

**NORTH MAHARASHTRA
UNIVERSITY, JALGAON (M.S.)**

**FINAL YEAR ENGINEERING
(B.E.)**

(PRODUCTION ENGINEERING)

TERM-I & II

W.E.F.: 2008-09

NORTH MAHARASHTRA UNIVERSITY, JALGAON
STRUCTURE OF TEACHING AND EVALUATION
B.E.(PRODUCTION ENGINEERING)

First term
09

W.E.F. 2008-

Sr. No	Subject	Teaching Scheme Hours/week			Examination Scheme				
		Lectures	Tutorial	Practical	Paper Duration Hours	Paper	TW	PR	OR
1	Computer Aided Design	4	--	2	4	100	25	--	25
2	Production Management	4	--	2	3	100	25	--	25
3	***Mechatronics Systems	4	--	2	3	100	25	--	25
4	Elective-I	4	--	--	3	100	--	--	--
5	Cost and Cost Control	4	--	--	3	100	25	--	--
6	***Seminar	--	--	2	--	--	25	--	--
7	***Project	--	--	2	--	--	25	--	25
Total		20	--	10	--	500	150	--	100
Grand Total		30			750				

*** Common with Mechanical Engineering and Automobile Engineering

Second Term

Sr. No	Subject	Teaching Scheme Hours/week			Examination Scheme				
		Lectures	Tutorial	Practical	Paper Duration Hours	Paper	TW	PR	OR
1	Procurement and Inventory Control	4	--	2	3	100	25	--	25
2	Production Planning and Control	4	--	2	3	100	25	--	25
3	Numerical Control and Machine Tool Robotics	4	--	4	3	100	25	--	25
4	Elective - II	4	--	--	3	100	25	--	--
5	***Project	--	--	4	--	--	100	--	50
6	***Industrial Visit/ Case Study	--	--	--	--	--	25	--	--
Total		16	-	12	--	400	225	--	125
Grand Total		28			750				

*** Common with Mechanical Engineering and Automobile Engineering

Elective-I

1. Operation Research
2. Non Conventional Energy System
3. Product Development and Rapid Prototyping
4. Material Handling Systems
5. Advanced Tool and Die Design

Elective-II

1. Marketing Management
2. Database Management
3. Financial Management
4. Advanced Welding Technology
5. Fluid Machinery

**B.E.(PRODUCTION ENGINEERING) : FIRST TERM
COMPUTER AIDED DESIGN**

**Teaching Scheme
Scheme**

Lectures : 4 Hours/Week
100 Marks
Practical : 2 Hours/Week
25 Marks

Marks

4 Hours

Examination

Theory :

Term Work :

Oral : 25

Paper Duration :

UNIT - I

10 Hours (20 Marks)

Define CAD / CAM, Product Life Cycle & CAD / CAM, Application of Computers for Design Process, Selection of a CAD system, Desirable relationship of CAD/CAM database, Benefits & Application of CAD.

Hardware in CAD, Introduction, The Design Work Station, The graphics terminal, Operator input / output devices, Computer Communication, Principle of networking Classification of network, Transmission media & interface, LAN system.

UNIT - II

10 Hours (20 Marks)

Computer Graphics - Introduction Graphic Primitives, Point Plotting, Drawing of lines, Coordinate system used in graphic element, Transformation in graphics D transformation, Homogenous transformation, Concatenate coordinate transformation, Translation, Rotation, Scaling, Mirror, Reflection, Inverse coordinate transformation, Clipping, 3D transformation, Projections, Scan conversion, Rendering Shaving, View port, Windowing.

UNIT - III

10 Hours (20 Marks)

Geometric Modeling - Requirement of Geometric Modeling, Geometric Model, Geometric Model Construction Method, Wire frame modeling, Surface Modeling, Solid Modeling, Representation of Curve & Surface, Design of curve shape, Cubic Spline, Bezier curve, B-Spline curve, Nurbs 7 B- spline, Representation of surfaces.

Automation - Concept of Automation, Types of Automation, Advantages & limitations of Automation, Levels of Automation, Advanced Automation Function.

UNIT - IV

10 Hours (20 Marks)

Visualization - Introduction, Model Clean up, Hidden line removal, Hidden surface Removal, Hidden Solid removal, Shading Colours, Computer Animation - Introduction, Convectional animation, Computer animation, Engineering animation, Animation types, Animation techniques, Key Frame technique, Simulation technique.

UNIT - V

10 Hours (20 Marks)

Graphics Standard - Introduction standard for graphics programming, Feature of GKS, Other graphics standard, PHIGS, PARASOLID, ACIS, Exchange of cad data between software packages, DXF file IGES, PDES other data exchange formats, product data exchange technology.

TERM WORK

Term work shall consist of any five experiments and three assignments based on above syllabus

- 1) Modeling of spring using any modeling software
- 2) Modeling of assembly of grinding vice using any modeling software.
- 3) Modeling & assembly of knuckle joint using any modeling software.
- 4) Modeling & assembly of flange coupling using any modeling software.
- 5) Modeling of connecting rod using any modeling software.
- 6) Modeling crank shaft using any modeling software.
- 7) Assembly of Tool post using any modeling software.
- 8) Assembly of spigot and socket using any modeling software.
- 9) Drafting of any component using any relevant software.

Note: Oral will be based on the prescribed term-work presented in the form of certified journal.

REFERENCES

- 1) P. Radhkrishnan, S. Subramanyam, V. Raju, "CAD/ CAM/CIM", New Age Publication
- 2) M. P. Grover, Automation, "Production System and Computer Integrated Manufacturing" , Pearson Education Publication
- 3) Mikell P. Grover, Emory W. Zimmers, "Computer Aided Design and Manufacturing", P.H.I. Publication
- 4) Rao, Tiwari, Kundra, "Computer Aided Manufacturing", T.M.H. Publication
- 5) Zeid, "CAD/CAM", T.M.H. Publication
- 6) Rudra Pratap, "Getting Started with Matlab" 7, OUP, New Delhi.

**B.E.(PRODUCTION ENGINEERING) : FIRST TERM
PRODUCTION MANAGEMENT**

**Teaching Scheme
Scheme**

Lectures : 4 Hours/Week
: 100 Marks
Practical : 2 Hours/Week
Work : 25 Marks

Oral : 25 Marks

Hours

Examination

Theory

Term

Paper Duration : 3

UNIT - I

10 Hours (20 Marks)

Introduction - Scope & definition of production management, Role of production management in the organization, internal relationship production department with other department like marketing, finance, R & D maintenance etc., functions within production management.

Process Planning - Meaning of process planning, Selection of machine tools, Speeds, Feeds etc., Analysis of Flow charts of a part, subassembly, assembly, selection of appropriate process, operations sheet.

UNIT - II

10 Hours (20 Marks)

Overview of production management functions, functions under production management

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- a) Process planning
- b) Production planning
- c) Inspection
- d) Materials requirement planning I
- e) Materials requirement Planning II

UNIT - III

10 Hours (20 Marks)

Functions where computer can help production management

- a) Production planning - MRP - I, MRP - II, Scheduling Routing
- b) Network for large product, project
- c) Productivity indices - productivity of machines, process, labour, material
- d) Cost information)

UNIT - IV

10 Hours (20 Marks)

Flow of information and decision making originator of data, forms of data collection, analysis of information, emission of inferences.

Latest techniques in production management, JIT, Concept of JIT, Definition, Characteristics of JIT management , Goals of JIT, Components of JIT, Karban and Pull system, Benefits and limitations of JIT.

UNIT - V

10 Hours (20 Marks)

ISO - 9000 origin of the standard - need of consistency, organizational structure, contract, review, design review, vendor evaluation, inspection in process, final, test of measuring equipments, their calibrations, training etc.

TERM WORK

Term work shall consists of six assignments and two case problems

REFERENCES

- 1) Lerin, Melaughlin, "Production & Operation Management"
- 2) Mayer R.R., "Production & Operations Management"
- 3) Buffa E.S. , "Modern Production & Operations Management", Wiley Eastern Ltd., New Delhi
- 4) K. Bedi, " Production and Operation Management", 2/ed, OUP, New Delhi.
- 5) K.Bedi, "Quality Management", OUP, New Delhi.

B.E.(PRODUCTION ENGINEERING) : FIRST TERM MECHATRONICS SYSTEMS

(Common with Mechanical Engineering and Automobile Engineering)

Teaching Scheme

Examination Scheme

Lectures : 4 Hours/week

Paper : 100 Marks

Practical : 2 Hours/week

Work : 25 Marks

Theory

Term

: 25 Marks

Oral

Duration : 3 Hours

Paper

UNIT - I

10 Hours (20 Marks)

INTRODUCTION TO MECHATRONICS

Scope and importance of mechatronics, Key issue, Systems, Measurement systems.

TRANSDUCERS AND SENSORS

Introduction, Difference between transducer and sensor, Transducer types, Transduction principle, Photoelectric transducers - photoemissive transducers, photoconductive transducers, photovoltaic transducers, Thermistors, Thermodevices, Thermocouple, Inductive transducers, Capacitive transducers, Pyroelectric transducers, Piezoelectric transducer, Half-effect transducer, Ionization transducers, Light Emitting diode, Optical encoder - incremental encoder, absolute optical encoder, Bimetallic strip, Bourdon tube, Strain gauge, Load cell, Diaphragms, Mechanical switches, Flow transducers, Fibre optic transducers.

UNIT - II

10 Hours (20 Marks)

SIGNAL CONDITIONING

Introduction, Voltage divider, Rectification, Diode voltage stabilizer, Clipping and Clamping circuit, Amplifier - OPANP circuits, more about filter circuits, Isolator, Instrumentation amplifier, Bridge circuit, Comparator, Oscillator, 555 Timer, Sample and Hold, Clock, Analog to Digital conversion - digital to analog converter, counter based analog to digital converter, successive approximation, Galvanometer, Ammeter and Voltmeter, Cathode ray oscilloscope.

DATA PRESENTATION AND DATA LOGGING SYSTEMS

Introduction, Recorders - Graphic recorders, Strip chart recorders, X-Y recorders, Magnetic tape recorder.

Data loggers - block diagram description , Data acquisition system - generalized data acquisition system, computer based data acquisition system.

UNIT - III

10 Hours (20 Marks)

ACTUATORS AND MECHANISMS

Introduction, Actuator types and application areas, Electromechanical actuators, DC Motors - brushed DC motor, brushless, coreless, AC Motors - induction motors, synchronous motors, stepper motor, Fluid power actuators - pneumatic actuators, valves actuators, hydraulic actuators, comparison, Piezoelectric actuators - an illustration, piezoelectric motor, Magnetostrictive actuators, Memory metal actuators, Ion-exchange polymer metal composites, Chemical actuator.

Mechanisms, Bearings - slide bearing, journal bearing, rolling element bearing, magnetic bearing, molecular bearing, Belt, Chain, Pulleys, Gears - gear ratio, Rack and pinion, Ratchet, Pawl and Crank, Slider and crank, Cam and Follower - shape of the cam, shape of the follower, Chain and Sprocket, Geneva wheel, Four bar linkages.

UNIT - IV

10 Hours (20 Marks)

INTRODUCTION TO MICROPROCESSORS AND MICROCONTROLLERS

Microprocessor - Introduction, Basic element of control systems

Microcontrollers - Introduction, Difference between Microprocessors and Microcontrollers

Programmable logic controllers - Introduction.

CONTROL SYSTEMS AND CONTROLLERS

Introduction, Control system, Open-loop control systems, Closed-loop control systems - notations, reachability, transfer function.

The Controllers - on-off controller, proportional controller, integral controller, derivative controller, proportional plus integral controller, proportional plus derivative controller, proportional plus integral plus derivative controller, comparison, More about automatic control, Diving automatic control methods.

UNIT - V

10 Hours (20 Marks)

INTEGRATION

Introduction, Background, Advanced actuators - advanced motorized actuators, pneumatic actuators, servo actuator systems, Consumer mechatronic products, Hydraulic fingers, Surgical equipment, Industrial robot - different parts of a robot, controller, drive, arm, end effector, sensor, functional requirements, robot based automation, Autonomous guided vehicle - AGV architecture, components based DCS view, man machine interface, design with fieldbus technology, Drilling machine, Conveyor based material handling systems - validation, design.

INDUSTRIAL DESIGN, AESTHETICS AND ERGONOMICS

Introduction, Element of product design - product physiognomy aesthetics, product physiognomy ergonomics, ergonomics in machine tool design, ergonomics in machine tool safety, product safety audit, Ergonomic factors for advanced manufacturing systems - machine oriented industrial design, factory without people, ergonomic problems in new technology.

TERM WORK

Term work shall consist of any five experiments and three assignments.

- 1) Study of Basic block diagram of mechatronics system components.
- 2) Study and demonstration of motion / force transducers.
- 3) Study and demonstration of temperature / pressure transducers.
- 4) Study and demonstration of AD / DA converter
- 5) Study and demonstration of hydraulic actuator / pneumatic actuator.
- 6) Study and demonstration of graphic / magnetic tape recorders.
- 7) Study of Microprocessors and Microcontrollers
- 8) Study of Robot / Autonomous guided vehicle

Note: Oral will be based on the prescribed term-work presented in the form of certified journal.

REFERENCE BOOKS

- 1) Dan Neculescu ,” Mehatronics”, Pearson Education, New Delhi
- 2) D. V. Alciatore,” Introduction to Mechatronic and Measurement Systems”, Tata McGraw- Hill Publishing Company Limited, New Delhi
- 3) HMT Limited,”Mechatronics”, Tata McGraw-Hill Publishing Company Limited, New Delhi
- 4) J.G. Joshi, “Mechatronics”, Prentice Hall of India, New Delhi
- 5) N.P.Mahalik, “Mehatronics”, Tata McGraw-Hill Publishing Company Limited, New Delhi
- 6) R.P. Borole,”Mehatronics”, Nirali Prakashan, Jalgaon.
- 7) W. Bolton, “Mechatronics”, Pearson Education, New Delhi
- 8) D.R. Appukuttan,” Introduction to Mechatronics”, Oxford, New Delhi

**B.E.(PRODUCTION ENGINEERING) : FIRST TERM
OPERATIONS RESEARCH
ELECTIVE - I**

Teaching Scheme

Examination Scheme

Lectures : 4 Hours/week

Paper : 100 Marks

Theory

Paper Duration : 3 Hours

UNIT-

10 Hours (20 Marks)

I

Introduction to OR – Definitions – Phases of OR, Role of OR in decision making, Models , Scope, Advantages, Limitations of OR.

Decision Theory – Introduction, Steps in decision making process, characteristics, Techniques of decision making under certainty, Risk uncertainty, Decision Trees

UNIT

10 Hours (20 Marks)

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II

Linear Programming – Basic formulation of LPP, Graphical method, Simplex method, Concept of Duality and its application, Sensitivity Analysis

UNIT - III

10 Hours (20 Marks)

Special techniques of Linear Programming such as Transportation method, Transshipment model, Assignment model, Traveling Salesman problem.

Dynamic Programming – Introduction, Concept, Characteristics, Approach (Basic Steps), Applications

UNIT - IV

10 Hours (20 Marks)

Queuing Theory – Introduction, Elements of Queuing System, Characteristics of queuing theory, Service discipline, Service mechanism, Queuing models, (M/M/1) : (FCFS / /), (M/M/C) (FCFS / /), (M/M/1) : (FCFS / N /)

UNIT - V

10 Hours (20 Marks)

Assembly line Balancing - Basic terminology and concepts, methods of solution for problems involving minimization of the number of work stations for a given cycle time and minimization of cycle time for a given number of work stations.

Games Theory - Basic concept and Terminology of Two person zero sum game, $M \times 2$ and $2 \times N$ games, Sub game method, Graphical method

REFERENCES

- 1) Hira and Gupta , "Operations Research", S.Chand & Co.
- 2) L.C. Jhamb , "Quantitative Techniques" I & II ,Evest Publications.
- 3) Manohar Mahajan , "Operations Research", Dhanpat Rai & Co.
- 4) S.D. Sharma , "Operation Research", Kedar Nath Ram Nath & Co.
- 5) V. K. Kapoor , "Operation Research"
- 6) Ravindran, "Operation Research Principles and Practice"" ,Wiley India Pvt.Ltd, New Delhi

B.E.(PRODUCTION ENGINEERING) : FIRST TERM NON CONVENTIONAL ENERGY SYSTEM ELECTIVE - I

Teaching Scheme

Examination Scheme

Lectures : 4 Hours/week

Paper : 100 Marks

Theory

Paper Duration : 3 Hours

UNIT- I

10 Hours (20 Marks)

Solar Energy - Introduction to Energy sources, Solar radiation and it's measurement, Solar energy collectors, Flat Plate collectors, Ene. Balance Equn. Thermal Analysis, Concentrating Collectors, Solar Energy storage, Solar Pond, Application of Solar energy, Solar heating systems

UNIT - II

10 Hours (20 Marks)

Wind Energy - Introduction, Site selection considerations, W.E.C.S. Basic components, Classification of W.E.C.S., Wind Horizontal axis rotors (Wind Mills) Vertical Axis machines, Energy storage, Application of wind energy

UNIT - III

10 Hours (20 Marks)

Bio - Energy - (Energy from Biomass)

Introduction, Biomass conversion Technologies, (Biomass Conversion) Wet processes, Dry processes, Factors affecting Biodigestion or generation of gas, KVIC type biogas plant, Janta biogas plant, Methods for obtaining energy from Bio mass

UNIT - IV

10 Hours (20 Marks)

Geothermal Energy - Introduction Estimates of Geothermal Power, Geothermal Sources, Hydrothermal (Convective) Resources, Vapour dominated Sy. Liquid dominated system, Geopressured resources, Hot dry rock resources (Petrothermal System) Application of geothermal energy, Geothermal Power Plants

UNIT - V

10 Hours (20 Marks)

Energy From Oceans - Introduction, Methods of Ocean thermal electric power generation prospects of O.T.E.C., in India, Site selection, Energy utilization, Basic Principles of Tidal power, Advantages & Disadvantages of Tidal power generation ocean waves, Energy & Power from the waves, Wave Energy conversion devices, Advantages & Disadvantages of wave energy, Applications of energy from Oceans.

REFERENCES

- 1) G. D. Rai, "Non-conventional Energy Sources", KhannaPublication
- 2) S.P.Sukhatme,"Solar Energy"
- 3) H. P. Garg and J. Prakash , "Solar Energy", Tata McGraw Hill
- 4) Kriteten and Krider , "Principles of Solar Engineering" ,McGraw Hill
- 5) Wakil , "Power Plant Engineering"
- 6) S.N. Bhadra, "Wind Electrical Systems", Oxford, New Delhi.

B.E.(PRODUCTION ENGINEERING) : FIRST TERM PRODUCT DEVELOPMENT AND RAPID PROTOTYPING ELECTIVE - I

Teaching Scheme

Examination Scheme

Lectures : 4 Hours/week

Theory Paper : 100 Marks

Paper Duration : 3 Hours

UNIT- I

10 Hours (20 Marks)

Product Development history and product development process tool, product development verses design, modern product development theories and methodologist in design. Product development teams, product development planning, technical and

business concerns. Understanding customer needs, Establishing product functions. Functionality, augmentation. Aggregation, common basis, functional functional modeling methods.

UNIT - II

10 Hours (20 Marks)

Product tear down and experimentation, benchmarking and establishing engineering specification. Product portfolios and portfolio architecture. Tear down process, tear down methods, post teardown reporting, benchmarking approach, support tools, setting specifications, portfolio architecture, types, platform, functional architecting, optimization selection, Product modularity, modular design.

UNIT - III

10 Hours (20 Marks)

Concepts and Modeling - Generation of concepts, information gathering and brain storming, directed search, morphological analysis, combining solutions. Decision making, estimation of technical feasibility, concept selection process, selection charts, measurement theory, numerical concept scoring, design evaluation scheme, concept embodiment, geometry and layout, system modeling, modeling of product metrics, selection of model by performance specifications, physical prototyping, informal and formal models.

UNIT - IV

10 Hours (20 Marks)

Rapid Product Development - Product Development: Classical steps of product development, Requirement of New Product development strategies, Critical factors affecting success, The Principle of simultaneous Engineering.
Model: Model classes, Influence of models to speed up product development.
Model making by Rapid prototyping: Definitions of rapid prototyping (RP), Rapid Tooling (RT), Rapid Manufacturing (RM). Relating Rapid prototyping models to product development phases.

UNIT - V

10 Hours (20 Marks)

Generation of Layer information - description of the geometry by a 3D data record, Data flow, CAD model types.

Rapid prototyping Technologies -

Photo polymerization Stereo lithography (SL), Laser Sintering, Layer Laminate Manufacturing (LLM), Extrusion Processes.

Rapid Prototyping Materials-Photopolymers, SL Resins, Sintering Materials, FDM Materials, LOM Materials.

Rapid Prototyping Industrial Applications

REFERENCE

- 1) NFM Roozenburg, J. Eekels, "Product Design : Fundamentals and Methods", John Wiley and Sons Ltd.,
- 2) Geoffrey Boothroyd, Peter dew , "Product Design for manufacturing and Assembly"
- 3) Mike Baxter, Champman and Hall, "Product Design : A Practical guide to systematic methods of new product development"
- 4) A. K. Chitale, R. C. Gupta, "Product Design and Manufacturing" ,Prentice Hall India
- 5) John R. Lindbeck," Product Design and Manufacturing" ,Prentice Hall International Editime
- 6) Kevin Otto, "Product Design : Techniques in Revenue Engineering and New Product Development" ,Kristin wood pearson Education Inc.

- 7) Andreas Gebharat, "Rapid Prototyping", Hanser Gardner Publication Inc Cincinnati.
 8) Naber H., Macht M., Geuer A, "Fast Prototype Tools in : Rapid Prototyping & Manufacturing "
 9) D. Kochan, "Solid Free from Manufacturing and Advanced Rapid Prototyping", Elsevier Science Publisher, B.V. New York.

**B.E.(PRODUCTION ENGINEERING) : FIRST TERM
 MATERIAL HANDLING SYSTEMS
 ELECTIVE - I**

Teaching Scheme

Examination Scheme

Lectures : 4 Hours/week

Theory

Paper : 100 Marks

Paper

Duration : 3 Hours

UNIT-

I

10 Hours (20 Marks)

Material handling & Material handling equipment - Material handling activities, Principles of material handling, effect of low facility output, Material handling analysis, Basis material handling Problems, Analysis procedure, Materials handling system, System Analysis and System Synthesis.

UNIT - II

10 Hours (20 Marks)

System design and system implementation, packaging, decorative and protective packaging, shipping end user containers, Receiving and shipping areas. Air carriage handling, Material handling training, Material handling equipment

UNIT - III

10 Hours (20 Marks)

Elements of material handling system: - Importance, terminology, Principles and features of material handling systems, Analysis of material handling problems. Selection of material handling equipments selection of the handling system cost data and economic analysis.

UNIT - IV

10 Hours (20 Marks)

Drives and basic specifications for selection of mechanical handling equipments. Study of various types of mechanical handling equipments such as Industrial trucks, tractors and trailers, cranes, hoist and monorails, conveyance, slides and chutes, Pneumatic & Hydraulic conveying system and elevator

UNIT - V

10 Hours (20 Marks)

Design of various types of mechanical handling equipment such as cranes, hoists, conveyer slides & chutes, Pneumatic and hydraulic conveying systems.

REFERENCE

- 1) Lewis & Marron , "Facilities & Plant Engg",. Hand book McGraw Hill Publishing.
- 2) M. P. Alexander , "Material Handling Equipment ",MIR Publisher.
- 3) Banga & Sharma , " Industrial Organisation Management ", Khanna Publishers.

- 4) Homi P. Sterval ,” Plant Engineering Handbook”, Multitech Publishing Co.
5) D. Whitney, “Mechanical Assemblies”, Oxford, New Delhi.

**B.E.(PRODUCTION ENGINEERING) : FIRST TERM
ADVANCED TOOL AND DIE DESIGN
ELECTIVE - I**

**Teaching Scheme
Examination Scheme**

Lectures : 4 Hours/week
Theory Paper : 100 Marks

Paper

Duration : 3 Hours

UNIT- I

10 Hours (20 Marks)

Review of die and mould related processes such as

i) Die Casting ii) Injection Moulding iii) Drop forging iv) Blow Moulding etc.

Review restricted to study & specification of machine to access their productivity and tooling facilities and tooling accessories.

UNIT - II

10 Hours (20 Marks)

Design of simple dies for forging, Casting or Moulding –

Details calculations of cavity shapes, shrinkage and other allowances, die manufacturing methods.

UNIT - III

10 Hours (20 Marks)

Process capability and Dimensional Analysis Basic Concepts and Definitions, Grades of tolerance and accuracies.

Surface quality of the machined surface of factor affecting it.

Attainable accuracies and surface roughness in various machining processes.

Definition of terminology & analysis of dimensional chain / linkage

UNIT - IV

10 Hours (20 Marks)

Process planning principles & Process sheet design

i) Factors affecting process design ii) General consideration in selecting machining methods iii) Study of the machined parts & initial data required for process design from the point of view of manufacture

UNIT - V

10 Hours (20 Marks)

Initial data required for process design

- i) Planning the sequence of machining operations along with selection of machine tools, cutting tools, jigs & fixtures, cutting variables as well as fixing in process dimensions and gauging.
- ii) Datum features / surfaces & their selections
- iii) Stock preparations and blank selection with material estimate
- iv) Time estimate & time standard
- v) Process sheet design for the complete manufacture of the machined parts

REFERENCE

- 1) Maslow, V-Danilvesky and V. Sasov , "Engineering Manufacturing Process in Machine and Assembly shop" , MIR Publisher
- 2) V. Danilvesky , "Manufacturing Engg" ., MIR Publishers
- 3) V. Kovan , "Fundamentals of process Engg" ., Foreign Language Publishing House, Moscow.
- 4) M.C. Shaw, "Metal Cutting Principles", 2 ed, Oxford New Delhi.

B.E.(PRODUCTION ENGINEERING) : FIRST TERM COST AND COST CONTROL

Teaching Scheme

Examination Scheme

Lectures : 4 Hours/week

Paper : 100 Marks

Work : 25 Marks

Duration : 3 Hours

Theory

Term

Paper

UNIT- I

10 Hours (20 Marks)

Fundamentals - Theory of casting, need of casting, Basic casting concepts, classification, concept of casting, Elements of casting, applications of casting, Systems and methods of casting.

Cost Data -

Materials - Purchasing, receiving, store keeping, material costing, pricing, stores issues, different method of pricing, material control

Labour - Remuneration, methods of remuneration, incentives, and group incentives, labour costing, labour control

UNIT- II

10 Hours (20 Marks)

Direct Expenses - Examples in various industries Overheads - Definition, Collection, Classification, Allocation, Apportionment and absorption, Overheads requiring special considerations, Depreciation and Obsolescence

UNIT- III

10 Hours (20 Marks)

Cost Ascertainment - Allocation apportionment, absorption of overheads, overhead analysis, absorption methods, absorption general considerations absorption of non production costs.

Unit Costing - Output & Operation costing, process costing, Normal & abnormal losses in process.

Waste, Scrap, Buy and Joint Products.

UNIT - IV

10 Hours (20 Marks)

Marginal Costs - Breaker's charts, theory of breakers charts, Segregation of fixed & variable expenses, Break even chart theory, Assumption Marginal Cost statement & accounts, Marginal costing & decision making, Marginal costing Vs Total absorption

UNIT - V

10 Hours (20 Marks)

Costing planning & Control - Introduction to cost control, standard costing & budgetary control, Theory of cost control & variance standard costing.

Variance Analysis - Cost variance, Wage, Materials, Overhead variance, Causes of variances

TERM WORK

Term work shall consists minimum eight assignments based on above syllabus.

REFERENCE

- 1) S. M. Inamdar, "Cost and Management Accounting" ,Everest Publication
- 2) B.K. Bhar, "Cost Accounting"
- 3) Bhattacharya S.K. and Dearden J., " Accounting for Management", Vikas Publication House Pvt Ltd., New Delhi.
- 4) Taylor A.H. & Sheary H., "Financial & Cost Accounting to Management"
- 5) I. M. Pandey., "Financial Management" , Vikas Publication House Pvt Ltd., New Delhi.
- 6) Lesile G. Eldenburg,"Cost Management "Wiley India Pvt.Ltd. New Delhi
- 7) G.Black, "Applied Financial Accounting and Reporting", Oxford, New Delhi

B.E. (PRODUCTION ENGINEERING): FIRST TERM PROJECT I

(Common with Mechanical Engineering and Automobile Engineering)

Teaching scheme

Examination scheme

Practical: 2 hrs / week

Oral: 25

Marks

Term Work: 25 Marks

1. Every student individually or in a group (group size is of 4 students. However, if project complexity demands a maximum group size of 5 students, the committee should be convinced about such complexity and scope of the work.) Shall take a project in the beginning of the (B.E. first Term) seventh term in consultation with the guide and the project must be completed in the (B.E. Second Term) eighth term.
2. The project proposal must be submitted in the institute in the beginning of the (B.E. first Term) seventh term. While submitting project proposal care is to be taken that project will be completed within the available time of two term i.e. 2 Hrs per week for (B.E. first Term) seventh term and 4 Hrs per week for (B.E. Second Term) eighth semester (total time become $12 \times 2 + 12 \times 4 = 72$ Hrs per project partner). The final title of the project work should be submitted at the beginning of the (B.E. Second Term) eighth semester.

3. Project title should be precise and clear. Selection and approval of topic:

Topic should be related to real life application in the field of MECHANICAL, AUTOMOBILE AND PRODUCTION ENGINEERING

OR

Investigation of the latest development in a specific field of MECHANICAL, AUTOMOBILE AND PRODUCTION ENGINEERING

OR

The investigation of practical problem in manufacture and / or testing of MECHANICAL, AUTOMOBILE AND PRODUCTION ENGINEERING equipments

OR

The MECHANICAL, AUTOMOBILE AND PRODUCTION ENGINEERING based applications project is preferable.

OR

Software development project related to MECHANICAL, AUTOMOBILE AND PRODUCTION ENGINEERING

and Agriculture Engineering with the justification for techniques used / implemented is accepted.

OR

Interdisciplinary projects should be encouraged. The examination will be conducted independently in respective departments.

4. The group should maintain a logbook of activities. It should have entries related to the work done, problems faced, solution evolved etc., duly signed by guide.

5. The group is expected to complete details system design, layout etc. in (B.E. first Term) seventh term, as a part of term work in the form of a joint report. Project report must be submitted in the prescribed format only. No variation in the format will be accepted.

6. One guide will be assigned at the most three project groups.

7. The guides should regularly monitor the progress of the project work.

8. Assessment of the project for award of TW marks shall be done by the guide and a

departmental committee (consisting of minimum two teachers with experience more than three years) as per the guidelines given in the following table.

A) ASSESSMENT OF PROJECT I TERMWORK B.E. FIRST TERM

NAME OF THE PROJECT _____

NAME OF THE GUIDE: _____

Sr No	Exam Seat No	Name Of Student Marks	Assessment by guide (70%)					Assessment by Departmental committee (30%)			Grand Total	Out of 25 Marks
			Literature survey	Topic Selection	Documentation	Attendance	Total	Evaluation (10%)	Presentation (20%)	Total		
			10	05	15	05	35	05	10	15		

Sign of Guide
O. D.

Sign. of Committee Members

Sign. Of H.

9. The guide should be internal examiner for oral examination (If experience is greater than three years).

10. The external examiner should be from the related area of the concerned project. He should have minimum of five
Years of experience at degree level / industry.

11 .The evaluations at final oral examination should be done jointly by the internal and external examiners.

**B.E. (PRODUCTION ENGINEERING): FIRST TERM
SEMINAR**

(Common with Mechanical Engineering and Automobile Engineering)

scheme:

Teaching scheme:

Examination

Practical: 2 hrs / week
25 Marks

Term Work :

- 1. For seminar every student will individually study a topic assigned to him / her and submit a report and shall deliver a short lecture / Seminar on the topic at the end of term.**
- 2. Selection of topic should be done by students in consultation with concerned guide**
 - a. Topic should be related to branch but it should be extended part of the branch (latest and advance topic).
 - b. The topic should be such that the student can gain latest knowledge. Student should preferably refer at least one research paper
- 3. Seminar topic should not be repeated in the department and registration of the same should be done on first come first served basis**
- 4. Seminar report should be submitted in paper bound copy prepared with computer typing**
 - a. Size of report depends on advancement of topic.
 - b. Student should preferably refer minimum 5 reference books / magazines.
 - c. Format of content
 - i. Introduction.
 - ii. Literature survey.
 - iii. Theory 1) Implementation 2) Methodology
 3) Application 4) Advantages, Disadvantages.
 - iv. Future scope.
 - v. Conclusion.

5 ASSESSMENT OF SEMINAR for TERM WORK

Title of seminar: _____

Name of guide: _____

Sr. No.	Exam Seat No.	Name of Student	Assessment by examiners					Grand Total
			Topic Selection	Literature Survey	Report Writing	Depth of understanding	Presentation	
			5	5	5	5	5	25

6. Assessment of Literature survey will be based on
 - a. Collection of material regarding history of the topic.
 - b. Implementation.
 - c. Recent applications.

7. Assessment of Depth of understanding will be based on
 - a. Questioning by examiners.
 - b. Questioning by students.
 - c. What the student understands i.e. conclusion regarding seminar.

8. Assessment of presentation will be based on;
 - a. Presentation time (10 minutes)
 - b. Presentation covered (full or partial)
 - c. Way of presentation
 - d. Questioning and answering (5 minutes)

9. Examiners should be a panel of two one of them must be guide. Examiner must have experience at least 3 years.
Examiners will be appointed by HOD in consultation with Principal.

**B.E.(PRODUCTION ENGINEERING) : SECOND TERM
PROCUREMENT AND INVENTORY CONTROL**

Teaching Scheme

Examination Scheme

Lectures : 4 Hours/week	Theory
Paper : 100 Marks	
Practical : 2 Hours/week	Term
Work : 25 Marks	Oral
: 25 Marks	Paper
Duration : 3 Hours	

NIT - I

10 Hours (20 Marks)

Material Planning and Programming -Material requirement planning (MRP) techniques to access the demand forecasting: Data collection and its processing.
Materials Management functions: Inventory, Types of Inventory Classification, tools for materials management.

UNIT - II

10 Hours (20 Marks)

Purchasing - Techniques and tools of buying methods & procedure of buying, documents etc. purchasing of capital equipment. Vendor and Vendor Selection -Vendor selection, training and development of vendor, vendor assessment

UNIT - III

10 Hours (20 Marks)

International Purchasing - Need, procedure nature of documents, problems in international purchasing, Trading organizations, Import substitution, strategy for import substitution, problems in import substitution. Export - import policy, Foreign exchange, Export promotion incentives & subsidies.

UNIT - IV
10 Hours (20 Marks)

Analytical structure of inventory problems, Relevant costs, Measurement of costs, Static inventory models under risk and under uncertainty, Decision criteria for inventory problems.

Inventory Control Models -

Dynamic inventory control models under uncertainty, Optimum lot size with constant demand, Dynamic inventory problems under risk and under uncertainty, multistage inventory problems, and probabilistic inventory control models.

UNIT - V
10 Hours (20 Marks)

Stores Function - Purpose of stores, location & layout, cost aspects and productivity, problems and developments, new development instoring.

Stores system and procedures - Receipt system, Physical system, storing practices, issue control, stores accounting and stores verification, costing of the receipt of materials, costing of the issues to production, Process of verification, computer application in inventory control

TERM WORK

Term work shall consist of five assignments on the above topics and at least one report on visits to industrial organization for study of materials management function in actual application.

In addition two assignments of computer applications in inventory control.

Note: Oral will be based on the prescribed term-work presented in the form of certified journal.

REFERENCES

- 1) K.S. Menon ,” Purchasing & Inventory Control Functions”
- 2) L.C. Jhamb , “Inventory Control” Everst Publishing Co.
- 3) P. Gopalkrishnan, M. Sudaresan , “Materials management”, Prentice Hall of IndiaPvt. Ltd.,
- 4) L. C. Jhamb , “Materials management”

B.E.(PRODUCTION ENGINEERING) : SECOND TERM
PRODUCTION PLANNING & CONTROL

Teaching Scheme

Examination Scheme

Lectures : 4 Hours/week

Paper : 100 Marks

Practical : 2 Hours/week

Work : 25 Marks

: 25 Marks

Duration : 3 Hours

Theory

Term

Oral

Paper

UNIT - I
10 Hours (20 Marks)

Introduction – Meaning, Scope, Objectives & Functions of PPC, Role of PPC in the organization, Types of PPC organization.

Production Forecasting – Use of forecast, types of forecast, statistical forecasting level, Demand, seasonal demand, Types of forecasting methods, comparative study, verifying & controlling the forecasting

UNIT - II

10 Hours (20 Marks)

Production Planning – Planning function, Routing, scheduling, loading, types of production and their characteristics, continuous, intermitted production, determination of capacity, division of capacity, Division of capacity, sequential load statements, Scheduling material difficulties, machine capacity, make or buy decision, production plans

UNIT - III

10 Hours (20 Marks)

Routing – Process charts, Job cards, route cards, operation charts, set up instructions operational charts.

Scheduling – Definition need and objectives of scheduling, Principal factors affecting meeting delivery charts.

Loading – Machine load charts, Master scheduling techniques, Line of balance (LOB), Analytical scheduling

UNIT - IV

10 Hours (20 Marks)

Production Control – Definition, Dispatching, Follow up and coordination with various departments

Dispatching – Job orders and Issues systems.

Follow up – Progressing, types of feedback systems, preventing production delays, causes of delay.

Evaluation – Definition, Importance and Advantages of evaluation

UNIT - V

10 Hours (20 Marks)

Material Planning – Scope and requirement of material planning, facility planning, sales planning, production planning, quality planning, Inventory planning, Manpower planning and Financial planning activity. Production Control of continuous and intermitted production order control applied to intermitted production. Flow control applied to continuous production, controlling rate of flow of materials, parts, sub-assemblies to match the rate of final products, line balancing. Computer assisted to production planning & control applied to machine capacity & utilization labour productivity measurement, MRP, Scheduling and procurement & inventory control

TERM WORK

The term work shall consist of eight assignment of the above syllabus & emphasis will be on case studies wherever possible.

Note: Oral will be based on the prescribed term-work presented in the form of certified journal.

REFERENCES

- 1) Mayer ,” Production Management”
- 2) Samuel Eilson, “Production Planning & Control”
- 3) P.C. Moore & T.E. Hendrick , “Production & Operation Management”

- 3) MC Niece , “Forecasting Production Planning & Control”
- 4) H.B.Mayard , “Industrial Engineering Handbook”, Mc Graw Hill Publisher.
- 5) L.C. Jhamb ,” Production Planning & Control”.

**B.E.(PRODUCTION ENGINEERING) : SECOND TERM
NUMERICAL CONTROL AND MACHINE TOOL ROBOTICS**

Teaching Scheme

Examination Scheme

Lectures : 4 Hours/week	Theory
Paper : 100 Marks	
Practical : 4 Hours/week	Term
Work : 25 Marks	Oral
	Paper
: 25 Marks	
Duration : 3 Hours	

UNIT - I

10 Hours (20 Marks)

Fundamentals of NC techniques, basic controls of NC system, NC coordinates system, Motion control system, Computer Numeric control, Features of CNC, The machine control units of CNC, CNC Software, DNC, Application of NC, NC pat programming.

UNIT - II

10 Hours (20 Marks)

Process Planning and Tools Selection- Process planning tooling of numerical controls, Tooling for hole operations, Milling cutters, Special inserted cutters, A Processing example, Speed and feed. Tool Changing and tool register, Tool changer, Automatic tool changes, Tool storage Tool length, and Tool length offset, Safety rules for numeric control.

UNIT - III

10 Hours (20 Marks)

Robot Technology - Fundamentals Key definition, general characteristic, basic component, robot anatomy, Robot configuration, Robot generation, Robot selection, Robot classification, Robot end effectors, Sensors, Vision.

UNIT - IV

10 Hours (20 Marks)

Robot Controls System -Limited sequence control play back with PTP Control, Play back with continuous path control, intelligence control, robot programming methods, Robot Programming, Head through programming, robot programming languages, simulation and of line programming.

UNIT - V

10 Hours (20 Marks)

Economic Consideration for Robot -Application of robot, general consideration in robot application, material transfer, machine loading welding, spray coating, processing operations, assembly, inspection, etc.

TERM WORK

The term work shall consists of eight assignments on the above syllabus

Note: Oral will be based on the prescribed term-work presented in the form of certified journal.

REFERENCES

- 1) Fred G. Martin," Robotic Exploration",Pearson Education Parentice Hall
- 2) Micheal P. Grover, Emory W. Zimmers, " CAD / CAM", Parentice Hall
- 3) K.S.Fu. R. CHonzalz," Robotics" , Mc Graw Hill
- 4) Warren S. Seames, "Computer Numeric Control."
- 5) Thomsons, "Robot Technology" , Delmer Publication.
- 6) [Ashitava Ghosaal, "Robotics Fundamental Concept and Analysis", Oxford.](#)

B.E.(PRODUCTION ENGINEERING) : SECOND TERM] MARKETING MANAGEMENT ELECTIVE - II

Teaching Scheme

Examination Scheme

Lectures : 4 Hours/week

Paper : 100 Marks

Theory

Work : 25 Marks

Term

Paper Duration : 3 Hours

UNIT - I

10 Hours (20 Marks)

Evaluation of Marketing and Market Concept, Essential difference between marketing & selling, Marketing management task and philosophies market system.

UNIT - II

10 Hours (20 Marks)

Market Environment Consumer, Industrial and Government markets, Buyers behavior. Marketing Planning - Growth Strategies, Competitive strategies, Marketing mix, consumerism, marketing during recession and inflation, social marketing

UNIT - III

10 Hours (20 Marks)

Marketing organization - Product management organization set up, personal qualities, training motivation. Principles of market research, Application of Market research, Quantitative and Qualitative research.

UNIT - IV

10 Hours (20 Marks)

Collection of market information. Postal Survey field research, sources of information market size estimation forecasting. Export need information collection, negotiation

UNIT - V

10 Hours (20 Marks)

Setting up a market research project, research design, costing sampling, questionnaire design, Data collection , Data validation and Controlling errors, Preservation of data, Report writing, Presentation of quantitative data

TERM WORK

Term work shall consist minimum eight assignments based on above syllabus.

REFERENCES

- 1) [A.Palmer, "Introduction to Marketing Theory & Practice", Oxford, New Delhi.](#)
- 2) Kolter Philip, "Marketing management analysis", Planning & Control PHI, Publication.
- 3) [P.K. Ghosh", "Industrial Marketing", Oxford, New Delhi.](#)
- 4) [T.K.Panda, "Sales and Distribution Management", Oxford, New Delhi.](#)
- 5) Gandhi J.C. , "Marketing"
- 6) Bhattacharya B., "Export Marketing Global Business Press"
- 7) Churchill G.A. Dryden , "Basic Marketing Research"
- 8) Lehman D, Irwin, "Marketing Research & Analysis"
- 9) S.Easwaran, "Marketing Research", Oxford.

B.E.(PRODUCTION ENGINEERING) : SECOND TERM DATA BASE MANAGEMENT ELECTIVE - II

Teaching Scheme

Examination Scheme

Lectures : 4 Hours/week

Paper : 100 Marks

Work : 25 Marks

Duration : 3 Hours

Theory

Term

Paper

UNIT - I

10 Hours (20 Marks)

Introduction to DBMS, Basic concepts, advantages of a DBMS over file processing system, Data abstraction, Data models and data independence, components of a DBMS and overall structure, Database terminology

Database administration issues: DBA role, indexes, Data dictionary, security, backups, Replication, SQL support for DBA, commercial RDBMS selection.
Data modeling: Basic concepts, types of data models, E-R data model and object oriented data model, relational, network and hierarchical data models and their comparison, E-R and ER diagramming.

UNIT - II
10 Hours (20 Marks)

Relational Model: Basic concepts, attributes and domains, interaction and extensions of a relation concept of integrity and referential constraints. Relational query language (relational algebra, relational calculus), concepts of view and trigger

UNIT - III
10 Hours (20 Marks)

SQL : Structure of SQL query, DDL and DML, SQL queries set operations, Predicates and join membership, tuple variables, set comparison, ordering of tuples, aggregate functions, nested query. Database modification using SQL, Dynamic and embedded SQL and concepts of stored procedure, Query optimization

UNIT - IV
10 Hours (20 Marks)

Relational database design: Need of normalization, notation of a normalized relation, normalization using functional dependency, Multi-valued dependencies and join dependency, 1NF, 2NF, 3NF, BCNF, 4NF.
Transaction Management : Basic concepts of transaction, components of transaction management (concurrency control, Recovery system), Different concurrency control protocols such as Time stamps and locking, different crash recovery such as log based recovery and shadow paging, concepts of cascaded abort, Multi-version concurrency control methods

Unit - V
10 Hours (20 Marks)

Object oriented DBMS: Review of object oriented concepts: Objects, Classes, attributes, Messages, Inheritance and Polymorphism etc. Object schemes, Class subclass relationship, Inter-object relationships, features of object oriented DBMS and ORDBMS, concepts of OID, persistence of objects in OODBMS, Physical organization, object - oriented queries, schemes modifications, Temporal database, Active databases

TERM WORK

Term work shall consist minimum eight assignments based on above syllabus.

REFERENCES

- 1) Singh, "Database Systems" concepts, Design & Application", Pearson LPE
- 2) Kahate, " Introduction to Database Management Systems" Pearson LPE
- 3) Henry F. Korth, Abraham silberschatz, "Database System Concepts", 5th Ed. Graw Hill Inc.
- 4) Date, "Introduction to Database Management Systems", 8/e Pearson LPE.
- 5) Rajesh Narang, "Database Management System", PHI
- 6) Elmars, Navathe, Somayajulu, Gupta," Fundamentals of Database Systems", Pearson
- 7) ISRD, "Introduction to Database Management System", Tata McGraw Hill
- 8) Connolly, "Database Systems" Pearson LPE
- 9) Bipin Desai, "Introduction to database management systems", Galgotia.

- 10) Renu Vig." Fundamentals of database management systems", ISTE learning materials centre.
- 11) Phillip Pratt,"Concepts of DBMS", Thomoson Learning 3rd Ed.
- 12) Phillip Pratt,"A Guide to SQL", Thomoson Learning 3rd Ed.
- 13) V.K. Jain, "Database Management System", Dremtech Press (Wiley India)
- 14) Oracle Sql, "Pl/Sql for 9i and 10g", Drematech Press (Wiley India)

**B.E.(PRODUCTION ENGINEERING) : SECOND TERM
FINANCIAL MANAGEMENT
ELECTIVE - II**

Teaching Scheme

Examination Scheme

Lectures : 4 Hours/week

Paper : 100 Marks

Theory

Work : 25 Marks

Term

Paper Duration : 3 Hours

UNIT - I

10 Hours (20 Marks)

Financial Management - Definition, Scope objectives, Organization of financial management, Emerging role of finance management in India.

Financial Analysis - Meaning of changes in financial position, statement of changes in financial position, working capital basis, cash basis, balance sheet, profit and loss accounts

UNIT - II

10 Hours (20 Marks)

Financial statement analysis - Ratio analysis, Importance & limitation of ration analysis. Leverage analysis - Operating leverage, financial leverage, combined leverage.

Volume cost profit analysis - Introduction break even analysis, break even charts, and application of break even charts

UNIT - III

10 Hours (20 Marks)

Capital Budgeting - Nature of capital budgeting, Principles of capital budgeting, Techniques of capital budgeting, Net present value, Internal Rate of return, Profitability Index, Pay back period, Project selection under capital rationing.

UNIT - IV

10 Hours (20 Marks)

Concept of measurement of cost of capital - Importance & concept, Measurement of specific costs, computation of overall cost of capital. Capital structure Theories, Net income approach, Net operating income approach, Modigliani - Miller Approach, Traditional Approach

UNIT - V

10 Hours (20 Marks)

Equality and preference shares, fundamentals of equality shares, Preference share capital, Difference between shares & debentures.

Dividend and valuation - Irrelevance of dividends, Relevance of dividends, Divident pay out ratio.

Theory of working capital management - Nature, Need for working capital, Determinants of working capital, Computation of working capital. Types of working capital.

TERM WORK

Term work shall consist minimum eight assignments based on above syllabus.

REFERENCES

- 1) M. Y. Khan & P. K. Jain ,” Financial Management “,Tata Mc Graw Hill
- 2) I. M. Pandey, “Financial Management”
- 3) S.M. Inamdar ,” Financial Management”, Everest Publications
- 4) P. Shah, “Basic Financial Accounting for Management”, Oxford, New Delhi

B.E.(PRODUCTION ENGINEERING) : SECOND TERM ADVANCED WELDING TECHNOLOGY ELECTIVE - II

Teaching Scheme

Examination Scheme

Lectures : 4 Hours/week

Paper : 100 Marks

Work : 25 Marks

Duration : 3 Hours

Theory

Term

Paper

UNIT - I Marks)

10 Hours (20

WELDING : Introduction, Arc & Resistance welding, Classification of welding process. Advantages, Disadvantages of welding. GAS WELDING : Definitions, Principle, Oxyacetylene welding, Types of welding, Types of welding flames, Gas welding techniques, Application of gas welding. Air-acetylene welding, definition, Principle of operation & applications
ARC WELDING PROCESS – TIG, MIG, CO₂ welding, carbon Arc welding, Plasma Arc welding, Arc spot welding.

UNIT - II Marks)

10 Hours (20

RESISTANCE WELDING:Definition, Fundamentals of electric resistance welding, variables in resistance welding, Advantages of resistance welding, Disadvantages & Applications.
SPOT WELDING – Introduction, Use, Definition, Procedure, Heat Shrinkage, Heat balance
Spot weld able materials, Spot welding methods, Advantages applications, Seam welding, Definition, Principles of operations, Applications.

UNIT - III Marks)

10 Hours (20

RADIANT ENERGY WELDING PROCESSES

Electron beam welding, Introduction, definition, Principle of operation, Application, Advantages & Disadvantages.

LASER BEAM WELDING:Definition, Principle & Theory of operation, forms of lasers, Applications, Advantages & Disadvantages,UNDER WATER WELDING PROCESS:Introduction, Problems encountered in under water welding, Types,

Characteristics of a good under water welding process, under water welding processes applications.

**UNIT - IV
Marks)**

10 Hours (20

WELD ABILITY & WELD ABILITY TESTING

Definition & Concept & Weld ability, Effect of alloying elements on weld ability, purpose, types of weld ability tests, Hot cracking tests, Root cracking tests, Hydrogen induced cracking tests.

Welding of Cast iron, Welding of carbon steels, Welding of tool steels etc.,

**UNIT - V
Marks)**

10 Hours (20

COMPUTER SYSTEMS FOR WELDING ENGINEERING:Introduction, computer systems, software for welding engineers.

COMPUTER AIDED WELDING DESIGN :Introduction, Welding analysis, Engineering design V/s welding design solutions to the welding design problems, computer aided welding analysis , Computer aided welding design,Welding robots, Introduction, Robotic welding system, Types of welding robots, Design of welding robots,WELDING AUTOMATION – Concept, welding operations, welding operations, Basic operations, programming operations, control operations, classification of welding automation

TERM WORK

Term work shall consist minimum eight assignments based on above syllabus.

REFERENCE BOOKS

- 1) O. P. Khanna, “Welding Technology” Dhanpat Rai Publications
- 2) R. K. Jain, “ Production Technology”
- 3) M. Lal, “Fabrication Technology”
- 4) P. N. Rao ,“Manufacturing Tech”. Vol I & II
- 5) P.C. Sharma ,“ Production Engineering”

**B.E.(PRODUCTION ENGINEERING) : SECOND TERM
FLUID MACHINERY
ELECTIVE - II**

Teaching Scheme

Examination Scheme

Lectures : 4 Hours/week

Paper : 100 Marks

Theory

Work : 25 Marks

Term

Paper Duration : 3 Hours

UNIT - I

10 Hours (20 Marks)

Impact of free Jets – Introduction, force exerted on a stationary flat plate held normal to jet, inclined to jet force Exerted on a stationary curved plate, Force exerted on a moving flat plate held normal to jet, Inclined to the direction of jet. Force exerted on a curved vane when the vane is moving in the direction of jet. Jet striking a moving curved vane Tangentially at one tip & leaving at the other Jet propulsion of ships

UNIT - II

10 Hours (20 Marks)

Hydraulic Turbines - Introduction, classification of hydraulic turbines, Impulse turbines pelton turbine, construction, work done, efficiency definition of head & efficiencies, Design aspects of pelton wheel.

Reaction Turbine - Francis Turbine, Work done & efficiencies. Working proportions, Design of francis runner. Advantage and Disadvantage of francis turbine over a pelton wheel. Proper & Kaplan turbine - Axial flow reaction turbine propeller turbine, Kaplan turbine, Kaplan versus francis turbine, Qeriar turbine, Tubular or bulb turbines, Runway speed, Draft tube, Specific speed, unit quantities, Model relationship scale effect performance characteristics of hydraulic turbines. Governing of Hydraulic Turbine cavitations selection of Turbines surge tanks

UNIT - III

10 Hours (20 Marks)

Centrifugal Pumps - Introduction - Classification working, work done by impeller on liquid, Heads of pump, losses & efficiencies of pump, minimum speed for starting, effect of discharge on efficiency working proportion of centrifugal pumps, multistage centrifugal pumps, specific speed, model testing & geometrically similar pumps characteristics of centrifugal pumps, net positive section head, cavitations priming of centrifugal pumps selection pumps, operational difficulties in centrifugal pumps

UNIT - IV

10 Hours (20 Marks)

Reciprocating Pumps - Introduction, classification, working, discharge work done & power required to drive reciprocating pump, coefficient of discharge & slip of reciprocating pump, Effect of acceleration of piston on velocity & pressures in the section & delivery pipes. Indicator diagrams, Air vessels

UNIT - V

10 Hours (20 Marks)

Miscellaneous Hydraulic Machines - Introduction, Hydraulic accumulator, Hydraulic Intensifier, Hydraulic press, Hydraulic crane, Hydraulic lift, Hydraulic ram, Hydraulic coupling, Hydraulic torque converter, Air lift pump, Jet pump.

Water Power Developed - Hydrology, Hydro power plant, Introduction application, Advantage & Disadvantage of hydro electric power plant, Advantage life of hydro plant components. Hydro plant controls, Safety measures in hydro electric power plant, preventive maintenance, Calculation of hydro power, cost of hydro power plant, combined hydro & steam power plant comparison of hydro power station with thermal power stations

TERM WORK

Term work shall consist minimum eight assignments based on above syllabus.

REFERENCES

- 1) S.Ananthswamy, "Fundamentals on hydraulic machinery", United book corporation , Pune.
- 2) V.P. Vasandani, "Theory of hydraulic machinery" ,Khanna publishers, Delhi.
- 3) Dr. J. Lal,"Hydraulic machines" ,Metropolitan Books co. pvt. Ltd. Delhi.
- 4) S.R.Majumdar," Oil Hydraulic System", Tata McGraw Hill.
- 5) S.R.Majumdar, "Pneumatic System" ,Tata McGraw Hill.
- 6) Agrawal , "Fluid Mechanics and Machinery" ,Tata McGraw Hill

B.E. (PRODUCTION ENGINEERING): FIRST TERM

PROJECT II

(Common with Mechanical Engineering and Automobile Engineering)

scheme
50 Marks

Teaching scheme

Practical: 4 hrs / week

Examination

Oral :

Term Work : 100
Marks

1. The Project group in (B.E. first Term) seventh term will continue the project work in (B.E. Second Term) eighth term and complete project in all respect (assembly, testing, fabrication, tabulation, test result etc.)
2. The group should maintain a logbook of activities. It should have entries related to the work done, problems faced, solution evolved etc., duly signed by guide.
3. The guides should regularly monitor the progress of the project work.
4. The project work along with project report should be submitted as part of term work in (B.E. Second Term) eighth term on or before the last day of the (B.E. Second Term) eighth term
5. Project report must be submitted in the prescribed format only. No variation in the format will be accepted.
6. Assessment of the project for award of TW marks shall be done by the guide and a departmental committee (consisting of minimum two teachers with experience more than three years) as per the guidelines given in the following table.

B) ASSESSMENT OF PROJECT II TERMWORK (B.E. SECOND TERM)

NAME OF THE PROJECT: _____

NAME OF THE GUIDE: _____

Sr. No	Exam. Seat No	Name Of Students	Assessment by guide (70%)						Assessment by department (30%)			Grand Total
			Fabrication /software / actual work	Execution of project	Project report	Scope/ Cost / Utility	Attende - nece	Total	Evalu- ation (10%)	Prese- ntaion (20%)	Total	
		Marks	20	10	20	10	10	70	10	20	30	100

Sign of Guide
Sign. of H. O. D.

Sign. of Committee Members

7. The guide should be internal examiner for oral examination (If experience is greater than three years).
8. The external examiner should be from the related area of the concerned project. He should have minimum of five years of experience at degree level / industry.
9. The evaluation at final oral examination should be done jointly by the internal and external examiners.

NORTH MAHARASHTRA UNIVERSITY JALGAON
B.E. (Common with Mechanical Engineering and Automobile Engineering)
W.E.F : 2008- 09

TERM - II

INDUSTRIAL VISIT / CASE STUDY

Teaching scheme:

Examination

scheme:

**NIL
Marks**

Term Work : 25

EDUCATION TOUR / TECHNICAL VISITS / CASE STUDY AND ITS

EVALUATION

1. During (B.E. First Term / Second Term) seventh and / or eighth terms or during vacation between (B.E. First Term / Second Term) seventh and eighth terms, every student; shall visit minimum two industries, factories arranged by colleges and accompanied by teachers. There shall be at least one teacher for a group of 20 students and at least one non-teaching staff accompanied with the students.
2. The colleges should obtain appropriate certificates of visit from the concerned organizations just after the visits.
3. Students should submit written report about the visits individually at the end of (B.E. Second Term) eighth term.
4. The report should contain information about the following points:
 - (a) The organization - activities of organization and administrative setup technical personnel and their main duties.
 - (b) The project / industry brief description with sketches and salient technical information.
 - (c) The work / processes observed with specification of materials, products, equipments etc. and role of engineers in that organization.
 - (d) Suggestions (if any) for improvement in the working of those organizations.
5. The evaluation of the report of technical visits will be made by panel of two teachers appointed by principal based on following points:

- (a) Coverage aspect: All above points should be covered.
 - (b) Detailed observations: System / Process / Product explained with data, diagram specifications.
 - (c) Quality of presentation: Report should be very objective and should consist of clear and systematic organization of topics and information.
 - (d) Viva - voce: A viva -voce shall be conducted on the technical visit report by the teachers to assess the specific knowledge gained by the students for technical applications.
6. The case study should include the study problem in Mechanical Engineering, Automobile Engineering and Production branch.

**NORTH MAHARASHTRA UNIVERSITY, JALGAON
ENGINEERING AND TECHNOLOGY FACULTY
Equivalent Subjects of B.E. Production Engineering**

FIRST TERM

S.N.	Old Subjects	S.N.	Equivalent Subjects	Year
1	Tool Design	1	--	--
2	Production Planning and Control	2	Production Planning and Control	B.E.Prod Sem-II (New)
3	Financial Management and Cost Control	3	--	--
4	Elective - I	4	Elective - I	
	1. Energy Management		1. --	--
	2. Tool Quality Management		2. --	--
	3. Automobile Engineering-I		3. --	--
	4. Non-conventional Energy Sources		4. Non-conventional Energy Sources	B.E.Prod Elective-I (New)
5. Management Information System	5. --	--		

SECOND TERM

S.N.	Old Subjects	S.N.	Equivalent Subjects	Year
1	Tribology	1	--	--
2	CAD/CAM	2	--	--
3	Material Management	3	--	--
4	Elective - II	4	--	--
	1. Mechanical Estimation and Costing		1. --	--
	2. Industrial Relations		2. --	--
	3. Automobile Engineering-II		3. --	--
	4. Power Plant Engineering		4. --	--
5. Foundry Engineering	5. --	--		