DIPLOMA WING

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA,BHOPAL

SCHEME OF STUDIES & EXAMINATIONS (IMPLEMENTED FROM SESSION : JULY 2023)

SCHEME	NAME OF BRANCH	BRANCH CODE	SEMESTER
OCBC JULY 2022/2023	PRODUCTION ENGINEERING	P05	THIRD (III)

S.N.	PAPER CODE	SUBJECT CODE	SUBJECT NAME	THEORY COMPONENT								PRACTICAL COMPONENT					TOTAL CREDITS	TOTAL MARKS
				HRS PER WEEK	CREDITS	TERM WORK				THEORY PAPER		HRS PER WEEK	CREDITS	LAB WORK	PRACTICAL EXAM/VIVA			
						QUIZ/ASSIGNMENT	MID TERM TEST*		TOTAL	MARKS	DURATION				MARKS	DURATION		
							I	II										
1	7401	301	BASIC MECHANICAL ENGINEERING	4	4	10	10	10	30	70	03 Hrs.	0	0	0	0	0	4	100
2	7402	302	FLUID MECHANICS AND HYDRAULIC MACHINERY	3	3	10	10	10	30	70	03 Hrs.	4	2	20	30	03 Hrs.	5	150
3	7541	303	INDUSTRIAL PRODUCTUON TECHNOLOGY - I	4	4	10	10	10	30	70	03 Hrs.	2	1	20	30	03 Hrs.	5	150
4	7542	304	HEAT POWER ENGINEERING	3	3	10	10	10	30	70	03 Hrs.	4	2	20	30	03 Hrs.	5	150
5			COMPUTER AIDED MACHINE DRAWING PRACTICE	0	0	0	0	0	0	0	0	4	2	20	30	03 Hrs.	2	50
6			PRODUCTION DRAWING LAB	0	0	0	0	0	0	0	0	4	2	20	30	03 Hrs.	2	50
7			**SUMMER INTERNSHIP- I	0	0	0	0	0	0	0	0	0	2	20	30	03 Hrs.	2	50
8			PROFESSIONAL DEVELOPMENT	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
9			***RECOVERY CLASSES/LIBERARY etc.	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
TOTAL				14	14				120	280		22	11	120	180		25	700

NOTE - (1)* Two Best, out of Three Mid Term Tests (Progressive Tests) Marks should be entered here.

(2)** 3-4 Weeks Summer Internship after II Semester.

(3)***To recover courses if session delays due to summer internship.

GRAND TOTAL OF CREDITS	GRAND TOTAL OF MARKS
25	700

DIPLOMA WING
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DIPLOMA IN PRODUCTION ENGINEERING (P05)

SEMESTER III

COURSE TITLE	:	BASIC MECHANICAL ENGINEERING
PAPER CODE	:	7401
SUBJECT CODE	:	301
TREORY CREDITS	:	04
PRACTICAL CREDITS	:	00

Course Objectives:

- To understand General Principles of Mechanical Engineering.
- To understand laws of thermodynamics, thermal and thermodynamic Processes.
- To understand working principles of power developing and power absorbing devices.
- To understand basic materials and manufacturing processes.

Course Content:

UNIT-I: Introduction to Thermodynamics - Role of Thermodynamics in Engineering and Science, Types of Systems, Thermodynamic Equilibrium, Properties, State, Process and Cycle, Elementary introduction to Zeroth, First and Second laws of thermodynamics, Heat and Work Interactions for various non-flow and flow processes; Concept of Heat Engine, Heat Pump & Refrigerator, Efficiency/ COP; Kelvin-Planck and Clausius Statements, Carnot Cycle, Carnot Efficiency, T-S and P-V Diagrams, Concept of Entropy (Definition only).

Unit-II: Heat transfer & Thermal Power Plant: Modes of Heat Transfer; Conduction: Composite Walls and Cylinders, Combined Conduction and Convection: Overall Heat Transfer Co-efficient, Simple Numerical Problems: Thermal Power Plant Layout; Rankine Cycle; Fire Tube and Water Tube boilers, Babcock & Wilcox, Cochran Boilers;

Unit-III: Steam Turbines: Impulse and Reaction Turbines; Condensers: Jet & Surface Condensers, Cooling Towers; **Internal Combustion Engines and Refrigeration:** Otto, Diesel and Dual cycles; P-V and T-S Diagrams; IC Engines: 2 - Stroke and 4 - Stroke I.C. Engines, S.I. and C.I. Engines.

Unit-IV: Materials and Manufacturing Processes: Engineering Materials, Classification and their Properties; Metal Casting, Moulding, Patterns, Metal Working: Hot Working and Cold Working, Metal Forming: Extrusion, Forging, Rolling, Drawing, Gas Welding, Arc Welding, Soldering, and Brazing.

Unit-V: Machine Tools and Machining Processes: Machine Tools: Lathe Machine and types, Lathe Operations, Milling Machine and types, Milling Operations, Shaper and Planer Machines: Differences, Quick-Return Motion Mechanism, Drilling Machine: Operations, Grinding Machine: Operations

Reference Books:

1. Basic Mechanical Engineering – M.P. Poonia & S.C. Sharma, Khanna Publishing House, Delhi
2. Elements of Mechanical Engineering – M. L. Mathur, F. S. Mehta and R. P. Tiwari, Jain Brothers, New Delhi
3. Engineering Heat Transfer – Gupta & Prakash, Nem Chand & Brothers, New Delhi

4. Workshop Technology (Vol. 1 and 2) – B. S. Raghuvanshi, Dhanpath Rai and Sons, New Delhi.
5. Basic Mechanical Engineering – J BenjaminElements of Mechanical Engineering – Roy and Choudhary
6. Engineering Thermodynamics – Spalding and Cole

Course outcomes:

At the end of the course, the student will be able to:

CO1	Understand basics of thermodynamics and components of a thermal power plant
CO2	Understand basics of heat transfer, refrigeration and internal combustion engines
CO3	Understand mechanism of thermal power plant and boiler operation
CO4	Identify engineering materials, their properties, manufacturing methods encountered in engineering practice
CO5	Understand functions and operations of machine tools including milling, shaping, grinding and lathe machines

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DIPLOMA IN PRODUCTION ENGINEERING (P05)

SEMESTER III

COURSE TITLE	:	FLUID MECHANICS AND HYDRAULIC MACHINERY
PAPER CODE	:	7402
SUBJECT CODE	:	302
TREORY CREDITS	:	03
PRACTICAL CREDITS	:	02

Course Objectives:

- To understand fluid flow & related machinery for power generation, water supply and irrigation.
- To Select and use appropriate flow measuring device.
- To Select and use appropriate pressure measuring device.
- To understand and analyze the performance of pumps and turbines.

Course Content:

UNIT-I: Properties of fluid: Density, Specific gravity, Specific Weight, Specific Volume, Dynamic Viscosity, Kinematic Viscosity, Surface tension, Capillarity, Vapour Pressure, Compressibility.

Fluid Pressure & Pressure Measurement: Fluid pressure, Pressure head, Pressure intensity, Concept of vacuum and gauge pressures, atmospheric pressure, absolute pressure, Simple and differential manometers, Bourdan pressure gauge, Concept of Total pressure on immersed bodies, center of pressure, Simple problems on Manometers.

Unit-II: Fluid Flow: Types of fluid flows, Path line and Stream line, Continuity equation, Bernoulli's theorem, Principle of operation of Venturimeter, Orifice meter and Pitot tube, Derivations for discharge, coefficient of discharge and numerical problems.

Flow Through Pipes: Laminar and turbulent flows; Darcy's equation and Chezy's equation for frictional losses, Minor losses in pipes, Hydraulic gradient and total gradient line, Numerical problems to estimate major and minor losses

Unit-III: Impact of jets: Impact of jet on fixed vertical, moving vertical flat plates, Impact of jet on curved vanes with special reference to turbines & pumps, Simple Numericals on work done and efficiency.

Unit-IV: Hydraulic Turbines: Layout of hydroelectric power plant, Features of Hydroelectric power plant, Classification of hydraulic turbines, Selection of turbine on the basis of head and discharge available, Construction and working principle of Pelton wheel, Francis and Kaplan turbines, Draft tubes – types and construction, Concept of cavitation in turbines, Calculation of Work done, Power, efficiency of turbines, Unit quantities and simple numericals.

Unit-V: Centrifugal Pumps: Principle of working and applications, Types of casings and impellers, Concept of multistage, Priming and its methods, Cavitation, Manometric head, Work done, Manometric efficiency, Overall efficiency. Numericals on calculations of overall efficiency and power required to drive pumps.

Reciprocating Pumps: Construction, working principle and applications of single and double acting reciprocating pumps, Concept of Slip, Negative slip, Cavitation and separation.

Reference Books:

1. Fluid Mechanics & Hydraulic Machines, S.S. Rattan, Khanna Publishing House, New Delhi
2. Hydraulic, fluid mechanics & fluid machines – Ramamrutham S, Dhanpath Rai and Sons, New Delhi.
3. Hydraulics and fluid mechanics including Hydraulic machines – Modi P.N. and Seth S.M., Standard Book House. New Delhi
4. One Thousand Solved Problems in Fluid Mechanics – K. Subramanya, Tata McGraw Hill.
5. Hydraulic, fluid mechanics & fluid machines – S. Ramamrutham, Dhanpat Rai and Sons, New Delhi
6. Fluid Mechanics and Hydraulic Machines – R. K. Bansal, Laxmi Publications, New Delhi

Course outcomes

At the end of the course, the student will be able to:

CO1	Measure various properties such as pressure, velocity, flow rate using various instruments.
CO2	Calculate different parameters such as co-efficient of friction, power, efficiency etc of various Systems.
CO3	Describe the construction and working of turbines and pumps.
CO4	Test the performance of turbines and pumps.
CO5	Plot characteristics curves of turbines and pumps.

FLUID MECHANICS AND HYDRAULIC MACHINERY LAB

Course Learning Objectives

- Appreciate the practical applications of orifice meter and venturi meter.
- Understand flow through pipes and the importance of pipe friction in practical environment.
- Understand the method of evaluating the performance characteristics of turbine, for a given set of input data.

Course Content:

1. Verify the Bernoulli's Theorem.
2. Determination of co-efficient of discharge of a mouth piece / orifice by variable head method.
3. Determination of co-efficient of discharge of a venturimeter / orifice meter.
4. Determination of the friction factor in a pipe.
5. Performance test on reciprocating pump / centrifugal pump and to draw the characteristics curves.
6. Performance test on impulse turbine / reaction turbine and to find out the Efficiency.

Reference Books:

1. Hydraulic and Pneumatic Controls by K. S. Sundaram.
2. Fluid Power with Applications by Anthony Esposito.

Course outcomes:

At the end of the course, the student will be able to:

CO1	Determine the Cd of orifice meter, venturi meter, orifice, mouth piece and pipe friction factor
CO2	Determine performance of pumps and turbines

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DIPLOMA WING
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DIPLOMA IN PRODUCTION ENGINEERING (P05)

SEMESTER III

COURSE TITLE	:	INDUSTRIAL PRODUCTION TECHNOLOGY-I
PAPER CODE	:	7541
SUBJECT CODE	:	303
TREORY CREDITS	:	04
PRACTICAL CREDITS	:	01

Course Learning Objectives:

- To understand the types of pattern, casting, moulding, furnaces and casting processes.
- To know the construction and working principles various welding processes.
- To understand various forming technologies and metal powder manufacturing methods.

Course Content:

UNIT-I: Foundry Technology

Patterns: Definition – types of pattern – solid piece – split piece – loose piece – match plate – sweep – skeleton – segmental – shell – pattern materials – pattern allowances.

Moulding: Moulding sand – constituents – types – properties of moulding sand – moulding sand preparation – moulding tools – moulding boxes – types of moulds – green sand mould – dry sand mould – loam sand mould – methods of moulding – Moulding machines – Jolting – Squeezing – sand slinger Construction and working principle. Cores: Essential qualities of core – materials – core sand preparation – core binders – core boxes – CO2 process core making – types of core. Metallurgy: Introduction – Iron-carbon diagram. Melting furnaces: Blast furnace – Cupola furnace – Crucible furnace – types – Pit furnace – Coke fired – Oil fired – Electric furnace – types – Direct arc – Indirect arc – Induction furnace –working principles.

UNIT-II: Casting: Shell mould casting – Investment casting – Pressure die casting – Hot chamber die casting – Cold chamber die casting – Gravity die casting – Centrifugal casting – Continuous casting – Defects in casting – causes and remedies.

UNIT-III: Welding Technology

Arc Welding: Definition – arc welding equipment – electrode types – filler and flux materials – arc welding methods – Metal arc – Metal Inert gas (MIG) – Tungsten inert gas (TIG) - Submerged arc - Electro slag welding – Resistance welding – Spot welding – Butt welding – Seam welding – Plasma arc welding – Thermit welding – Electron beam welding – Laser beam welding – Friction welding – Ultrasonic welding – Induction welding – working principle – applications – Advantages and disadvantages.

Gas welding: Oxy-acetylene welding – advantages – limitations – gas welding equipment –three types of flames – welding techniques – filler rods. – Flame cutting – soldering – brazing – difference between soldering and brazing. Types of welded joints –Selection of welding rod and type of flame for gas welding of ferrous metals- merits and demerits of welded joints – Inspection and testing of welded joints – destructive and non-destructive types of tests – magnetic particle test – radiographic and ultrasonic test - defects in welding – causes and remedies.

UNIT-IV: Forming Technology

Forging: Hot working, cold working – advantages of hot working and cold working – hot working operations – rolling, forging, smith forging, drop forging, upset forging, press forging – roll forging. Press Working: Types of presses – mechanical and hydraulic presses – press tools and accessories – press working operations – bending operations – angle bending – channel bending – curling – drawing – shearing operations – blanking, piercing, trimming – notching – lancing.

UNIT-V: Powder Metallurgy: Methods of manufacturing metal powders – atomization, reduction and electrolysis deposition – compacting – sintering – sizing – infiltration – mechanical properties of parts made by powder metallurgy – design rules for the power metallurgy process.

Reference Books:

1. Elements of Workshop Technology Volume I & II, Hajra Chowdry & Bhatt Acharaya, Media Promoters, 11th Edition, 2007
2. Introduction of Basic Manufacturing Processes and Workshop Technology, Rajendersingh, New age International (P) Ltd. New Delhi- 110002, 2006
3. Manufacturing Process Begeman, Tata McGraw Hill, New Delhi.
4. Workshop Technology- Volume I, II, & III, WAJ Chapman Viva Books Pvt. Ltd., New Delhi

Course outcomes:

At the end of the course, the student will be able to:

CO1	Demonstrate understanding of casting process
CO2	Illustrate principles of forming processes
CO3	Demonstrate applications of various types of welding processes.
CO4	Explains the concepts of rolling, forming and forging.
CO5	Illustrates the concept of powder metallurgy

INDUSTRIAL PRODUCTION TECHNOLOGY-I LAB

Course Learning Objectives:

- To impart knowledge about principles/methods of casting with detail design of gating/riser system needed for casting, defects in cast objects and requirements for achieving sound casting.
- To impart knowledge about welding behaviour of machine and process during welding, analysis of common and newer welding techniques and metallurgical and weldability aspects of different common engineering materials.

Course Content:

- **Prepare the green sand mould using the following patterns.**
  - **Solid pattern**

1. Stepped pulley
2. Bearing top

  - **Split pattern**

3. Bent Pipe with core print
4. T-pipes with core print
5. Tumbles

  - **Loose Piece Pattern**

6. Dovetail

- **Core preparation**

7. Core preparation for Bent pipe/T-pipe

- **Make the following welding joint/cutting.**
- **Arc welding (Raw Material: 25 mmx6mm MS flat)**

1. Lap joint
2. Butt joint
3. T-joint

- **Gas Welding (Raw Material: 25mmx3mm Ms flat)**

4. Lap joint
5. Butt joint

- **Gas cutting: (GI/MSSheet-3mm thickness)**

6. Profile cutting–circular profile

- **Spot welding: (GI/MS Sheet)**

7. Lap joint

Reference Books:

1. Elements of Workshop Technology Volume I & II, Hajra Chowdry & Bhatt Acharaya, Media Promoters, 11th Edition, 2007
2. Introduction of Basic Manufacturing Processes and Workshop Technology, Rajendersingh, New age International (P) Ltd. New Delhi- 110002, 2006
3. Manufacturing process Begeman Tata McGraw Hill, New Delhi 1981. 5th Edition, 1981
4. Workshop Technology- Volume I, II, & III, WAJ Chapman Viva Books Pvt. Ltd., New Delhi

Course outcomes:

At the end of the course, the student will be able to:

CO1	Identify the tools used in foundry.
CO2	Make sand mould by using the different types of pattern.
CO3	Make sand core for bend pipe and T pipe
CO4	Identify the tools used and safety precautions in welding.
CO5	Apply the knowledge to make different types of joints by arc and gas welding.

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DIPLOMA IN PRODUCTION ENGINEERING (P05)

SEMESTER III

COURSE TITLE	:	HEAT POWER ENGINEERING
PAPER CODE	:	7542
SUBJECT CODE	:	304
TREORY CREDITS	:	03
PRACTICAL CREDITS	:	02

Course Learning Objectives:

- Describe internal combustion engine.
- Select appropriate type of compressor to suit the requirements.
- Calculate performance parameters of Air compressor.
- Understand Refrigeration & Air-conditioning processes and their application.

Course Content:

UNIT-I: Basics of Thermodynamics and Thermodynamic Processes of Perfect Gases: Introduction – definitions and units of mass, weight, volume, density, specific weight, specific gravity and specific volume – pressure – units of pressure – temperature - absolute temperature – S.T.P and N.T.P conditions – heat - specific heat capacity at constant volume and at constant pressure – work – power – energy – types - law of conservation of energy – thermodynamic system – types – thermodynamic equilibrium - properties of systems – intensive and extensive properties –State of System- process – cycle – point and path functions - zeroth , first and second laws of thermodynamics – problems Perfect gases – laws of perfect gases – Boyle's, Charles' , Joule's, Regnault's and Avogadro's laws –General Gas Equation- characteristic gas equation – relation between specific heats and gas constant – universal gas constant - problems –Thermodynamic Processes-Change in Internal Energy- enthalpy – change in enthalpy – entropy – change in entropy – general equations for change in entropy. Constant volume, constant pressure, isothermal(hyperbolic) , isentropic (reversible adiabatic), polytropic, – p-V and T-s diagrams, work done , change in internal energy , heat transfer , change in enthalpy , change in entropy for various processes – problems - Free expansion and throttling processes.

UNIT-II: Thermodynamic Air Cycles and Steady Flow Energy Equation & Applications: Air cycles – air standard efficiency – reversible and irreversible processes – assumptions in deriving air standard efficiency – Carnot cycle – Otto cycle – Joule cycle – Diesel cycle – comparison of Otto cycle and Diesel cycle - Comparison of ideal and actual p-V diagrams of Otto and Diesel cycles – problems - dual combustion cycle (description only). Steady flow system – control volume – steady flow energy equation – assumptions –Engineering applications – steam boiler – condenser – nozzles – steam and gas turbines – reciprocating and rotary compressors –Centrifugal pump – non flow energy equation – problems.

UNIT-III: Air Compressors: Uses of compressed air – classifications of Air compressor – reciprocating compressor - single stage reciprocating compressor – compression processes – power required to drive the compressor (Neglecting clearance Volume)– problems – clearance volume and its effects – volumetric efficiency – power required to drive the compressor with clearance volume – problems – multi stage compression –merits and demerits –Two stage compressor with imperfect cooling-with perfect inter cooling - work input – condition for minimum work input in multi stage compressor with perfect inter cooling – ratio of cylinder diameters for minimum work input - problems – rotary compressors – Roots blower - vane blowers – centrifugal and axial flow air compressors. Gas turbines –uses - classifications – merits and demerits of gas turbines - constant pressure combustion gas turbine – gas turbine with – intercooler – reheater - regenerator -effects – closed cycle gas turbines - merits and demerits of open and closed cycle gas turbines – jet propulsion -turbojet engines – merits and demerits – turbo propeller engines – merits and demerits - ramjet– merits and demerits –Rocket engines – applications of rockets.

UNIT-IV: Fuels & Combustion of Fuels and Internal Combustion Engines: Classifications of fuels - merits and demerits – requirements of a good fuel – combustion equations – stoichiometric air required for complete combustion of fuels – excess air – products of combustion – problems – analysis of exhaust gases- Orsat apparatus - calorific value of fuels – higher and lower calorific values – Dulong's formula – problems – determination of calorific value – Bomb and Junker's calorimeter – problems -Internal combustion engines. Classifications of I.C Engines – components of I.C Engines and functions material and method of manufacturing - four stroke cycle petrol and diesel engines – two stroke cycle petrol and diesel engines - comparison of four stroke and two stroke engines – Comparison of petrol and diesel engines - valve timing diagram for four stroke petrol and diesel engines – port timing diagram for two stroke petrol and diesel engines.

UNIT-V: Refrigeration and Air- Conditioning: Introduction - COP of Heat Pump and refrigerator, Tonnes of Refrigeration. Vapour compression system - Vapour compression refrigeration cycle, components of Vapour Compression Cycle. Applications- Water Cooler Domestic refrigerator, Ice plant & cold storage. Psychrometry - Properties of air, psychrometric chart & processes (No Numerical) Air conditioning systems - Definition of Air conditioning and classification of Air Conditioning Systems.

Reference Books:

1. Thermal Engg, R. K. Rajput,8th Edition, Laxmi publications Pvt. Ltd, New Delhi.
2. Applied Thermodynamics, P. K. Nag, 2nd Edition, TATA McGraw – Hill Publishing Company, New Delhi.
3. Thermal Engineering, R.S. Khurmi and J.K. Gupta, 18th Edition, S. Chand & Co,NewDelhi
4. Thermal Engineering, B. K. Sarkar, 3rd Edition, Dhanpat Rai & Sons New Delhi
5. Applied Thermodynamics, Domkundwar and C. P Kothandaraman, 2nd Edition, Dhanpat Rai & Sons, New Delhi.

Course outcomes:

At the end of the course, the student will be able to:

CO1	Explain the basics of systems and laws of thermodynamics and thermodynamic processes. Explain different Air Cycles.
CO2	Apply steady flow energy equation for nozzles and condensers.
CO3	Familiarize the parts, functions and types of Air compressors and determine their efficiency. Describe the working of the gas turbines.
CO4	Explain different type of fuels and their combustion phenomenon.
CO5	Explain the types and functions of IC engines.

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HEAT POWER ENGINEERING LAB

Course Learning Objectives:

- To understand working of various IC Engines and familiarise with various parts of different engines physically
- To understand and relate the working of an engine as studied in theory.
- Understand troubleshooting to rectify some of the problems normally occurring in engines and automobiles.
- Understand and familiarise with the working of air compressor, refrigeration system and steam boilers.

Course Content:

List of Experiments:

PART-A

1. Determine flash and fire point of the given oil using open cup apparatus.
2. Determine flash and fire point of the given oil using closed cup apparatus.
3. Determine the absolute viscosity of the given lubricating oil using Redwood viscometer.
4. Determine the absolute viscosity of the given lubricating oil using Say bolt viscometer.
5. Port timing diagram of two stroke petrol Engine
6. Valve time diagram for four stroke petrol Engine.
7. Valve time diagram for four stroke diesel engines.

PART-B

8. Load test (Performance test) on Four Stroke Petrol Engine.
9. Load test (Performance test) on Four Stroke diesel Engine.
10. Morse test on Multi-cylinder petrol engine.
11. Heat balance test on Four Stroke Petrol engine.
12. Heat balance test on Four Stroke Diesel engine.
13. Volumetric efficiency of Air Compressor.
14. Thermal Conductivity measurement using guarded plate apparatus
15. Determination of COP of Refrigeration System

PART-C

16. Study of high-pressure boiler.
17. Study of boiler mountings and Accessories.

Reference Books:

1. Fundamental of thermodynamics, by Richard E Snnatag, Claus Borgnakke, Gordon J Vanwy-len, Wiley Student edition, 6th Ed.,
2. Basic and applied thermodynamics by P. K. Nag ,Tata McGraw hill New delhi 2009
3. Heat engines(Vol-I & Vol-II) by Patel and Karmachandani
4. I. C. Engine Fundamentals by Hey wood
5. Thermal Engineering by R. S. Khurmi

Course outcomes:

At the end of the course, the student will be able to:

CO1	Appreciate the practical applications of Bomb calorimeter /Boy's gas calorimeter
CO2	Appreciate the Mechanism of valve functioning in 2 and 4-stroke diesel engine
CO3	Understand the method of evaluating the performance characteristics of single cylinder diesel engine at different loads and draw the heat balance sheet
CO4	Understand the method of finding the indicated power of individual cylinders of an engine by using morse test
CO5	Study of high pressure boiler with model

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DIPLOMA IN PRODUCTION ENGINEERING (P05)

SEMESTER III

COURSE TITLE	:	COMPUTER AIDED MACHINE DRAWING PRACTICE
PAPER CODE	:	--
SUBJECT CODE	:	--
TREORY CREDITS	:	00
PRACTICAL CREDITS	:	02

Course Objectives:

- To use computer aided drafting,
- To prepare geometrical model of various machine elements
- To draw the different views of machine elements
- To interpret the drawing in engineering field and illustrate three dimensional objects

Course Content:

S.No.	Topics for practice
I	Introduction to CAD software.
II	Drawing aids and editing commands.
III	Basic dimensioning, hatching, blocks and views.
IV	Isometric drawing, printing and plotting
V	Machine Drawing practice using Auto CAD: Detailed drawings of following machine parts are to be given to the students to assemble and draw the sectional or plain elevations, plans and side views with dimensioning and bill of materials using cad software (12 exrcises). 1) Sleeve & Cotter Joint 2) Spigot & Cotter Joint 3) Knuckle Joint 4) Stuffing Box 5) Screw Jack 6) Foot Step Bearing 7) Universal Coupling 8) Plummer Block 9) Simple Eccentric 10) Machine Vice 11) Connecting Rod 12) Protected Type Flanged Coupling.

Reference Books:

1. Bhatt, N.D., Machine Drawing, Charotar Publishing House, 2003.
2. Sidheswar, N., Kannaiah, P. and Sastry, V.V.S., Machine Drawing, Tata McGraw Hill Book Company, New Delhi, 2000.
3. Kannaih, P., Production Drawing, New Age International , 2009

Course outcomes:

At the end of the course, the student will be able to:

CO1	Understand the representation of materials used in machine drawing
CO2	Draw the development of surfaces for sheet metal working applications.
CO3	Draw the machine elements including keys, couplings, cotters, riveted, bolted and welded joints.
CO4	Construct an assembly drawing using part drawings of machine components
CO5	Represent tolerances and the levels of surface finish of machine elements.

DIPLOMA WING
RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL
DIPLOMA IN PRODUCTION ENGINEERING (P05))

SEMESTER III

COURSE TITLE	:	PRODUCTION DRAWING LAB
PAPER CODE	:	--
SUBJECT CODE	:	--
TREORY CREDITS	:	00
PRACTICAL CREDITS	:	02

Course Learning Objectives

- Production Drawing provides a convenient means to create designs for almost every engineering discipline.
- Computer Aided Design software can be used for the component drawings and explaining clearly the tolerances, surface roughness's etc.

Course Content

1. Representation Materials & Machine Components
2. Limits and Fits
3. Form and Positional Tolerances
4. Surface Roughness and its Indication & Heat and Surface Treatment Symbols
5. Detailed and Part Drawings
   a. Stuffing Box
   b. Crosshead
   c. Eccentric
   d. Connecting rod
   e. Screw jack
   f. Pipe vice
   g. Plummer block
   h. Lathe tool post
   i. Oldham coupling
   j. Universal coupling
   k. Spring
   l. loaded relief valve
   m. Air cock valve

Reference Books:

2. Bhatt, N.D., Machine Drawing, Charotar Publishing House, 2003.
3. Sidheswar, N., Kannaiah, P. and Sastry, V.V.S., Machine Drawing, Tata McGraw Hill Book Company, New Delhi, 2000.
4. Kannaih, P., Production Drawing, New Age International , 2009
5. Machine Drawing with AutoCAD,/ Pohit and Ghosh, PE
6. Geometrical Dimensioning and Tolerancing, James D. Meadows, B.S. Publications

Course outcomes:

At the end of the course, the student will be able to:

CO1	Draw the conventional representation of different materials used in engineering practice like wood, glass, metal etc., and the limits and tolerances
CO2	Understand and indication of form and position tolerances on drawings, types of run-out, total run-out and their indication.
CO3	Improve visualization ability of surface roughness and its indications with respect to the material surface.
CO4	Apply the drawing techniques to draw various part drawings and assembly, tolerances, roughness etc.
CO5	Explains the internal features of different part drawings and assembly

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DIPLOMA WING

RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL

DIPLOMA IN PRODUCTION ENGINEERING (P05))

SEMESTER III

COURSE TITLE	:	SUMMER INTERNSHIP - I
PAPER CODE	:	--
SUBJECT CODE	:	--
TREORY CREDITS	:	00
PRACTICAL CREDITS	:	02

SUMMER INTERNSHIP –

3-4 weeks summer internship after IInd Semester.

It should be undertaken in an industry/Govt. or Pvt. Certified Agencies which are in social sector/Govt. Skill Centers/Schemes.

Evaluation is based on work done, quality of report, performance in viva-voce, presentation etc.

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DIPLOMA WING
RAJIV GANDHI PROUDYOGIKI VISHWAVIDYALAYA, BHOPAL
DIPLOMA IN PRODUCTION ENGINEERING (P05))

SEMESTER - III

COURSE TITLE	:	PROFESSIONAL DEVELOPMENT
PAPER CODE	:	--
COURSE CODE	:	--
TREORY CREDITS	:	00
PRACTICAL CREDITS	:	00

Course Objectives:

Following are the objectives of this course:-

(1) To learn the principles of Professional and Social ethics.
(2) To know the concept of Lifelong learning and Self-directed learning.
(3) To present self for employment.
(4) To introduce the need of industrial visits.
(5) To understand CV, Resume, Bio-data and Interview and their significance.
(6) To develop the skills of Group Discussion.

Course Content:

Unit – I Professional and Social Ethics

Professional ethics, its need and importance, general code of ethics for engineers, ethical issues for engineers.

Need and importance of social skills, social skills for better group performance, important social skills such as social perceptiveness, coordination, negotiation, persuasion etc.

Unit – II Lifelong learning and Self-directed Learning

Lifelong learning, its examples, self-directed learning, its examples, important steps in lifelong learning.

Need for planning self-directed learning, planning self-directed learning plan, examples.

Unit – III Career Planning

Importance of career planning, major career opportunities in concerned branch of engineering , study of the important career opportunities regarding qualification, knowledge, skills, experience required for them, role of personal factors like personal life style, interest areas, desires, personal preferences in career planning.

Identification and detailing of important career opportunities in relation to branch of diploma, identification and detailing of important self-personal factors and self-personal preferences, development of self-career plan.

Unit – IV Industrial Visits

Necessity of exposure to environment and practices, lectures by industry experts.

Importance of Students' industrial visits, learning through observing real life industrial systems, planning and organizing the industrial visits.

Unit – V CV, Resume, Bio-data and Interview

Need of presenting self for employment, salient features and formats of bio-data, CV, resume, comparison of the three for their merits, limitations and specific uses, study of cases and examples of bio-data, CV, resume and covering letter by all students for self of for the given cases.

Importance of employment related interviews, purpose of interview, dress code, body language and posture of interviewee, do's and don'ts for interviews, interview checklist, practice of facing employment related interviews for all students.

Unit – VI Group Discussion

Need and importance of group discussion in professional work, ideal group discussion and skills needed to effectively participate in group discussion, practice of group discussion skills.

Course Outcomes:

After completing this course, the student will be able to:-

(1) Demonstrate his/her understanding of Professional and Social ethics.
(2) Plan self-learning and self-directed learning for completing the task.
(3) Suggest an action plan for his career planning.
(4) Demonstrate his/her learning from visits to industry.
(5) Prepare CV, Resume and Bio-data along with a covering letter for a job.
(6) Effectively face an interview.
(7) Participate in Group discussion.

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