

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C G)

SCHEME OF TEACHING & EXAMINATION B.E. VII SEMESTER MECHANICAL ENGINEERING

S.No.	Board of Study	Subject Code	Subject	Periods per Week			Scheme of Examination			Total Marks	Credit L+(T+P)/2
				L	T	P	Theory/Pract.				
							ESE	CT	TA		
1	Mech. Engg.	337711 (37)	Automobile Engg.	4	1	-	80	20	20	120	5
2	Mech. Engg.	337712 (37)	Heat & mass Transfer	4	1	-	80	20	20	120	5
3	Mech. Engg.	337713 (37)	Computer Aided Design and Manufacturing	4	1	-	80	20	20	120	5
4	Mech. Engg.	337714 (37)	Operations Research	4	1	-	80	20	20	120	5
5	Refer Table -2		Professional Elective – II	4	1	-	80	20	20	120	5
6	Mech. Engg.	337721 (37)	Automobile Engg. Lab	-	-	3	40	-	20	60	2
7	Mech. Engg.	337722 (37)	Heat & mass Transfer Lab	-	-	3	40	-	20	60	2
8	Mech. Engg.	337723 (37)	Computer Aided Design and Manufacturing Lab	-	-	3	40	-	20	60	2
9	Mech. Engg.	337724 (37)	Minor Project	-	-	3	100	-	40	140	2
10	Management	300725 (36)	Innovative & Entrepreneurial Skills	-	-	2	-	-	40	40	1
11	Mech. Engg.	337726 (37)	** Practical Training Evaluation / Library	-	-	1	-	-	40	40	-
Total				20	5	15	620	100	280	1000	34

L- Lecture T- Tutorial
P- Practical , ESE- End Semester Exam
CT- Class Test TA- Teacher's Assessment

**To be completed after VI Sem. and before the commencement of VII Sem.

Table – II			
Professional Elective- II			
S.No.	Branch	Code	Name of Subject
1	Mechanical	337751 (37)	Quality Control & Total Quality Management
2	Mechanical	337752 (37)	Reliability Based Design
3	Mechanical	337753 (37)	Finite Element Method
4	Mechanical	337754 (37)	Product Development
5	Mechanical	337755 (37)	Numerical Control of Machine Tools
6	Mechanical	337756 (37)	Nuclear Power Engineering

Note : 1/4th of total strength of students subject to minimum of twenty students is required to offer an elective in the college in a particular academic session.

Note : Choice of elective course once made for an examination cannot be changed for future examinations.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C G)

Semester: B.E. VII Sem.

Subject: Automobile Engineering

Total Theory Periods: 50

Total Marks in End Semester Exam: 80

Minimum number of class tests to be conducted: 2

Branch: Mechanical Engg.

Code: 337711 (37)

Total Tutorial Period : 12

UNIT-I

Chassis & Frame - Layout of chassis & its main components, types of frames, conventional frames & unitized chassis.

Suspension system & Springs -Objects & principles of suspension, system, types, rigid axle suspension & Independent suspension for front & rear ends, simple & double arm parallel & perpendicular type of suspension system. Gas filled suspension system.

Springs - Purpose, types viz. leaf, coiled, rubber, air, suspension system, torsion bar, stabilizer, Telescopic damper.

UNIT – II

Clutches

Characteristics, functions, principles of operation of clutch, friction clutch, single plate, multi plate, centrifugal clutch, positive clutch, friction plate clutch lining materials. Torque transmitted and related problems.

Fluid flywheel

Construction, principles of working & characteristics.

UNIT – III

Gear Box: Object of Gear Box, Air, rolling & gradient resistance, tractive effort variation with speed, performance curve.

Types of Gear Boxes:- Sliding mesh, constant mesh, synchromesh device, automatic transmission, overdrive, lubrication of gear box.

Torque converter: Principles of working, characteristics, Torque converter with direct drive.

Testing of automobiles.

UNIT – IV

Universal Joint:- Types, propeller shaft, slip joint.

Differential – Functions, single & double reduction differential, limited slip differential.

Front Axle: Live & dead axle, stub axle.

Back Axle: Hotch kiss drive, torque tube drive.

Tyres: Types specification, causes of tyre wear & rim.

Brakes & Braking system: Purpose, principles, layout of braking system. Classification, mechanical, hydraulic, master cylinder, Tandoma master cylinder wheel cylinder, self energizing & self adjusting brakes, disc brakes, antiskid brakes.power operated brakes:

UNIT – V

Steering system:- Gear & links, types of steering gears, reversibility of steering, center point steering, steering geometry viz castor, camber, king pin inclination toe in, toe out, cornering power, under-over steer; power steering, effect of shimmy, condition of true rolling, calculation of turning radius. Correct steering equation and related problems.

Electrical System: Battery construction, maintenance, testing and charging, cut out, lighting circuit, horn, signals etc.

TEXT BOOKS

1. Automobile Engineering – Kripal Singh – Standard Publications
2. Automobile Engineering – G.B.S. Narang – Khanna Publishers

REFERENCE BOOKS

1. Automobile Engineering - Dr. N. K. Giri – Khanna Publishers
2. Automobile Engineering – K. R. Govindan – Anuradha Agencies
3. Automotive Mechanics – Heitner
4. Motor Vehicle – Newton & Steeds – Life & Sons Limited.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C G)

Semester: B.E. VII Sem.

Subject: Heat & Mass Transfer

Total Theory Periods: 50

Total Marks in End Semester Exam: 80

Minimum number of class tests to be conducted: 2

Branch: Mechanical Engg.

Code: 337712 (37)

Total Tutorial Period: 12

N.B. :- H.M.T. Data Book (PSG), Fifth Edition "Wiley Eastern Limited" Permitted in the Examination.

UNIT – I

Introduction

Various modes of heat transfer, Fourier's, Newton's and Stefan Boltzman's Law, Combined modes of heat transfer, thermal transfer, thermal diffusivity, overall heat transfer coefficient.

Conduction

The thermal conductivity of solids, liquids and gases, factors influencing conductivity measurement. The general differential equation of conduction. One dimensional steady state conduction, linear heat flow through a plane and composite wall, tube and sphere, critical thickness of insulation, Effect of variable thermal conductivity, Conduction with heat generation in flat and cylinders.

UNIT - II

Fins

Conduction convection system, extended surfaces rectangular, triangular, circumferential and pin fins. General conduction analysis, fins of uniform and non-uniform cross sectional area. Heat dissipated by a fin. Effectiveness and efficiency of fins. Approximate solution. Design of fins for maximum heat transfer. Solution for different boundary condition. Use of fin analysis for measuring temperature error of Thermometer.

Transient/Unsteady State Heat Conduction

System with negligible internal resistance, Lumped capacity method and its Validity. Unsteady state conduction through finite and semi- infinite slab without surface resistance, convection boundary conditions. Solution through Heisler's chart.

UNIT – III

Forced Convection

Physical Mechanism of Forced Convection, Dimensional analysis for forced convection, velocity and Thermal Boundary layer, Flow over plates, Flow across cylinders and spheres, Flow in tubes, Reynold's analogy.

Natural Convection

Physical Mechanism of Natural Convection, Dimensional analysis of natural convection; empirical relationship for natural convection.

UNIT IV

Two Phase Heat Transfer

Boiling heat transfer, Pool boiling, boiling regimes and boiling curve, next transfer correlations in pool boiling. Condensation heat transfer, Film condensation, derivation for the average heat transfer coefficient 'h' for the case of laminar film condensation over vertical plate, Heat transfer correlation for inclined plates, vertical tubes, Horizontal bank tubes.

Heat Exchangers

Different types of heat exchangers; Determination of heat exchanger performance, Heat exchanger transfer units, Analysis restricted to parallel and counter flow heat exchanger (LMTD and NTU method)

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C G)

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UNIT V

Thermal Radiation

Introduction, absorption and reflection of radiant energy, Emission, Radiosity and irradiation, Black and non black bodies, Kirchoff's law; intensity of radiation, radiation exchange between black surface, geometric configuration factor. Grey body relation exchange between surface of unit configuration factors. Electrical analogy to simple problems. Non-luminous gas radiation. Errors in temperature measurement due to radiation.

Introduction to Mass Transfer

Mass and mole concentrations, molecular diffusion, eddy diffusion, Molecular diffusion from an evaporating fluid surface, Introduction to mass transfer in laminar and turbulent convection Combined heat and mass transfer, the wet and dry bulb thermometer.

TEXT BOOKS

1. Heat Transfer – S.P. Sukhatme – TMH
2. Heat & Mass Transfer – D.S. Kumar – S.K. Kataria & Sons
3. Heat transfer- C P Arora, TMH

REFERENCE BOOKS

1. Heat & Mass Transfer – K. Kannan – Anuradha Agencies
2. Heat Transfer – J.P. Holman – TMH
3. Heat Transfer – A Practical Approach – Yunus A. Cengel – McGraw Hill
4. Heat Transfer – Ghosh, Dastudhar – Oxford University Press

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C G)

Semester: B.E. VII Sem.
Subject: Computer Aided Design and Manufacturing
Total Theory Periods: 50
Total Marks in End Semester Exam: 80
Minimum number of class tests to be conducted: 2

Branch: Mechanical Engg.
Code: 337713 (37)
Total Tutorial Period: 12

UNIT – I

Introduction CAD/CAM

The influence of computers on manufacturing environment, Introduction of CAD/CAM, the product cycle & CAD/CAM, automation and CAD/CAM, the common database as linkage to various computerized applications. Product engineering, Benefits of CAD/CAM, Concurrent engineering.

UNIT – II

Geometric Modeling

Data base: Design database concept, objectives, data structures, creation of data files in application programs and relational database management system.

Requirement of Geometric Modeling, Geometric models, Geometric construction Methods, other modeling methods, curve representation, desirable modeling facilities & rapid prototyping.

3D representation of surfaces and solids; Plane surface, surfaces of revolution, Bezier surfaces, spline surfaces, Solid entities, basic set theory.

UNIT – III

Numerical Control

Introduction to Numerical Control, Basic components of an NC system, the NC procedure, NC coordinate systems, NC motion control systems, applications of Numerical Control, Introduction to Computer Control in NC, problems with conventional NC, Computer Numerical Control, Direct Numerical Control, Combined DNC/CNC system, Adaptive control machining system,

NC Part Programming

Introduction to NC Part Programming, Manual part programming, Computer assisted part programming, the APT (Automatically Programming Tool) language, MACRO statement in APT, Advantages of CAD/CAM in NC programming.

UNIT – IV

Group Technology

introduction to group technology, part families, parts classification & coding, three parts classification & coding system, group technology machine cells, benefits of group technology

Computer integrated manufacturing (CIM) system

Introduction of CAPP, Flexible manufacturing system, benefits.

UNIT V

Finit Element method

Introduction, types of analysis, general procedure of finite element analysis- stiffness matrix, solution procedure, one dimensional problem.

TEXT BOOKS

1. CAD/CAM Principles & Applications – P.N. Rao – TMH Publication
2. CAD/CAM Computer Aided Design & Manufacturing – Mikell P. Groover, Emory W. Zimmer - Pearson Education
3. Concept and application of Finite element analysis, R D Cook, John Wiley

REFERENCES BOOKS

1. CAD/CAM Theory & Practice – Ibrahim Zied – TMH Publication
2. CAD/CAM – Surendra Kumar & A.K. Jha – Dhanpat Rai & Company
3. Finite element analysis

Semester: B.E. VII Sem.

Branch: Mechanical Engg.

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C G)

Subject: Operations Research

Code: 337714 (37)

Total Theory Periods: 50

Total Tutorial Period: 12

Total Marks in End Semester Exam: 80

Minimum number of class tests to be conducted: 2

UNIT I

Introduction

Various stages of O.R., Fields of application, optimization and its classification.

General Linear Programming Problems- Introduction, maximization and minimization of function with or without constraints, formulation of a linear programming problem, graphical method and simplex method, Big M method degeneracy, application of L.P.P. in Mechanical Engineering.

UNIT – II

The Transportation Problems

Mathematical formulation computational procedures, Stepping stone method, Modified Distribution Method, Vogels Approximation Method, Solution of balanced and unbalanced transportation problems and case of Degeneracy.

The Assignment Problems

Mathematical formulation of assignment problems, solution of assignment problems, traveling salesman problems, Air crew Assignment problems.

UNIT - III

Waiting Line Theory

Basic queuing process, basic structure of queuing models, some commonly known queuing situations Kendall's service time, solution to M/M/1: ∞ /FCFS models.

Network Analysis

CPM/PERT, Network Representation, Techniques for drawing network. Resource smoothing and leveling, project cost, Optimum project duration, project crashing, updating, Time estimation in PERT.

UNIT – IV

Game Theory

Introduction, two person zero sum game, methods for solving two person zero sum game: when saddle point exists, when no saddle point exists, solution of $2 \times n$ and $m \times 2$ game.

Simulation

Basic concept of simulation, applications of simulation, merits and demerits of simulation, Monte Carlo simulation, simulation of Inventory system, simulation of Queuing system.

Note: Four questions to be set, one from each unit.

TEXT BOOKS

1. Operation Research , Sasien Yaspan
2. Operation Research – N. D. Vohra – TMH
3. Operation Research– Hira & Gupta – S. Chand & Co.

REFERENCES

1. Operation Research – H. Gillette – TMH, New Delhi
2. Operations Research – M. Taha – TMH, New Delhi
3. Fundamentals of Operation Research – Ackof Sasieni – Dhanpat Rai & Sons
4. Quantitative Approach to Management – Lovin and Krit Patrick – TMH
5. Operation Research– S.D. Sharma – S. Chand & Com. New Delhi

Semester: B.E. VII Sem.

Subject: Quality Control & Total Quality Management

Branch: Mechanical Engg.

Code: 337751 (37)

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C G)

Total Theory Periods: 50

Total Tutorial Period: 12

Total Marks in End Semester Exam: 80

Minimum number of class tests to be conducted: 2

UNIT-I

Basic Concept of Quality

Quality and quality control, concept of quality, quality characteristics, Quality of design and quality of conformance, History of quality control, Quality policy and objectives, Economics of quality.

Statistical Concept of Variation

Concept of variation frequency distribution, continuous and discrete, probability distributions viz. Normal, Exponential and weibull distribution, pattern of variation, significance tests, Analysis of variance, statistical aids in limits and tolerances.

UNIT-II

Quality Assurance

Concept, advantages, field complaints, quality rating, quality audit, inspection planning, quality mindness, quality budget, vendor quality rating (VQR), vendor rating (VR), manufacturing planning for quality, Quality function deployment (QFD).

Statistical Quality Control

Objectives, Growth and applications of S.Q.C., S.O.C, Techniques in manufacturing planning. Process capability analysis, Control charts for variables and attributes and their analysis, process capability, concept of six sigma.

UNIT III

ACCEPTANCE SAMPLING

Fundamental concept in acceptance sampling, operating characteristics curve. Acceptance plans, single, double and introduction of multiple plans, LTPD, AOQL, AOQ.

UNIT - I V

Total Quality Management

Total Quality Control (TQC), Concept of Total Quality Management (TQM), TQM philosophies, Deming approach to TQM, Juran ten steps to Quality Management, Taguchi Philosophy, Crosby fourteen steps, TQM models, Tools and techniques of TQM,

UNIT V

Quality system

Quality system, need for quality system, ISO 9000 Quality Management Standards, ISO 9000:2000 requirement, Quality Auditing, ISO 14000, Benefits of ISO 14000.

TEXT BOOKS

1. Quality Planning and Analysis by Juran J.M. and Gryana FM. – McGraw Hill, New York
2. Statistical Quality Control – R.C. Gupta – Khanna Publishers, Delhi
3. Statistical quality control – E. L. Grant and R. S. Leavenworth – Mc. Graw Hill, New York

REFERENCE BOOKS

4. Engineering Statistics and quality control – I. W. Burr, Mc. Graw Hill, New York
5. Managing for Total quality from Deming to Tguchi and SPC. - Logothetis – Prentice Hall of India
6. Statistical Quality Control – M. Mahajan – Dhanpat Rai & Company – New Delhi

Semester: B.E. VII Sem.
Subject: Reliability Based Design

Branch: Mechanical Engg.
Code: 337752 (37)

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C G)

Total Theory Periods: 50

Total Tutorial Period: 12

Total Marks in End Semester Exam: 80

Minimum number of class tests to be conducted: 2

UNIT - I

Basic concepts in probability theory:

Probability of events and random variables; discrete distributions: Poisson and Binomial, continuous distributions: Exponential, Weibull, Normal and Lognormal distributions

UNIT - II

System reliability:

Series, parallel, standby redundant and 'out-of' systems; static and dynamic reliability models

UNIT - III

Probabilistic models:

Load (stress) and capacity (strength) variables, load-capacity analysis (Stress-Strength Interference Theory)

Probabilistic design methodology:

Interference theory, calculation of reliability of with stress and strength having exponential, normal, lognormal, Gamma and Weibull distributions

UNIT - IV

Reliability and rates of failure:

Reliability characterization and failure rates, bath tub curves, constant failure rate models, conditional probability of survival of a device, increasing failures rate models

UNIT- V

Reliability testing and data analysis:

Non-parametric methods; grouped and ungrouped data, ungrouped and grouped censored data

Reliability data analysis; parametric methods, parameters estimation using linear regression of transformed data, accelerated life testing

TEXT BOOKS

1. Introduction to Reliability Engineering, 2nd Edition - Elmer E. Lewis - John Wiley & Sons, Inc.
2. Mechanical Engineering Design, 5th Edition- J. E. Shigley and C. R. Mischke - McGraw-Hill

REFERENCE BOOKS

1. Optimisation for Engineering Design - Kalyanmoi Deb- Prentice Hall India
2. Optimisation Concepts and Applications in Engineering - Ashok Belegundi, T Chandrapta - Pearson education
3. Optimisation Theory and Applications – S.S. Rao - Wiley Eastern Ltd
4. Reliability in Design - Kapoor K.C.

Semester: B.E. VII Sem.
Subject: Finite Element Method

Branch: Mechanical Engg.
Code: 337753 (37)

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C G)

Total Theory Periods: 50

Total Tutorial Period: 12

Total Marks in End Semester Exam: 80

Minimum number of class tests to be conducted: 2

UNIT - I

Introduction:

Over view of the method, range of applications, energy methods to solve problems in mechanics of solids, virtual work principle, Rayleigh-Ritz method

UNIT - II

Basic Equations:

Basic equations from fluid mechanics, heat transfer, and solid mechanics, functional and it's minima, variational approach, FEM and Ritz method, element equations from variational principle, finding variational principles for the problem, methods of weighted Gelarkin collocation techniques

UNIT - III

Formulation of FEM equations:

Elements and interpolation functions, stiffness, matrix and the equilibrium equations, formulation based on generalised co-ordinates, convergence requirements, natural co-ordinates, numerical integration, Newton-Cotes and Gauss-Legendre quadrature

UNIT - IV

Solving FEM equations:

Assembly of global stiffness matrix and inserting boundary conditions, solution of linear system of equation, Gauss elimination, Gauss-Siedel, Cholesky's decomposition, nature of the stiffness matrix

UNIT - V

FEM software and applications:

Exposure to FEM software, standard components of FEM software and their roles, application of FEM

TEXT BOOKS

1. An Introduction to the Finite Element Method - Reddy J.N. - McGraw-Hill Company
2. Introduction to Finite Element, in Engineering - Belegundu Chandrapatla - Prentice Hall of India Pvt. Ltd New-Delhi

REFERENCE BOOKS

1. FEM - Desai and Abel
2. Finite Element Procedure - K.J. Bathe - Prentice-Hall of India Pvt. New-Delhi
3. Finite Element Analysis - Krishnamoorthy

Semester: B.E. VII Sem.

Subject: Product Development

Total Theory Periods: 50

Total Marks in End Semester Exam: 80

Branch: Mechanical Engg.

Code: 337754 (37)

Total Tutorial Period: 12

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C G)

Minimum number of class tests to be conducted: 2

UNIT-I

Product Development Process

Background for design, design theory design materials, human factors in design applied ergonomics, product development processes and organization, identifying customer needs, establishing product specifications, concept generation and selecting product architecture.

UNIT-II

Product Design Methods

Generating concepts, selection of a concept, Testing of concept, product architecture, Creative and rational clarifying objectives- the objective trees methods, establishing functions – the function analysis methods, setting requirement- requirements specification methods determining characteristics – the QFD method, generating alternatives-the morphological chart method, evaluating alternatives-the weighted objectives methods, improving details-the value engineering method and design strategies.

UNIT –III

Design for Manufacture

Estimating manufacturing costs, reducing component, assembly and support cost design for assembly, design for disassembly, design for environment, design for graphics and packaging, effective prototyping – principle and planning.

UNIT –IV

Industrial Design

Its need - Ergonomic needs, Aesthetic needs, impact, accessing the quality, steps involved in Industrial design process, Management of Technology & user driven products.

UNIT – V

Patents, Product Development & Project Management

Legal issues in product design, trademarks, trade-secret, copy rights, patents – types, steps for disclosure, design resources, economics – quantitative & qualitative analysis, management of product development projects, Design Structure Matrix, Gantt Chart, Project schedule, budget, risk plan, accelerating project, execution, assessing and correction, Intellectual property rights.

TEXT BOOKS

1. Karl. T. Ulrich and Steven D. Eppinger “Product Design & Development” – TMH – 3rd addition
2. Kevin Otto and Kristin wood “Product Design” –Pearson Education
3. Imad Moustapha “Concurrent Engineering in Product Design and Development” – New Age International Publishers
4. Chitale & Gupta, “Product Development”, Tata McGraw Hill.
5. Monks, J.G, “Operations Management”, McGraw Hill, 1977
6. Francis, R. L., and White, J. A., “Facility Layout and Location”, Prentice Hall of India, 1974

Semester: B.E. VII Sem.
Subject : Numerical Control of Machine Tools
Total Theory Periods: 50
Total Marks in End Semester Exam: 80

Branch: Mechanical Engg.
Code: 337755 (37)
Total Tutorial Period: 12

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C G)

Minimum number of class tests to be conducted: 2

UNIT - I

Introduction

Fundamentals of numerical control, advantages limitations of N.C systems -classification of N.C systems.

Computer Numerical Control

Nomenclature, types and features of CNC machine tools. . Machine control unit. Position control and its significance. Engineering analysis of NC positioning systems. Open loop and closed loop systems. Precision in NC positioning systems: control resolution, accuracy and repeatability. Actuators: servomotors, stepper motors, transducers and feedback elements.

UNIT - II

Features of N.C. Machine tools

Design consideration of N.C machine tools - increasing productivity with N.C machines, tooling for CNC machine.

System Device

Feed back system-counting devices digital analog converters

Interpolations

DDA integrators, simple and symmetrical DD reference word CNC interpolators.

UNIT - III

Part Programming

Process planning and flow chart for part programming. systems, nomenclature and tool geometries. Tool presetting & Modular Tooling. Selection of tools based on machining capacity, accuracy and surface finish. Elements of programming for turning and milling. part programming. Preparatory codes G, Miscellaneous functions M. Interpolation, Tool compensations, cycles for simplifying programming. Typical part programming

Control Loops for N C Systems

Introduction-control loops for point and counting systems.

UNIT - IV

Computerized Numerical Control

CNC concepts-advantage of CNC reference planes, sampled data techniques, microcomputers in CNC.

Adaptive Control Systems

Adaptive control with optimization, and constraints-variable gains AC systems.

UNIT - V

Modern CNC machines

CNC lathes. Turning centers. Machining centres. Automatic pallet changers. Automatic tool changers. Direct numerical control and applications. CNC machine design features.

TEXT BOOKS

1. Automation, Production Systems and Computer Integrated Manufacturing - Mikell P. Groover - PHI, 2001.
2. CNC Programming - S.K. Sinha - Galgotia Publications 2003.

REFERENCE BOOKS

1. HMT Mechatronics - Tata McGraw Hill
2. numerical control of machine tool by urie and koren

Semester : B.E. VII Sem.
Subject : Nuclear Power Engineering
Total Theory Periods: 50
Total Marks in End Semester Exam: 80

Branch: Mechanical Engg.
Code: 337756 (37)
Total Tutorial Period: 12

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C G)

Minimum number of class tests to be conducted: 2

UNIT – I

Introduction to Nuclear Engineering

Introduction, Why Nuclear Power for Developing Countries, Atomic Nuclei, Atomic Number and Mass Numbers, Isotopes, Atomic Mass Unit, Radioactivity and Radioactive Change, Rate of Radioactive Decay, Mass-Energy Equivalence, Binding Energy, Release of Energy by Nuclear Reaction, Types of Nuclear Reactions, Initiation of Nuclear Reaction.

UNIT – II

Nuclear Reactors

Introduction, General Components of Nuclear Reactor, General Problems of Reactor Operation, Different types of Reactors, Pressurized Water Reactors, Boiling Water Reactors, Heavy Water-cooled and Moderated CANDU (Canadian Deuterium Uranium) Type Reactors, Gas-cooled Reactors, Liquid Metal-cooled Reactors, Organic Moderated and Cooled Reactors, Breeder Reactors, Reactor Containment Design

UNIT – III

Nuclear Materials

Introduction, Fuels, Cladding and Structural Materials, Coolants, Moderating and Reflecting Materials, Control Rod Materials, Shielding Materials.

UNIT – IV

Nuclear Waste & Its Disposal

Introduction, Unit of Nuclear Radiation, Types of Nuclear Waste, Effects of Nuclear Radiation, Radioactive Waste Disposal System, Gas Disposal System.

UNIT – V

Nuclear Power Plant

Location of Nuclear Power Plant, Nuclear Power Stations in India, India's three stage program for Nuclear Power development, Method of loading of Nuclear Power Plant, Comparison of Nuclear Power Plants with Thermal Power Plants, Safety measures for Nuclear Power Plants.

TEXT BOOKS

1. A Course in Power Plant Engineering – Arora, Domkundwar – Dhanpat Rai & Co., 2005
2. Power Plant Engineering, 2nd Edn. – P.K. Nag – Tata McGraw-Hill Pub. Com., New Delhi, 2004

REFERENCE BOOKS

1. Power Plant Engineering – P.C. Sharma – S.K. Kataria & Sons, 2003
2. Principles of Energy Conversion, 2nd Edn., International Edn. – Archie W. Culp Jr. – McGraw Hill, 1991

Semester: B.E. VII Sem.
Subject: Automobile Engineering Lab
Total Practical Periods: 40
Total Marks in End Semester Exam: 40

Branch: Mechanical Engg.
Code: 337721 (37)

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C G)

STUDIES TO BE CARRIED OUT (MINIMUM TEN EXPERIMENTS)

1. Study of Frame and Chassis.
2. Study of Clutches – Single Plate, Multi Plate and Centrifugal
3. Study of Gear Boxes – Sliding mesh, Constant mesh, Synchro mesh.
4. Study of Differential, Universal joints, Axles and Slip Joints.
5. Study of Brakes – Mechanical, Hydraulic, Air Brake and Disc Brake.
6. Study of Steering System used with Rigid Axle suspension and independent suspension system, Power Steering
7. Study of different types of springs used in Automobiles.
8. Study of Rigid Axle suspension system.
9. Study of Front Independent Suspension System.
10. Study of Rear Independent Suspension System.
11. Study of Battery, Staring and Generating System and Battery Charging System.
12. Study of Automotive Electrical System.
13. Study of Educational Car Model.

LIST OF EQUIPMENTS/MACHINES REQUIRED

1. Working model of Single plate, Multi-plate & Centrifugal Clutch
2. Working model of Actual Differential System
3. Working model of Universal Joint, Axles & Slip Joints
4. Working model of Mechanical, Hydraulic and Air Brake
5. Working model of Steering System used with Rigid Axle suspension System
6. Working model of Steering System used with Independent Suspension System
7. Different types of Springs used in Automobiles
8. Working model of Rigid Axle Suspension System
9. Working model of Front Independent Suspension System
10. Working model of Rear Independent Suspension System
11. Working model of Battery, Staring and Generating System along with Charging unit
12. Working model of Electrical System
13. Cut section of Actual Master Cylinder of Hydraulic Brake System
14. Educational Car Model

Semester: B.E. VII Sem.
Subject: Heat & Mass Transfer Lab
Total Practical Periods: 40
Total Marks in End Semester Exam: 40

Branch: Mechanical Engg.
Code: 337722 (37)

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C G)

EXPERIMENTS TO BE PERFORMED (MINIMUM TEN NUMBERS)

1. To Determine Thermal Conductivity of Insulating Powders.
2. To Determine Thermal Conductivity of a Good Conductor of Heat (Metal Rod).
3. To Measure the thermal Conductivity of Liquid.
4. To determine the transfer Rate & Temperature Distribution For a Pin Fin.
5. To Measure the Emmissivity of the Test plate Surface.
6. To Determine Stefan Boltzman Constant of Radiation Heat Transfer.
7. To Determine the Surface Heat Transfer Coefficient For Heated Vertical Cylinder in Natural Convection.
8. Determination of Heat Transfer Coefficient in Drop Wise & Film Wise condensation.
9. To Determine Critical Heat Flux in Saturated Pool Boiling.
10. To Study Performance of Simple Heat Pipes.
11. To Study and Compare LMTD and Effectiveness in Parallel and Counter Flow Heat Exchangers.
12. To Find the Heat transfer Coefficient in Forced Convection in a tube.
13. To determine the total thermal conductivity and thermal resistance of the given compound resistance in series.
14. To find out the thermal conductivity of given slab material.
15. To determine the individual thermal conductivity of different lagging in a lagged pipe.
16. To study the rates of heat transfer for different materials and geometries
17. To understand the importance and validity of engineering assumptions through the lumped heat capacity method.
18. Testing and performance of different heat insulators.

LIST OF EQUIPMENTS/MACHINES REQUIRED

1. Thermal Conductivity Of Insulating Powder Apparatus
2. Thermal Conductivity Of Metal Bar Apparatus
3. Thermal Conductivity Of Liquid Apparatus
4. Transfer Rate And Temperature Distribution For A Pin Fin Apparatus
5. Emmissivity Of The Test Plate Surface And Plotting A Graph Of Emmissivity Versus Temperature Apparatus
6. Stefan-Boltzman Constant Of Radiation Of Heat Transfer Apparatus
7. Surface Heat Transfer Coefficient For Heated Vertical Cylinder In Natural Convection Apparatus
8. Heat Transfer Coefficient In Drop Wise And Film Wise Condensation Apparatus
9. Critical Heat Flux In Saturated Pool Boiling Apparatus
10. Performance Of Different Heat Pipe Apparatus
11. Heat Transfer Rate Through Heat Exchanger Apparatus
12. Heat Transfer Coefficient In Forced Convection of Air in a Tube Apparatus
13. Heat transfer through composite wall Apparatus
14. Thermal conductivity of insulating slab Apparatus
15. Heat transfer through lagged pipe Apparatus
16. Unsteady state heat transfer Apparatus
17. Testing and performance Test Rig for heat insulators.

Semester: B.E. VII Sem.
Subject: Computer Aided Design & Manufacturing Lab
Total Practical Periods: 40
Total Marks in End Semester Exam: 40

Branch: Mechanical Engg.
Code: 337723 (37)

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C G)

EXPERIMENTS TO BE PERFORMED

CAD (MINIMUM FIVE EXPERIMENTS)

1. Introduction & different features of the CAD Software
2. 2-D Drafting
3. 3-D Modeling
4. 3-D Advanced Modeling
5. Assembly modeling
6. Feature Modification and Manipulation
7. Detailing
8. Sheet Metal Operations
9. Surface Modeling
10. One Dimensional problems of Finite Element Method.
(These exercises may be performed by any of the following Advanced CAD Software)

CAM (MINIMUM FIVE EXPERIMENTS)

1. To prepare part programming for plain turning operation.
2. To prepare part programming for turning operation in absolute mode.
3. To prepare part program in inch mode for plain turning operation.
4. To prepare part program for taper turning operation.
5. To prepare part program for turning operations using turning cycle.
6. To prepare part program for threading operation.
7. To prepare part program for slot milling operation.
8. To prepare part program for gear cutting operation.
9. To prepare part program for gear cutting using mill cycle.
10. To prepare part program for drilling operation.
11. To prepare part program for multiple drilling operation in Z-axis.
12. To prepare part program for multiple drilling in X-axis.
13. To prepare part program for multiple drilling in X and Z axis using drilling cycle.

LIST OF EQUIPMENTS/MACHINES REQUIRED

1. Computer Numerically Control Lathe Trainer
2. P-IV (IBM) 2.6 GHz, 80 GB HDD, 256/512 SD RAM (As Compatible with CAD Software) 52 X CD RW, 1.44 MB FDD, 17" Colour Monitor, Laser Scroll Mouse
3. Software – Pro-E, Solid-work, CATIA, ANSYS
4. CNC Controlled Milling Machine
5. CNC Controlled Drilling Machine

Semester: VII
Subject: Innovative and Entrepreneurial skills
Total Theory Periods: 28
Total Marks in End Semester Exam: 40
Minimum no. Of Class test to be conducted:--

Branch: Common to all branches
Code: 300725 (36)
Total Tutorial Period: NIL

Unit I

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI (C G)

Innovation: innovation- an abstract concept; creativity, innovation and imagination; types of innovation - classified according to products, processes or business organizations.

Unit II

Entrepreneurship: who is an entrepreneur? Entrepreneurship- A state of Mind, Emergence of entrepreneur; Role of Entrepreneur; A Doer not a Dreamer- Characteristics of an entrepreneur; Factors affecting entrepreneurial growth – Social, cultural, personality factors, psychological and Social Factors. Impact of Entrepreneurship for sustainable development.

Unit III

Difference between entrepreneur and entrepreneurship, Difference between entrepreneur and intra-preneur, Common Entrepreneurial competencies/Traits; Entrepreneurship stimulants, Obstacles inhibiting Entrepreneurship; Types of entrepreneurs, Functions of an entrepreneur.

Unit IV

Identification of Business Opportunities: Introduction, Sources of Business of Product Ideas, Steps in Identification of Business opportunity and its SWOT Analysis.

UNIT-V

Techno-Economic Feasibility of the project: Introduction, Techno- Economic feasibility of the Project, Feasibility Report, Considerations while preparing a Feasibility Report, Proforma of Feasibility Report, Role of Institutions and entrepreneurship.

Text and Reference Books:

1. Competing through Innovation-Bellon & Whittington, Prentice Hall of India
2. A Guide to Entrepreneurship – David Oates- JAICO Publishing House.
3. Entrepreneurship- Rober D Hisrich, Peters, Shepherd- TMH
4. Entrepreneurship in Action- Coulter, Prentice Hall of India
5. Entrepreneurship Management and Development – Ajith Kumar, HPH
6. Fundamentals of entrepreneurship- Mohanty, PHI
7. Patterns of Entrepreneurship- Jack M Kaplan, Wiley, student Edition.