

Subject Teacher HOD Principal

CAPITAL SCHOOL OF ENGINEERING

PLOT NO. 1288, MAHATAPALLA, BAJAPUR, KHURDA,PIN-752060
Session: 2023-2024

Course Name: DIPLOMA
Theory/Practical: Theory
Section : B
Semester : 3

Branch Name: MECHANICAL
Subject Name: TH 2 : Strength of Material
Teacher Name: RAKESH KU SAHU

Credit " External Evaluation(Marked) '80' Internal Evaluation(Marked) '20'

Text Books:

Sl.No	Text Books
1	Strength of Materials, Dhanpat Rai, S Ramamrutham
2	Strength of Materials, S.Chand, R K Rajput
3	Strength of Materials, S.Chand, R.S khurmi

Reference books:

Sl.No	Reference books
1	Strength of Materials, Mc millon and co. lmtd, G H Ryder
2	Strength of Materials, TMH, S Timoshenko and D H Young

Course Outcomes:

Sl.No	Course Outcomes
1	Determination of stress, strain under uniaxial loading (due to static or impact load and temperature) in simple and single core
2	Determination of stress, strain and change in geometrical parameters of cylindrical and spherical shells due to pressure
3	Realization of shear stress besides normal stress and computation of resultant stress in two dimensional objects.
4	Drawing bending moment and shear force diagram and locating points in a beam where the effect is maximum or minimum
5	Determination of bending stress and torsional shear stress in simple cases
6	Understanding of critical load in slender columns thus realizing combined effect of axial and bending load.

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
1	1	1	Simple stress& strain	Cos 1	
2	2	1	Types of load, stresses & strains,(Axial and tangential) Hooke's law	Cos 1	
3	3	1	Young's modulus, bulk modulus, modulus of rigidity, Poisson's ratio	Cos 1	

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
4	4	1	derive the relation between three elastic constants,	Cos 1	
5	5	1	Principle of super position, stresses in composite section	Cos 1	
6	6	1	Temperature stress, determine the temperature stress in composite bar	Cos 1	
7	7	1	Temperature stress, determine the temperature stress in composite bar	Cos 1	
8	8	1	Strain energy and resilience, Stress due to gradually applied, suddenly applied and impact load	Cos 1	
9	9	1	Strain energy and resilience, Stress due to gradually applied, suddenly applied and impact load	Cos 1	
10	10	1	Simple problems on above	Cos 1	
11	11	2	Thin cylinder and spherical shell under internal pressure	Cos 2	
12	12	2	Definition of hoop and longitudinal stress, strain	Cos 2	
13	13	2	Derivation of hoop stress, longitudinal stress, hoop strain, longitudinal strain and volumetric strain	Cos 2	
14	14	2	Derivation of hoop stress, longitudinal stress, hoop strain, longitudinal strain and volumetric strain	Cos 2	
15	15	2	Computation of the change in length, diameter and volume	Cos 2	
16	16	2	Computation of the change in length, diameter and volume	Cos 2	

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
17	17	2	Simple problems on above	Cos 2	
18	18	2	Simple problems on above	Cos 2	
19	19	3	Two dimensional stress systems	Cos 3	
20	20	3	Determination of normal stress, shear stress and resultant stress on oblique plane	Cos 3	
21	21	3	Determination of normal stress, shear stress and resultant stress on oblique plane	Cos 3	
22	22	3	Determination of normal stress, shear stress and resultant stress on oblique plane	Cos 3	
23	23	3	Location of principal plane and computation of principal stress	Cos 3	
24	24	3	Location of principal plane and computation of principal stress	Cos 3	
25	25	3	Location of principal plane and computation of principal stress	Cos 3	
26	26	3	Location of principal plane and computation of principal stress and Maximum shear stress using Mohr's circle	Cos 3	
27	27	3	Location of principal plane and computation of principal stress and Maximum shear stress using Mohr's circle	Cos 3	
28	28	3	Location of principal	Cos 3	

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
			plane and computation of principal stress and Maximum shear stress using Mohr's circle		
29	29	4	Bending moment& shear force	Cos 4	
30	30	4	Types of beam and load	Cos 4	
31	31	4	Concepts of Shear force and bending moment	Cos 4	
32	32	4	Concepts of Shear force and bending moment	Cos 4	
33	33	4	Shear Force and Bending moment diagram and its salient features illustration in cantilever beam, simply supported beam and over	Cos 4	
34	34	4	Shear Force and Bending moment diagram and its salient features illustration in cantilever beam, simply supported beam and over	Cos 4	
35	35	4	Shear Force and Bending moment diagram and its salient features illustration in cantilever beam, simply supported beam and over	Cos 4	
36	36	4	Shear Force and Bending moment diagram and its salient features illustration in cantilever beam, simply supported beam and over	Cos 4	

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
37	37	4	Shear Force and Bending moment diagram and its salient features illustration in cantilever beam, simply supported beam and over	Cos 4	
38	38	4	Shear Force and Bending moment diagram and its salient features illustration in cantilever beam, simply supported beam and over	Cos 4	
39	39	5	Theory of simple bending	Cos 6	
40	40	5	Assumptions in the theory of bending	Cos 6	
41	41	5	Bending equation, Moment of resistance, Section modulus& neutral axis.	Cos 6	
42	42	5	Bending equation, Moment of resistance, Section modulus& neutral axis.	Cos 6	
43	43	5	Bending equation, Moment of resistance, Section modulus& neutral axis.	Cos 6	
44	44	5	Bending equation, Moment of resistance, Section modulus& neutral axis.	Cos 6	
45	45	5	Solve simple problems	Cos 6	
46	46	5	Solve simple problems	Cos 6	
47	47	5	Solve simple problems	Cos 6	
48	48	5	Solve simple problems	Cos 6	
49	49	6	Combined direct & bending stresses	Cos 6	
50	50	6	Define column	Cos 6	

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
51	51	6	Axial load, Eccentric load on column	Cos 6	
52	52	6	Direct stresses, Bending stresses, Maximum& Minimum stresses. Numerical problems on above	Cos 6	
53	53	6	Direct stresses, Bending stresses, Maximum& Minimum stresses. Numerical problems on above	Cos 6	
54	54	6	Buckling load computation using Euler's formula (no derivation) in Columns with various end conditions	Cos 6	
55	55	7	Torsion: Assumption of pure torsion	Cos 5	
56	56	7	The torsion equation for solid and hollow circular shaf	Cos 5	
57	57	7	The torsion equation for solid and hollow circular shaf	Cos 5	
58	58	7	Comparison between solid and hollow shaft subjected to pure torsion	Cos 5	
59	59	7	Comparison between solid and hollow shaft subjected to pure torsion	Cos 5	
60	60	7	Comparison between solid and hollow shaft subjected to pure torsion	Cos 5	

Subject Teacher **HOD** **Principal**

CAPITAL SCHOOL OF ENGINEERING

PLOT NO. 1288, MAHATAPALLA, BAJAPUR, KHURDA,PIN-752060
Session: 2023-2024

Course Name: DIPLOMA
Theory/Practical: Theory
Section : B
Semester : 3

Branch Name: MECHANICAL
Subject Name: TH 4 : Thermal Engineering-I
Teacher Name: RAJALAXMI DAS

Credit " External Evaluation(Marked) '80' Internal Evaluation(Marked) '20'

Text Books:

Sl.No	Text Books
1	Thermal Engineering by R.S. Khurmi
2	Engineering Thermodynamics by P.K.Nag

Reference books:

Sl.No	Reference books
1	Thermal Engineering by Mahesh M Rathore

Course Outcomes:

Sl.No	Course Outcomes
1	Comprehending significance of thermodynamics properties in order to analyze a Thermodynamic system.
2	Comprehending & applying first & second law of thermodynamics in closed & open system
3	Comprehending & applying gas laws applicable to perfect gas in order to determine Thermodynamic properties.
4	Comprehending the concept of I.C engine and gas power cycle & computing work done & efficiency thereof.

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
1	1	1	Thermodyna Thermodynamic Systems (closed, open, isolated)mic concept & Terminology,	Cos 1	
2	2	1	Thermodynamic properties of a system (pressure, volume, temperature, entropy,	Cos 1	
3	3	1	Thermodynamic properties of a system (pressure Internal energy and units of measurement).	Cos 1	

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
4	4	1	Intensive and extensive properties	Cos 1	
5	5	1	Define thermodynamic processes, path, cycle , state, path function, point function.	Cos 1	
6	6	1	Thermodynamic Equilibrium	Cos 1	
7	7	1	Quasi-static Process.	Cos 1	
8	8	1	Conceptual explanation of energy and its sources	Cos 1	
9	9	1	Work , heat and comparison between the two.	Cos 1	
10	10	1	Mechanical Equivalent of Heat	Cos 1	
11	11	1	Work transfer, Displacement work	Cos 1	
12	12	1	Numericals	Cos --Select--	
13	13	2	Laws of Thermodynamics, State & explain Zeroth law of thermodynamics.	Cos 2	
14	14	2	State & explain First law of thermodynamics.	Cos 2	
15	15	2	Limitations of First law of thermodynamics	Cos 2	
16	16	2	Application of First law of Thermodynamics (steady flow energy equation	Cos 2	
17	17	2	Application of First law of Thermodynamics turbine and compressor)	Cos 2	
18	18	2	Second law of thermodynamics (Claucius & Kelvin Plank statements)	Cos 2	

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
19	19	2	Second law of thermodynamics (Claucius & Kelvin Plank statements)	Cos 2	
20	20	2	Application of second law in heat engine, h	Cos 2	
21	21	2	Application of second law in heat pump	Cos 2	
22	22	2	Application of second law in refrigerator	Cos 2	
23	23	2	Application of second law determination of efficiencies & C.O.P	Cos 2	
24	24	2	Application of second law in heat engine, heat pump, refrigerator & determin(solve simple numerical)	Cos --Select--	
25	25	3	Properties Processes of perfect gas	Cos 3	
26	26	3	1 Laws of perfect gas: Boyle's law, Charle's law, Avogadro's law, Dalton's law of partial pressure,	Cos 3	
27	27	3	Guy lussac law, General gas equation, characteristic gas constant, Universal gas constant.	Cos 3	
28	28	3	Explain specific heat of gas (Cp and Cv)	Cos 3	
29	29	3	Relation between Cp & Cv.	Cos 3	
30	30	3	Enthalpy of a gas	Cos 3	
31	31	3	Application of first law of thermodynamics to various non flow process (Isothermal	Cos 3	
32	32	3	Application of first law of thermodynamics to various non flow process (Isobaric, Isentropic process)	Cos 3	
33	33	3	Application of first law of thermodynamics to	Cos 3	

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
			various non flow process (polytrophic process)		
34	34	3	Solve simple problems on above	Cos 3	
35	35	3	Free expansion & throttling process	Cos 3	
36	36	4	. Internal combustion ,Explain & classify I.C engine.engine	Cos 4	
37	37	4	Terminology of I.C Engine such as bore, dead centers, stroke volume, piston speed &RPM	Cos 4	
38	38	4	Explain the working principle of 2-stroke C.I engine	Cos 4	
39	39	4	Explain the working principle of 2-stroke & 4- stroke engine S.I engine.	Cos 4	
40	40	4	Differentiate between 2-stroke & 4- stroke engine C.I. engine.	Cos 4	
41	41	4	Differentiate between 2-stroke & 4- stroke engine S.I engine.	Cos 4	
42	42	5	Gas Power Cycle,Carnot cycle	Cos 4	
43	43	5	Otto cycle.	Cos 4	
44	44	5	Otto cycle.	Cos 4	
45	45	5	Diesel cycle	Cos 4	
46	46	5	Diesel cycle.	Cos 4	
47	47	5	Dual cycle	Cos 4	
48	48	5	Dual cycle	Cos 4	
49	49	5	Solve simple numerical	Cos --Select--	
50	50	5	Solve simple numerical	Cos --Select--	
51	51	6	Fuels and Combustion	Cos 4	
52	52	6	Define Fuel.	Cos 4	
53	53	6	Types of fuel.	Cos 4	
54	54	6	Application of different types of fuel.	Cos 4	
55	55	6	Application of different	Cos 4	

SL No.	Lecture No.	Module/Unit No.	Topic To Be Taught	Cos	Reference Material Links
			types of fuel.		
56	56	6	Heating values of fuel.	Cos 4	
57	57	6	Heating values of fuel.	Cos 4	
58	58	6	Numericals	Cos --Select--	
59	59	6	Quality of I.C engine fuels Octane number, Cetane number.	Cos 4	
60	60	6	Quality of I.C engine fuels Octane number, Cetane number.	Cos 4	

Subject Teacher

HOD

Principal