

Choice Based Credit System (CBCS)												
Diploma VIthSem ME												
S.No	Subject Code	Name of Subject	Periods			Evaluation Scheme						
			L	T	P	Assignment	TA	Total	ESE	Subject Total	Credit	Hours
1	7D.351	Principle of Management	3	0	0	20	10	30	70	100	3	3
2	7D.352	Design of machine element	3	0	0	20	10	30	70	100	3	3
3	7D.353	Production technology	3	0	0	20	10	30	70	100	3	3
4		Elective	3	0	0	20	10	30	70	100	3	3
5	40D.451	Human Values and Ethics*										
PRACTICAL/DESIGN/DRAWING/SESSIONAL												
1	7DP.352	Design of machine element Lab			2		30	30	20	50	1	2
2	7D.395	Project			10		75	75	75	150	5	10
										600	18	26

Note: - \* Non Credit Course.

**Program:** Diploma  
**Semester:** VI  
**Course:** Principle of Management  
**Course Code:** 7D.351

L	T	P	C
3	0	0	3

**Course Objective:**

- To study the rudiments of business and various types of business.
- To understand the intellectual property rights (IPR)
- To comprehend the management process, organization management, and different functions of management
- To perceive the principles of human resource management and financial management.

**Unit I:**

**Overview of Business:** Types of Business, Service, Manufacturing, Trade, Industrial sectors, Introduction to Engineering Industry, Process Industry, Textile Industry, Chemical Industry. Agro Industry, Globalization, Introduction, Advantages & disadvantages w.r.t India, Intellectual Property Rights (IPR), Concept, Types of IPR.

**Unit II:**

**Management Process:** What is Management? Evolution, Various Definitions, concept to Management, Levels of Management, Administration and Management, Functions of Management: Planning, Organizing, Coordinating, Directing, Controlling, Decision Making.

**Organizational Management:** Organization, Definition, Steps in forming organization, Types of Organization, Line, Line & Staff, Authority & Responsibility, Span of Control (Management),

**Unit III:**

**Human Resource Management:** Personnel Management: Introduction, Definition & Function. Staffing: Introduction to HR, Introduction to HR Planning, Recruitment procedure. Personnel – Training & Development: Types of training, Induction to Skill enhancement. Safety Management: Causes of Accidents, Safety Procedures.

**Unit IV:**

**Financial Management:** Financial Management, Objectives & Functions, Capital Generation & Management, Types of capitals, Sources of finance.

**Suggested Reading:**

1. *Essentials of Management, Harold Koontz & Weirich: (Tata McGraw Hill)*
2. *Principles & Practices of Management, L.M. Prasad, S.Chand*
3. *Management, Stephen Robbins, INS Pub.*
4. *Management, Stoner Freeman & Gilbert Jr - Prentice Hall of India, 6th Edition*
5. *Principles of management- Ramaswamy. T Himalaya Publishing House 8th edition*

**Program:** Diploma

**Semester:** VI

**Course:** Design of Machine Element

**Course Code:** 7D.352

L	T	P	C
3	0	0	3

**Course Objective:**

- To perceive the basics of machine design, mechanical properties of materials, and theories of elastic failures.
- To elaborate the design principles and designing of various types of joints, shafts, and couplings.
- To comprehend the design principles and designing of various types of springs and fasteners.
- To study the designing of different types of antifriction bearings.
- To understand the ergonomic and aesthetic concepts in design.

**Unit I:**

**Introduction to Design:** Introduction- State the factors governing the design of machine elements. State types of loads. Define working stress, allowable stress, failure stress, yield stress, ultimate stress & factor of safety. State mechanical properties of the material of the product. Describe design procedure. Preferred numbers, fits and tolerances. Concepts of stress, Strain, Types of Stresses such as Tension, Compression, Shear, Bearing pressure Intensity, Crushing, bending and torsion, Principle Stresses (Simple Numerical). Fatigue, Endurance & Limits. Stress Concentration—Causes & Remedies. Properties of Engineering materials, Theories of Elastic Failures— Principal normal stress theory, Maximum shear stress theory & maximum distortion energy theory.

**Unit II:**

**Design of simple machine parts:** Cotter Joint with sleeve, cotter joint with socket and spigot ends, cotter joint with a gib. Design of knuckle joint .Illustrative problems with solutions. Design of levers- State types of levers and their function. Design hand lever, foot lever & bell crank lever.

**Design of Shafts Keys and Couplings and Spur Gears:** Types of Shafts, Shaft materials, Standard Sizes, Design of Shafts (Hollow and Solid) using strength and rigidity criteria, Design of Sunk Keys, Effect of Key ways on strength of shaft. Design of Couplings – Muff Coupling, Protective type Flange Coupling, Bush-pin type flexible coupling. Design of spur Gears.

**Unit III:**

**Design of springs:** Classification and Applications of Springs ,spring terminology, materials and specifications. Stresses in springs, Wahl’s correction factor, Deflection of springs, Energy store in springs. Design of Helical tension and compression springs subjected to uniform applied loads like I.C. engine valves weighing balance, railway buffer and governor springs. Leaf springs—construction and application.

**Design of Fasteners:** Stresses in Screwed fasteners, bolts of Uniform Strength. Design of Bolted Joints subjected to eccentric loading .Design of parallel and transverse fillet welds, axially loaded symmetrical section, Merits and demerits of screwed and welded joints. Unit IV:

**Antifriction Bearings:** Classification of Bearings—Sliding contact & rolling contact. Terminology of Ball bearing.

**Ergonomics & Aesthetic consideration in design:** Ergonomics considerations in Design. Aesthetic considerations in Design.

**Suggested Reading:**

1. *Machine Design P.Kannaiah ,Scitech Pub.*
2. *Design of Machine Elements, V.B. Bhandari(TMh)*
3. *A Text book of Machine Design By R.S Khurmi and J.K Gupta (S. Chand Pub.)*
4. *A Text book of Machine Design By Sharma and Agarwal, S.K Kataria and sons.*
5. *Machine Design by R.B Gupta, SatyaPrakashan.*

**Program:** Diploma

**Semester:** VI

**Course:** Design of Machine Element Lab

**Course Code:** 7DP.352

L	T	P	C
0	0	2	1

### List of Experiment

- Design of sleeve cotter joint.
- Design of socket and spigot cotter joints.
- Design of Knuckle joint.
- Design of pivot, thrust and collar bearings.
- Design of spur gear showing its terminology.
- Design of screwed Fasteners.
- Design of bush-pin type flexible coupling

**Program:** Diploma  
**Semester:** VI  
**Course:** Production Technology  
**Course Code:** 7D.353

L	T	P	C
3	0	0	3

**Course Objective:**

- To enlighten the production system. Plant location, plant layout, group technology, and material handling systems.
- To study the concepts such as process planning, production planning and control, work study, and process charts.
- To elaborate the concepts such as work measurement, allowances and inventory control.
- To comprehend the tool engineering and various modern manufacturing concepts.

**Unit I:**

**Production System:** Production-Definition, Types of production systems, Productivity-Importance, Measurement of Productivity, Techniques of improving productivity. Elements of cost, Fixed cost, Variable cost, Break even analysis, Calculation of Break- even point.

**Plant Location, Plant Layout and Material Handling:** Plant Location- Importance of Factors affecting Site Selection, Government Policies , and Backward Areas. Plant Layout- Objectives types design principles, characteristics of Plant Layout, Symptoms of Bad Plant Layout. Group Technology Cellular layout. Material handling–Need, Principles and Types of material handling devices– conveyors, Hoist & cranes, fork lift truck trolleys, Pipes Automated Guided Vehicles (AGV's) Selection of Material Handling systems and Devices.

**Unit II:**

**Process Planning:** Planning of Processes from raw material to finished product, Factors affecting Process Planning, Deciding sequence of operations, Operation Sheet, Combined operations, Determination of Inspection Stages. Selection of Machine, Techniques of assembly planning, Types of assembly. Plant Capacity Machine Capacity, Plant Efficiency.

**Production Planning and Control:** Definition & concept to Routing, Sequencing [n-job two machines] Scheduling, Dispatching. Meaning of Control Progressive Control. Gantt-chart. Concept to Line balancing.

**Work Study:** Method Study-Definition, Objectives, Procedure ,and Selection of work. Recording Techniques:- Process Charts–Outline process chart, Flow process chart Two Hand process chart, Multiple activity chart, Flow diagram, String diagram, Travel chart. Micro-motion study, Critical examination, Principles of Motion Economy, Concept of ergonomics and workplace layout.

**Unit III:**

**Work Measurement-**Objectives, procedure Time Study, Time Study Equipments- Stop watch Time Study, Standard Time, Work Sampling, Analytical Estimating, Pre determined Motion Time Study, Allowances, Calculation of Standard Time, and Concept of Merit Rating.

**Inventory Control:** Methods of Inventory Management, Inventory Cost relationship, Deciding Economic Batch Quantity, EOQ Model, Calculation of EOQ, Concept of discounts. Introduction of Material Requirement Planning. Stores Function–Storage systems– One bin, two bin system, Material Issue Request (MIR), Bin card.

**Jigs and Fixtures:** Introduction, Difference between jig and fixture, Different components of Jig/fixture, Types of jigs and fixtures. Types of locators and clamping devices, 3-2-1 principle of location. General principles of jig/fixture, design.

**Modern Trends:** Just In Time manufacturing, Pull and push system, types of manufacturing systems. 5'S'- concepts, meaning of each term, 5'S' as Waste management technique, inventory reduction by 5'S'. Single Piece. Basic concepts of Kaizen, Brainstorming. Poka Yoke. Lean manufacturing, Business Process Re- engineering, DMAIC cycle, Flexible Manufacturing System. Rapid Prototyping–concept, need, method, advantages, limitations.

**Suggested Reading:**

1. S.N.Chary, "Production and Operations Management", Tata McGraw Hill.
2. R. Paneerselvam, "Production and Operations Management, Prentice Hall of India.
3. Aswathappa & Bhatt – Production & Operations Management, HPH.
4. Gaither & Frazier - Operations Management, Cengage Publication.
5. Russell & Taylor - Operations Management, PHI Publication.
6. Chase, Aquilanno, Jacob & Agarwal - Operations Management, TMH Publication.

**Program:** Diploma  
**Semester:** VI  
**Course:** Power Plant Engineering  
**Course Code:** 7D.354

L	T	P	C
3	0	0	3

### Course Objective:

- To perceive the knowledge of different types of power plants and their components
- Analyze different types of steam cycles and estimate efficiencies in a steam power plant and its components.
- To describe basic working principles of nuclear power plants and gas turbine power plants.
- To understand the waste heat recovery systems and non-conventional power generation systems.
- To elaborate the operational and economic aspects of power plants.

### Unit I:

**Introduction to Power Plant:** Powers scenario in India, Types of power plants–Hydro, Nuclear, Thermal Future trends in power sector. Analysis of steam cycles–Carnot, Rankine, Reheat cycle, Regenerative cycle, Methods of reheating, Advantages and disadvantages of reheat cycle, Gas turbine cycle.

**Steam Power Plant:** Layout of steam power plant, general features of selection of site, High pressure boilers– Construction and working of Sub-critical and Super-critical boilers. Coal and ash handling system– equipment’s for in plant handling of coal such as belt conveyor, screw conveyor, bucket elevator, Coal crushing, Pulverized fuel handling system, Ball mill, Pulverized fuel and their advantages, Multi- retort stoker, Pulverized fuel burner, Hydraulic and pneumatic cash handling, Electrostatic precipitator. Boiler Feed water treatment. Environmental aspects of steam power plant, water pollution, air pollution, emissions standard and its control.

### Unit II:

**Nuclear Power Plant:** Elements of nuclear power station layout, general criteria for selection of site. Fusion and fission reaction, types of nuclear reactors, Nuclear fuels coolant & moderators. Working of PWR, BWR, CANDU, BREEDER type reactor. **Gas Turbine Power Plant:** General Layout selection of site, Gas turbine power plants in India. Components of gas turbine plants, gas turbine Fuels. Comparison of Gas turbine plant with diesel and Steam power plant. Environmental impact of gas turbine power plant.

### Unit III:

**Waste Heat Recovery:** Sources of waste heat, Heat recovery forms & methods–Sensible and latent Heat recovery, Use of waste heat–Agricultural, greenhouse, Animal shelter, Aqua cultural uses, process heating. Waste Heat recovery boilers.

**Non-conventional power generation plants:** Tidal power plant–factors affecting suitability of site, working of different tidal power plants, advantages and disadvantages. Wind power plant–different types, advantages and Disadvantages. Solar power plant, geo-Thermal power plant, Magneto Hydrodynamics power plant, Small hydropower plant, Introduction to Plasma technology.

### Unit IV:

**Economics and operational aspects:** Prediction of load, selection of types of generation, number of generating units. Load duration curves, cost analysis, elements, controlling the cost of power plant (simple numerical). Major electrical equipment’s in power station–generator, step-up transformer, and switch gear, electrical motors (types, purpose & importance).

### Suggested Reading:

1. *Power Plant Technology, M.M.Wakill, Tata McGraw Hill*
2. *Power Plant Engineering, P. K. Nag Tata McGraw Hill*
3. *Boiler Control Systems, Lindsay, McGrawHill International, Lodon*
4. *Power Generation Operation and Control, A.J.Wood and B.F.Woolenberg, John Wiley, New York*

**Program:** Diploma

**Semester:** VI

**Course:** Human Values and Ethics

**Course Code:** 40D.451

L	T	P	C
2	0	0	0

**Course Objective:**

- To develop students' sensibility with regard to issues of gender in contemporary India.
- To provide a critical perspective on the socialization of human beings.
- To introduce students to information about some key aspects of Indian culture and ethics.
- To expose the students to debates on the politics and economics of work.
- To help students reflect critically on gender violence.
- To expose students to more egalitarian interactions between men and women.
- Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.

**Unit I:**

**VALUE CRISIS IN CONTEMPORARY INDIAN SOCIETY**

- 1.1 Value Crisis at the Individual Level
- 1.2 Societal Level
- 1.3 Intellectual Level
- 1.4 Cultural Level
- 1.5 Value – What are they?
- 1.6 The Indian Concept of Values.
- 1.7 Modern Approach to the Study of Values.
- 1.8 Aesthetic Sensibilities

**MORAL AND ETHICAL HUMAN VALUES**

- 2.1 Bases for Moral Judgment
- 2.2 Some Canons of Ethics.
- 2.3 Virtue Ethics.
- 2.4 Ethics of Duty.
- 2.5 Ethics of Responsibility
- 2.6 Factors to be considered in Making Ethical Judgments.
- 2.7 Different Meanings of Human Values
- 2.8 A New Approach to Human Value ,Freedom, Creativity Love &Wisdom

**Unit III:**

**MORAL VALUES IN PROFESSION**

1. What is a Profession?
2. Professional Ethos
3. Code of Professional Ethics
4. Practicing the Code
5. Corporate Social Responsibility
6. The Larger Domain of Human Values
7. Institutionalizing Ethics and Human Values

**GENDER SENSITIZATION**

1. Socialization of women
2. Just Relationships, being together as equals
3. Declining sex ratio, demographic consequences
4. Women's work, its politics and economics, fact and fiction, unrecognized and unaccounted work
5. Domestic violence, eve teasing and harassment. Is home a safe place?

**Suggested Reading:**

1. Dr. Rajan Mishra, *Human Values: Laxmi Publications Pvt. Ltd.*
2. S. Dinesh Babu, *Professional Ethics and Human Values; Laxmi Publications Pvt. Ltd.*
3. P.S. Rathore. *Business Ethics And Communication; S.Chand Publishing*
4. Dr. K.Alex. *Managerial Skills; S. Chand Publishing.*
5. Dr. M. Adithan, *Study Skills For Professional Students For Higher Education S.ChandPublishing*
6. Govindarajan M "Professional Ethics and Human Values."
7. R.R. Gaur and R. Sangal " A Foundation Course in Human Values and Professional Ethics "

**Program:** Diploma **Semester:** VI  
**Course:** Project Course  
**Code:**7D.395

L	T	P	C
0	0	10	5

**Course Objective:**

- To apply the knowledge gained throughout the courses in a practical and illustrative way.
- To develop the workability in a collaborative manner with a group of students.
- To develop abilities in problem solving and critical judgment
- To demonstrate ability to effectively collect, analyze and organize scientific information
- To develop the ability to write & prepare synopsis & dissertation.
- To develop the ability of presentation skill.