

Chhattisgarh Swami Vivekanand Technical University, Bhilai

SCHEME OF TEACHING & EXAMINATION B.E. VIII 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.	337811 (37)	Robotics	4	1	-	80	20	20	120	5
2	Mech. Engg.	337812 (37)	Refrigeration & Air Conditioning	4	1	-	80	20	20	120	5
3	Mech. Engg.	337813 (37)	Production Management	4	1	-	80	20	20	120	5
4	Refer Table – 3		Professional Elective – III	4	1	-	80	20	20	120	5
5	Refer Table -4		Open Elective – IV	4	1	-	80	20	20	120	5
6	Mech. Engg.	337821 (37)	Robotics Lab	-	-	2	40	-	20	60	1
7	Mech. Engg.	337822 (37)	Refrigeration & Air Conditioning Lab	-	-	2	40	-	20	60	1
8	Mech. Engg.	337823 (37)	Production Management Lab	-	-	2	40	-	20	60	1
9	Mech. Engg.	337824 (37)	Major Project	-	-	6	100	-	80	180	3
10	Mech. Engg.	300825 (37)	Report Writing & Seminar	-	-	2	-	-	40	40	1
11			Library	-	-	1	-	-	-	-	-
Total				20	5	15	620	100	280	1000	32

L- Lecture

T- Tutorial

P- Practical ,

ESE- End Semester Exam

CT- Class Test

TA- Teacher's Assessment

Table – III			
Professional Elective- III			
S.No.	Branch	Code	Name of Subject
1	Mechanical	337871 (37)	Mechatronics
2	Mechanical	337872 (37)	Vibration & noise Control
3	Mechanical	337873 (37)	Optimization Techniques
4	Mechanical	337874 (37)	Energy Management and Audit
5	Mechanical	337875 (37)	Cryogenic Engineering
6	Mechanical	337876 (37)	Environmental Pollution & Control

Note : 1/4th of total strength of students subject to Minimum Strength 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

Table – IV

Open Elective -IV			
S.No.	Board of Studies	Code	Name of Subject
1	Management	300881 (36)	Enterprise Resource Planning
2	Information Technology	300882 (33)	E-Commerce & strategic IT
3	Management	300883 (36)	Technology Management
4	Information Technology	300884 (33)	Decision Support & Executive Information system
5	Computer Science & Engg.	300885 (22)	Software Technology
6	Management	300886 (36)	Knowledge Entrepreneurship
7	Management	300887 (36)	Finance Management
8	Management	300888 (36)	Project Planning, Management & Evaluation
9	Mechanical Engg.	300889 (37)	Safety Engineering
10	Computer Science & Engg.	300890 (22)	Bio Informatics
11	Mechanical Engg.	300891 (37)	Energy Conservation & Management
12	Nanotechnology	300892 (47)	Nanotechnology
13	Management	300893 (36)	Intellectual Property Rights
14	Mechanical Engg.	300894 (37)	Value Engineering
15	Civil Engg.	300895 (20)	Disaster Management
16	Civil Engg.	300896 (20)	Construction Management
17	Civil Engg.	300897 (20)	Ecology and Sustainable Development
18	Chem. Engg.	300898 (19)	Non Conventional Energy Sources
19	Electrical Engg.	300899 (24)	Energy Auditing and management

Note (1) – 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 (2) - Choice of elective course once made for an examination cannot be changed in future examinations.

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Semester: B.E. VIII Sem.

Subject: Robotics

Total Theory Periods: 50

Total Marks in End Semester Exam: 80

Minimum number of class tests to be conducted: 2

Branch: Mechanical Engg.

Code: 337811 (37)

Total Tutorial Period : 12

UNIT – I

Introduction to Robotics

Evolution of Robots and Robotics, Laws of Robotics, What is and What is not a Robot, Progressive Advancement in Robots, Robot Anatomy, Human Arm Characteristics, Design and Control Issues, Manipulation and Control, Sensors and Vision, Programming Robots, The Future Prospects, Notations.

UNIT – II

Coordinate Frames, Mapping and Transforms

Coordinate Frames, Description of Objects in Space, Transformation of Vectors, Inverting a Homogeneous Transform, Fundamental Rotation Matrices

UNIT – III

Symbolic Modeling of Robots – Direct Kinematic Model

Mechanical Structure and Notations, Description of Links and Joints, Kinematic Modeling of the Manipulator, Denavit – Hartenberg Notation, Kinematic Relationship between Adjacent Links, Manipulator Transformation Matrix.

Introduction to Inverse Kinematic model

UNIT – IV

Robotic Sensors and Vision

The Meaning of Sensing, Sensors in Robotics, Kinds of Sensors used in Robotics, Robotic vision, Industrial Applications of Vision-Controlled Robotic Systems, Process of Imaging, Architecture of Robotic Vision Systems, Image Acquisition, Description of Other components of Vision System, Image Representation, Image Processing.

UNIT – V

Robot Applications

Industrial Applications, Material Handling, Processing Applications, Assembly Applications, Inspection Application, Principles for Robot Application and Application Planning, Justification of Robots, Robot Safety, Non-Industrial Applications, Robotic application for sustainable Development.

TEXT BOOKS

1. Robotics & Control – R.K. Mittal & I.J. Nagrath – TMH Publications
2. Robotics for engineers - Yoram Korean- McGrew Hill Co.
3. Industrial Robotics Technology programming and Applications - M.P.Groover, M.Weiss, R.N.Nagel, N.G.Odrey

REFERENCE BOOKS

1. Robotics Control Sensing, Vision and Intelligence - K.S.Fu, R.C.Gonzalex, C.S.G.Lee- McGrew hill Book co.
2. Kinematics and Synthesis of linkages - Hartenberg and Denavit - McGrew Hill Book Co
3. Kinematics and Linkage Design - A.S. Hall - Prentice Hall
4. Kinematics and Dynamics of Machinery - J.Hirchhorn - McGrew HillBook Company.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester: B.E. VIII Sem.

Subject: Refrigeration & Air Conditioning

Total Theory Periods: 50

Total Marks in End Semester Exam: 80

Minimum number of class tests to be conducted: 2

Branch: Mechanical Engg.

Code: 337812 (37)

Total Tutorial Period : 12

Note : *Refrigerant and Psychrometric Properties (Tables and Charts) by Jain Brothers Publications are Permitted in the examination.*

UNIT – I

Introduction

Refrigeration and second law of Thermodynamics, Refrigeration effect and unit of Refrigeration, Heat pump, reversed Carnot cycle.

Vapour Compression Refrigeration System

Analysis of simple vapour compression Refrigeration cycle by p-h and T-S diagram. Effect of operating conditions, liquid vapour heat exchangers, actual refrigeration cycle.

Multiple Evaporator and compressor system.

Application, air compressor system, Individual compressor, compound compression, cascade system.

Application, air compressor systems, individual compressor, compound compression, cascade system.

UNIT – II

Gas cycle Refrigeration

Limitation of Carnot cycle with gas, reversed Brayton cycle, Brayton cycle with regenerative H.E.

Air cycle for air craft

Necessity of cooling of air craft, Basic cycle, boot strap, regenerative type air craft refrigeration cycle.

UNIT – III

Vapour Absorption System

Simple Vapour absorption system, Electrolux Refrigerator, Analysis of Ammonia absorption refrigeration system, Lithium Bromide Absorption Refrigeration System.

Refrigerants

Classification, Nomenclature, selection of Refrigerants, global warming potential of CFC Refrigerants.

Refrigeration Equipments

Compressor, condenser, evaporator, expansion devices – types & working.

UNIT – IV

Psychrometry

Psychrometric properties, psychometric relations, psychrometric charts, psychrometric processes, cooling coils, By-pass factor and air washers.

Human Comfort

Mechanism of body heat losses, factors affecting human comfort, effective temperature, comfort chart.

UNIT – V

Cooling load calculations

Internal heat gain, system heat gain, RSHF, ERSHF, GSHF, cooling load estimation, heating load estimation, psychrometric calculation for cooling, selection of air conditioning, apparatus for cooling and dehumidification, Air conditioning system

TEXT BOOKS

1. Refrigeration & Air Conditioning – Ahmadid, Amean - PHI
2. Refrigeration and Air Conditioning –C. P. Arora - TMH.

REFERENCE BOOKS

1. Refrigeration and Air Conditioning – Manohar Prasad – Newage International Pub
2. Refrigeration and Air Conditioning – Arora & Domkundwar – Dhanpat Rai & Sons
3. Refrigeration and Air Conditioning – P.L. Ballaney – Khanna Pub.
4. Refrigeration and Air Conditioning – W.F. Stooker

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Semester: B.E. VIII Sem.

Subject: Production Management

Total Theory Periods: 50

Total Marks in End Semester Exam: 80

Minimum number of class tests to be conducted: 2

Branch: Mechanical Engg.

Code: 337813 (37)

Total Tutorial Period : 12

UNIT-I

Production Management

Definition, objectives, scope, benefits, functions of production management, place of production management in an organization, types of production system, Product life cycle, product design and development, production cycle.

Costing and Cost Analysis

Elements of costs, Break even analysis, Incremental costs, make or buy decision.

UNIT-II

Sales Forecasting

Purposes, methods – Delphi, linear regression, economic indicators, time-series analysis, adjustment for seasonal variations, moving average, exponential smoothing.

UNIT-III

Production Planning and Control

Functions, Organization, Master Scheduling, Aggregate planning and strategies, Materials requirement planning, product structure tree, Routing, Loading Scheduling – forward and backward, Dispatching – priority rules, Sequencing, Johnson's algorithm for n jobs and two machines, Gantt's chart, Bar chart, Flow process chart.

Materials Handling

Principles of materials handling, unit load, Types of materials handling equipment, Relation between materials handling and plant layout.

UNIT - IV

Material Management

Objectives and functions of materials management, Organization of materials management.

Procurement

Objectives of purchase deptt. purchase responsibilities and organization, types of purchasing, purchase procedures, Import and Export.

Stores Keeping

Stores management, functions of stores, classification of materials, standardization of materials, identification and maintenance of layout of stores, physical control of materials, pricing of stores, issuing of stores.

Inventory Control

Objective, scope and functions of inventory control, inventory control techniques, economic ordering quantity, periodic ordering quantity, A.B.C. analysis, General idea regarding inventory control under risk and uncertainty.

UNIT – V

Quality Control

Difference between inspection and quality control, acceptance sampling, procedure's risk and consumer's risk, operating characteristic curve for single sampling plan, AOQL

Quality of conformance, quality of design, economics of quality, SQC charts for variables and attributes.

Introduction to JIT manufacturing, kanban system.

TEXT BOOKS

1. Production and operation Management – By P. Ramamurty – New Age International Pub., 2005
2. Production and operation Management – By R. Mayer – TMH
3. Quality Planning and Analysis, Juran and Gryna

REFERENCE BOOKS

1. Industrial Engineering & Production Management – Martand Telsang – S. Chand & Co., 2004
2. Production and operations Management by – Adam and Ebert – PHI – 6th Edn., 2003
3. Production planning and Control – By Samuel Eilon, Navneet Prakashan Ltd., Bombay

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Semester: B.E. VIII Sem.

Subject: Mechatronics

Total Theory Periods: 50

Total Marks in End Semester Exam: 80

Minimum number of class tests to be conducted: 2

Branch: Mechanical Engg.

Code: 337871 (37)

Total Tutorial Period : 1

UNIT – I

Introduction about Mechatronics, scope of Mechatronics, application, process control automation and N/c Machines.

UNIT – II

Sensors and Transducers

Introduction, classification, specification, characteristics of transducers, type of transducers-displacement, strain, vibration pressure, flow, temperature, force & torque, tactile.

UNIT – III

Hydraulic Pneumatic & Electrical actuators

Pumps & Compressors, control valves & accessories, actuators, fluid power symbols, fluid power systems, switching devices, solenoids, motors.

UNIT – IV

Data Acquisition and Control System

Introduction, Quantizing theory, Analog to Digital Conversion, Digital to Analog (D/A) conversation, transfer function, transient response & frequency response & frequency response, stability criteria.

UNIT – V

Design of Mechatronic systems

Introduction, Automatic front and back and cutting in steel rolling mill, lift control system, CNC lathe, temperature control of a heat treatment furnace, EOT crane control panel, Grey grain separators, electrode arm control in electric arc furnace.

TEXT BOOKS

1. Mechatronics, Revised – N. Shanmugam – Anuradha Agencies , 2004
2. Mechatronics – HMT Limited –8th reprint, 2003

REFERENCE BOOKS

1. Mechatronics and Measurement system – David G. Alciatore & Michal B. Histad – TMH – 2nd reprint
2. Mechatronics, 3rd Edn. – W. Bolton – Pearson Education

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Semester: B.E. VIII Sem.

Subject: Vibration & Noise Control

Total Theory Periods: 50

Total Marks in End Semester Exam: 80

Minimum number of class tests to be conducted: 2

Branch: Mechanical Engg.

Code: 337872 (37)

Total Tutorial Period : 12

UNIT- I

Fundamentals of vibrations:

Simple harmonic motion, combination of two simple harmonic motions, beats, Fourier analysis

Single degree of freedom system:

Free un-damped vibrations: Equivalent systems linear and torsional, natural frequency estimation, energy methods

Damped vibrations

Damping models, structural, coulomb, and viscous dampings, critically, under and over-damped system, logarithmic decrement

Forced vibrations

Harmonic excitation, support motion, vibration isolation, critical speeds of shafts in bending

UNIT- II

Two degree of freedom system:

Free vibrations of spring coupled system, general solution, torsional vibrations, two degree of freedom mass coupled system, bending vibrations in two degree of freedom system, forced vibrations of an un-damped two degree of freedom system, dynamic vibration absorber, forced damped vibrations

UNIT- III

Multi-degree of freedom system:

Free un-damped analysis.

Numerical methods:

Dunkerley's, Rayleigh, Holzer methods.

Experimental methods in vibration analysis:

Vibration measurement devices and analysers, balancing of rigid rotors

UNIT- IV

Analysis and measurement of sound:

One dimensional waves in a gas, sound perception and the decibel scale, the ear, combining sound levels in decibels, octave bands, loudness, weightings, directionality of acoustic sources and receivers, directivity index

UNIT- V

Noise control:

Noise criteria, sound absorption and insulation, noise barriers, acoustic enclosures, silencers

TEXT BOOKS

1. Mechanical Vibrations – W.T. Thomson W.T.- Prentice Hill India
2. Theory & Practice of Mechanical Vibrations – J.S. Rao, Gupta - New Age International.

REFERENCE BOOKS

1. Mechanical Vibrations – G.K. Grover - S. Chand & CO.
2. Acoustics for Engineers - Turner & Pretlove - Macmillan
3. Acoustics and Noise Control - Smith, Peters & Owen - Addison-Wesley-Longman, 2nd Edition
4. Industrial Noise Control: Fundamentals and Applications - Bell and Bell, Marcel-Dekker

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Semester: B.E. VIII Sem.
Subject: Optimization Techniques
Total Theory Periods: 50
Total Marks in End Semester Exam: 80
Minimum number of class tests to be conducted: 2

Branch: Mechanical Engg.
Code: 337873 (37)
Total Tutorial Period : 12

UNIT – I

Optimization Technique

Classification of optimization, problems, single variable and multivariable optimization with equality constraints and Inequality constraints. Convex programming problem.

UNIT – II

Linear Programming - II

Duality in Linear programming, dual simplex method, decomposition principle, sensitivity analysis, quadratic programming, changes in cost coefficient, golden section method.

UNIT – III

Non-Linear Programming – I

Rate of convergence, Design variables, Random search methods, Chrivariate methods, Powell's method, Newton's method, Marquard Method, Test function.

UNIT – IV

Geometric Programming

Unconstrained minimization problem, primal dual relationship, geometric programming with mixed Eerie quality, application and complementary function.

UNIT- V

Dynamic Programming

Multistage Decision processes. Principles of optimality, continuous dynamic programming.

TEXT BOOKS

1. Optimization Techniques – C.S. Rao – Dhanpat Rai & Sons, New Delhi
2. Optimization methods for Engineering Design – R.L. Fox - Addison Wesley Pub

REFERENCE BOOKS

1. Engineering Optimization Theory and Practice – S.S. Rao – New Age Publishers.
2. Introduction to optimum Design – J.S. Arora – Mc. Grawhill publishers
3. Foundation of Mathematical optimization – Pallaschke – Kluwer Academic Publishers

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Semester: B.E. VIII Sem.

Subject: Energy Management and Audit

Total Theory Periods: 50

Total Marks in End Semester Exam: 80

Minimum number of class tests to be conducted: 2

Branch: Mechanical Engg.

Code: 337874 (37)

Total Tutorial Period : 12

UNIT – I

Energy Sources

Introduction, Sources of Energy – Conventional and Non-Conventional, Elasticity of demand and application, concepts to energy, Indian energy scene, Energy storage, Solar energy, water, battery and Mechanical Storage Systems.

UNIT – II

Energy Utilization and Conversion System

Classification of furnaces, controlled atmosphere in furnaces, furnace fuels, efficient use of energy in furnaces, thermal efficiency, reducing heat losses.

Combined Power and Heating System

Characteristics of prime movers, Heat and Power requirements, Economics of a CHP System.

UNIT – III

Material and Energy balance

Facility as an energy system, methods for preparing process flow, material and energy balance diagrams.

Energy Action Planning

Key elements, force field analysis, Energy policy purpose, perspective, contents, formulation, ratification, organizing –location of energy management, top management support, managerial function, roles and responsibilities of energy manager, accountability, motivation, Information system – design barriers, strategies, Marketing and communicating-training and planning.

UNIT – IV

Energy Audit

Energy Management information system, Thirty nine steps for energy management, types of energy audit, preliminary energy audits, Technical assistance in energy audit, energy accounting and analysis, Instruments used in Energy auditing.

UNIT – V

Economics and Finance

Introduction, Economics, Discounted Cash flow, Loans, Investments, Option Identification and Analysis, Optimization, Conflict Correction, Constructing the Optimal Target Investment Schedule, Project Management, Monitoring Against the Target Financial Schedule.

TEXT BOOKS

1. Energy Management – W.R. Murphy, G. Mckay –
2. Energy Management – Paul O'Callaghan –
3. Engineering Economics & Engineering Management – R. Raju – Anuradha Agencies

REFERENCE BOOKS

1. Principles of Energy Conversion – Archie W. Culp – Jr. International Student Edition – McGraw Hill Publishers
2. Energy Management in illuminating System – Kao Chen – CRC Publishers
3. Industrial Energy Recovery - D.A. Reay – Wiley Publishers
4. Thermal Energy Recovery – T.L. Boyer – Wiley Publishers
5. Energy Conservation Through Control – E.G. Shinskey – Academic Press
6. Economics of Solar Energy & Conservation Systems, Vol-I & II – F. Kreith & R.E. West – CRC Press

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Semester: B.E. VIII Sem.

Subject: Cryogenic 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: 337875 (37)

Total Tutorial Period: 12

UNIT-I

Introduction to Cryogenic Systems

Properties of materials at low temperature, Properties of Cryogenic Fluids.

Air and Gas Liquefaction Systems:

Thermodynamically ideal system, Production of low temperatures

Liquefaction systems for gases other than Neon, Hydrogen and Helium, liquefaction systems for Neon, Hydrogen and Helium.

Cryogenic Refrigeration System

UNIT – II

Gas Separation and Gas Purification Systems

The thermodynamically ideal separation system properties of mixtures, Principles of gas separation, air separation systems, Hydrogen, Argon, Helium air separation systems, Gas purification methods.

UNIT – III

Vacuum Techniques

System for production of high vacuum such as mechanical, diffusion, ion and cryopumps.

Cryogenics measurement systems

Temperature pressure, flow rate, liquid level measurement, Introduction to Cryocoolers.

UNIT – IV

Cryogenic Fluid Storage Systems

Introduction, Basic Storage vessels, inner vessel, outer vessel design, piping, access manways, safety device.

Cryogenic insulations

Vacuum insulation, gas filled powders and fibrous materials, solid foam, selection and comparison of insulations. Cryogenic fluid transfer systems. Transfer through uninsulated lines, vacuum insulated lines, porous insulated lines etc.

UNIT – V

Advances in Cryogenics

Vortex tube and applications, Pulse tube refrigerator, Cryogenic Engine for space vehicles.

Cryogenic Applications

Applications in gas industry, cryogenic fluids, space research, Cryobiology, food processing, electronics, nuclear and high energy physics, chemical processing, metal manufacturing, cryogenic power generation, medicine, analytical physics and chemistry.

TEXT BOOKS

1. Cryogenic Systems – R.F. Barron
2. Cryogenic Engineering – R.B. Scott – D.Van Nostrand Company, 1959

REFERENCE BOOKS

1. Cryogenic Process Engineering – K.D. Timmerhaus and T.M. Flynn, Plenum Press, New York, 1989
2. High Vacuum Technology – A. Guthrie – New Age International Publication
3. Experimental Techniques in Low Temperature Physics – G.K. White – Oxford University Press, England, 1959

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Semester: B.E. VIII Sem.
Subject: Environmental Pollution & Control
Total Theory Periods: 50

Branch: Mechanical Engg.
Code: 337876 (37)
Total Tutorial Period: 12

Total Marks in End Semester Exam: 80
Minimum number of class tests to be conducted: 2

UNIT-I

Environmental Pollution – Introduction & Classification

Sources and classification of air pollutants, aerosols, primary and secondary air pollutants, effect of air pollution on human health, effect of SO₂, CO₂, NO₂, H₂S and lead, economic effect of air pollution, mechanism of deterioration in polluted atmosphere. Factors influencing atmospheric deterioration, effect of air pollution on building materials, paints, textiles, rubber, leather, paper and electronic industry.

UNIT – II

Environmental Pollution - Sources

Air pollution due to automobiles, exhaust, Crankcase and evaporative emissions and their control, effect of various parameters of I.C. engines on air pollution, photochemical air pollution, air pollution from ferrous metallurgical operations and thermal power plants.

UNIT – III

Chemistry of Pollution

Definition of pollutant concentrations, mass concentration, volume concentration, mass-volume concentration and relationship between these concentrations, smoke and its control. Ringelmann smoke chart, smoke prevention and control of air pollution by process change, elementary ideas of control of gaseous contaminants for combustion and absorption.

UNIT – IV

Pollution Control

Control of air pollution by equipment, objectives of using control equipment, objectives of using control equipment, settling chambers, inertial separators, cyclones, principle of electrostatic precipitators, descriptive study of the above equipment only, merits and demerits of the equipment, choice of equipment.

UNIT – V

Environmental Laws & Acts

Air pollution indices, definition of air pollution index, type and use of air pollution indices, criteria for a standardized index, acid rain, causes of acid rain and its remedy, green house and its effect, air pollution legislation and regulations, constitution of the Board, functions of the central board and state boards, classification of pollution sources under Air Act 1981 and 1986.

TEXT BOOKS

1. Air Pollution - M.N. Rao and H.V.N. Rao
2. Air Pollution Central Theory - Martin Crawford.

REFERENCE BOOKS

1. Air Pollution Central Technology - R.W. Bethewaven Van Nostrans.
2. Air Pollution & Control – KVSG Murali Krishnan – Kaushal & Company
3. Air Pollution & Control Technologies – Y. Anjaneyulu – Allied Publishers
4. Water & Air Pollution & Environmental Protection Laws, Vol. - II – M.C. Mehta – Delhi Law House

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Semester: B.E. VIII Sem.
Subject: Robotics lab
Total Practical Periods: 28
Total Marks in End Semester Exam: 40

Branch: Mechanical Engg.
Code: 337821 (37)

EXPERIMENTS TO BE PERFORMED (MINIMUM FIVE NUMBERS)

1. To detect the sensor scanning system to overcome limitation of fixed sensors on various robotic applications, ultrasonic sensor, laser range finders, infrared detectors and miniature.
2. To find the horizontal and vertical movement up to 180° in either direction.
3. To detect objects with infrared ray detector.
4. To determine object distance (3cm – 300cm).
5. To detect distance (10cm to 80 cm) with infrared object detector.
6. To determine 5 Axis Robotic Arm movement and its degree of rotation.
7. To lift the object and place 100m away in various directions.
8. To find the gripper movement (0 to 50mm).
9. To study various Robotic Arm Configurations.
10. To study Pick and Place Robot

LIST OF EQUIPMENTS/MACHINES REQUIRED

1. 5 Axis Robotic Arm System
2. Hex Crawler Robot. The Mechatronics Robot
3. Ultrasonic Range Finder
4. Servo Power Supply
5. Infrared Object/Distance Detector
6. A 7.2V Battery Charger
7. Blue Tooth Transducer
8. Blue Tooth Pc Adaptor
9. Various Wooden Models to study Robotic Arm Configuration
10. Working model of Pick and Place Robot

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Semester: B.E. VIII Sem.
Subject: Refrigeration & Air Conditioning Lab
Total Practical Periods: 28
Total Marks in End Semester Exam: 40

Branch: Mechanical Engg.
Code: 337822 (37)

EXPERIMENTS TO BE PERFORMED (MINIMUM SEVEN NUMBERS)

1. To study Domestic Refrigerator.
2. To study the Hermetically Sealed Compressor.
3. To study Refrigeration Tutor and to determine the following:-
 - a. Theoretical coefficient of Performance
 - b. Actual Coefficient of Performance.
 - c. Theoretical capacity of the plant
 - d. Actual capacity of the plant.
4. To Study the Mechanical Heat Pump and to determine the following:-
 - a. Theoretical coefficient of Performance
 - b. Actual Coefficient of Performance.
 - c. Theoretical capacity of the plant
 - d. Actual capacity of the plant
5. To study the Air and Water Heat Pump and to determine the following:-
 - a. Theoretical coefficient of Performance of the system as a refrigerator and as a heat pump.
 - b. Actual Coefficient of Performance of the system as a refrigerator and as a heat pump.
 - c. Capacity of the system in tons as a refrigerator.
 - d. Capacity of the system in kW as a heat pump under the following conditions of operation:-
 - i. Water cooled condenser and water-cooled evaporator.
 - ii. Water-cooled condenser and air-cooled evaporator.
 - iii. Air-cooled condenser and air-cooled evaporator.
 - iv. Air-cooled condenser and water-cooled evaporator.
6. To study the following processes on the Air Conditioning Test Rig.
 - a. Sensible Heating
 - b. Sensible Cooling
 - c. Sensible Cooling/cooling dehumidification
 - d. Humidification and cooling
7. To Find the Efficiency of Cooling Tower Test Rig.
8. To Study the Simple vapor Absorption System.
9. To study the AC Simulator and to determine the following:-
 - a. Sensible Heating
 - b. Sensible Cooling
 - c. COP of R-22
 - d. Air Washer Efficiency
 - e. Sensible heat load applied
 - f. Latent heat load applied
 - g. RSHF
 - h. ESHF
 - i. Creation of different climatic conditions in AC simulator

LIST OF EQUIPMENTS/MACHINES REQUIRED

1. Domestic Refrigerator
2. Cut Section of Hermitically Sealed Compressor
3. Refrigeration Tutor Test Rig
4. Mechanical Heat Pump Test Rig
5. Air & Water Heat Pump Test Rig
6. Air Conditioning Test Rig
7. Simple Absorption System Test Rig
8. Cooling Tower Test Rig
9. Air Conditioning Simulator Test Rig

Chhattisgarh Swami Vivekanand Technical University, Bhilai

**Semester: B.E. VIII Sem.
Engg.**

Branch: Mechanical

Subject: Production Management Lab

Code: 337823 (37)

Total Practical Periods: 28

Total Marks in End Semester Exam: 40

EXPERIMENTS TO BE PERFORMED (MINIMUM FIVE NUMBERS)

Case Studies to analyze design, programme, implement and maintain the following systems:-

1. Payroll Processing
2. Inventory Control
3. Material Requirement planning
4. Manpower planning
5. MIS in Banks, Library
6. Sales Analysis
7. Accounts receivable, accounts payable

LIST OF EQUIPMENTS/MACHINES REQUIRED

The above mentioned case studies should be analyzed, designed, programmed and implemented on the Computers.

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Semester: BE 8th
Subject: Report Writing & Seminar
Total No. of periods: 2 per week
Total marks in End Semester Exam: Nil marks
Minimum Number of class test to be conducted: 2

Branch: Mechanical Engg.
Code: 300825 (37)
Total Tutorial Periods : Nil
Teacher's Assessment: 40

Unit -I

Introduction to Technical Writing: how differs from other types of written communication Purpose of technical writing, Correspondence: prewriting, writing and rewriting Objectives of Technical Writing. Audience Recognition: High-tech audience, Low tech audience, Lay audience, Multiple Audience.

Unit - II

Correspondence: Memos, Letters, Emails, Its differentiation, types of letters, Document Design, its importance, Electronic Communication: Internet, Intranet, extranet, Writing effective e-mail.

Unit - III

Summary: Report Strategies, Effective style of technical report writing: Structures: content, introduction, conclusions, references, etc., Presentation, Writing first draft, revising first draft, diagrams, graphs, tables, etc. report lay-out.

Unit -IV

Report Writing: Criteria for report writing, Types of Report: Trip report, Progress report, lab report, Feasibility report, project report, incident report, etc. Case Studies.

Unit -V

Proposals & Presentation: Title page, Cover letter, Table of Content, list of illustrations, summary, discussion, conclusion, references, glossary, appendix, Case Studies. Oral Presentation/ Seminar:

Text Books:

1. Sharon J. Gerson & Steven M. Gerson "Technical Writing - Process& Product", Pearson Education.

Reference Books:

1. Sunita Mishra, "Communication Skills for Engineers" Pearson Education
2. Davies J.W. "Communication for engineering students", Longman
3. Eisenberg, "Effective Technical Communication", Mc. Graw Hill.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester: VIII
Subject :Enterprise Resource Planning
Total Theory Periods : 40
Total Marks in End Semester Exam : 80
Minimum no. of class tests to be conducted : 2

Branch : Common to All Branches
Code : 300881 (36)
Total Tut Periods : 10

UNIT-I

Conceptual foundation of Business Process reengineering: Role of information Technology and BPR; Process improvement and Process redesign, Process identification and mapping; Role/Activity diagrams, Process Visioning, and benchmarking.

[No of Periods: 8 + 2]

UNIT -2

Enterprise Resource Planning: Evolution of ERP- MRP and MRP II, structure of ERP- two tier architecture, three tier architecture, Electronic data processing, management information system, Executive information system, ERP as an integrator of information needs at various Levels.

[No of Periods: 8 + 2]

UNIT -3

Typical Business Processes: Core processes, Product control, Sales order processing, Purchases, Administrative processes, Human resource, Finance support processes, Marketing, Strategic planning, Research and development, Problems in traditional view.

[No of Periods: 8 + 2]

UNIT -4

ERP models/functionality: Sales order processing, Production scheduling, forecasting, distribution, finance, features of each of the models, description of data flow across each module, overview of supporting databases & packages.

[No of Periods: 8 + 2]

UNIT -5

ERP implementation issues: Opportunities and problems in ERP selection, and implementation; ERP implementation: identifying ERP benefits, team formation, Consultant intervention, Selection of ERP, Process of ERP.

[No of Periods: 8 + 2]

Books:

1. V.K. GARG & N .K. VENKATKRISHNAN:, ERP, Concepts and Practices, PM
2. Rahul V. Altekar, Enterprise wide Resource Planning-theory and practice, PHI

References:

1. ALEXIS LEON: Enterprise Resource Planning, TMH
2. S. SADAGOPAN: MIS, PM
3. V. RAJARAMAN: Analysis and Design of Information Systems, PHI
4. **MONK' & BRADY: Concepts in ERP, Vikas pub, Thomson**

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester: **VIII**

Subject: **E-Commerce and Strategic IT**

Total Theory Periods: **50**

Total Marks in End Semester Exam: **80.**

Minimum number of class tests to be conducted: **02**

Branch: **Common to All Branches**

Code: **300882 (33)**

Total Tutorial Periods: **Nil**

UNIT – I Introduction: What is E-Commerce, Forces behind E-Commerce, E-Commerce Industry Framework, and Brief History of E-Commerce. Inter Organizational E-Commerce, Intra Organizational E-Commerce, and Consumer to Business Electronic Commerce, Architectural framework

Unit – II

Network Infrastructure : LAN, Ethernet(IEEE standard 802.3) LAN , WAN , Internet, TCP/IP Reference Model, Domain Name Server , Internet Industry Structure,

UNIT – III

Electronic payment systems, types of electronic payment systems, digital token-based electronic payment systems, smart cards & electronic payment systems, credit card based electronic payment systems, risk and electronic payment systems, designing electronic payment systems.

UNIT – IV

Information Distribution and Messaging: FTP,E-Mail,WWW server,HTTP, Web service implementation, Information publishing , Web Browsers, HTML, Common Gateway Interface

UNIT – V Mobile & wireless computing fundamentals, mobile computing framework, wireless delivery technology and switching methods, mobile information access devices, mobile data internetworking standards, cellular data communication protocols, mobile computing applications, personal communication service.

BOOKS :

1. Frontiers of E-commerce by Kalakota & Whinston (Addison-wesley) E-business roadmap for success by Dr. Ravi Kalakota & Marcia Robinson (addision wesicy)
2. Electronic Commerce By Bharat Bhasker (TMH)

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester: VIII

Subject Name: Technology Management

Total Theory periods: 40

Total Marks in End Semester Exam: 80

Minimum number of class tests to be conducted: 02

Branch: **Common to All Branches**

Subject Code: 300883 (36)

Total Tutorial periods: 10

Unit I

Technology: - Definitions, Types and Characteristics, Management of Technology (MOT), Technological Environment, Parameters of Technological Environment; Science & Technology in India.

[No of Periods: 8 + 2]

Unit II

Innovation Management: - Invention v/s Innovation, Definition and components of innovation. Types of innovations: Product, Process and system innovations, Understanding Innovation Process.

[No of Periods: 8+ 2]

Unit III

Technology life cycle, Technology evolution and S-curves of Technology Evolution, Technology Diffusion, Dynamics of Diffusion, Mechanism of Diffusion.

[No of Periods: 8 + 2]

Unit IV

Technology strategies & Intelligence: Technology Strategy & types, Models for technology strategy formulation Definition of Technology Intelligence, Technology Audit, Process of Technology Intelligence: Technology Scanning, Monitoring, Forecasting and Assessment.

[No of Periods: 8 + 2]

Unit V

Acquisition and technology transfer. Over view of - GATT, Intellectual property rights (IPR)

[No of Periods: 8 + 2]

Texts Books:

1. V. K. Narayanan, "Managing Technology and Innovation for competitive advantage", Pearson Education.
2. Tarek Khalil, "Management of Technology", McGraw Hill.

Reference Books:

1. Lowell Steele, "Managing Technology", McGraw Hill.
2. R. A. Burgelman and M. A. Maidique, "Strategic Management of Technology and Innovation", Irwin.
3. Plsek, Creativity, Innovation and Quality, PHI

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester: VIII

**Subject: Decision Support and Executive
Information System**

Total Theory Periods: 50

Total Marks in End Semester Exam: 80.

Minimum number of class tests to be conducted: 02.

Branch: Common to all Branches

Code: 300884(33)

Total Tut Periods: Nil.

UNIT-I Decision Support System:

What is a DSS, Decision Making Rational Decisions, Definitions of Rationality, Bounded Rationality and Muddling Through, The Nature of Managers, Appropriate Data Support, Information Processing Models, Group Decision Making?

UNIT-II Component OF DSS:

Data Component : Information and its Usefulness, Characteristics of Information, Databases to Support Decision Making, Database Management Systems, Data Warehouses, Data Mining and Intelligent Agents

Model Component:-Models Representation Methodology, TimeModel Based ManagementSystems, Access to Models Understandability of Results, Integrating Models Sensitivity of aDecision,

Brainstorming and Alternative Generation, Evaluating Alternatives, Running External Models.

Mail Component: Integration of Mail Management Examples of Use implications for DSS.

Unit-III Intelligence and Decision Support Systems:

Programming Reasoning, Backward Chaining Reasoning, Forward Chaining Reasoning, Comparison, Certainty Factors, User-Interface Component: User Interface Components, The Action Language, Menus, Command Language, I/O Structured Formats, Free Form Natural Language, The Display or Presentation Language, Windowing Representations, Perceived Ownership of Analyses, Graphs and Bias Support for All Phases of Decision Making, The Knowledge Base Modes of Communication

Unit-IV Designing A DSS: Planning for DSS, Designing a Specific DSS, Interviewing Techniques, Other Techniques, Situational Analysis Design Approaches, Systems Built from Scratch,

Using Technology to Form the Basis of the DSS, Evaluating a DSS Generator, Using a DSS Generator, The Design Team, DSS Design and Re-engineering Discussion .

Unit-V Implementation and Evaluation of DSS : Implementation Strategy , Prototypes, Interviewing , User Involvement , Commitment to Change, Managing Change, Institutionalize System, Implementation and System Evaluation, Technical Appropriateness, Measurement Challenges , Organizational Appropriateness.

Name Of Text Books:-

Decision Support System By Vicki I Sauter

Management Information system-Gerald V. Post & David L. Anderson

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester: VIII
Subject: Software Technology
Total Theory Periods: 4 per week.
Total Marks in End Semester Exam: 80.
Minimum number of class tests to be conducted: 02.

Branch: **Common to All Branches.**
Code: 300885 (22)
Total Tut Periods: Nil.

UNIT-1

ASSEMBLY LANGUAGE PROGRAMMING

Pentium Assembly languages-Registers, Memory Model, Addressing mode, 1source Link, Installation, Assembler Directives.

ASSEMBLER DESIGN

Simple manual Assembler, Assembler Design Process, Load and Go Assembler, Object File Formats.

UNIT-2

LINKERS

Linking -Combining Object Modules, Pass I, Pass II; Library Linking; Position Independent Code (PIC); Shared Library Linking.

LOADERS- Binary Image; Types of Loaders.

UNIT 3

MACROPROCESSORS

Macro in NASM- Local Labels in Macro Body, Nested Macros.; Design of Macroprocessors – Major Data Structures, Macroprocessing Technique, Simple macroprocessors without nesting, Nested calls & definitions

UNIT – 4

COMPILERS

Lexical Analysis; Syntax Analysis; Intermediate Code Generation; Target Code Generation; Optimizing Transformation

UNIT – 5

TEXT EDITORS

Design of a Text Editor ; Data Structures for Text Sequences; Text Document Design; Text view Design

DEBUGGER

Features; Breakpoint mechanism; Hardware support; context of Debugger; Check pointing & reverse Execution

Textbooks

1. SYSTEM SOFTWARE by Santanu Chattopadhyay ; Prentice Hall of India
2. Software Engineering By Roger S Pressman ; Mc-Graw Hill

References

1. Foundations of Software Technology and Theoretical Computer Science, By V. (Venkatesh) Raman: Springer
2. Software Visualization by John Stasko; MIT press
3. Software Engineering By Rajib Mall : PHI

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester: VIII

Subject: Knowledge Entrepreneurship

Total Theory Periods: 40

Total Marks in End Semester Exam:80

Minimum no. of class tests to be conducted: 2

Branch: Common to All Branches

Code: 300886 (36)

Total Tut Periods: 12

Unit – I

Introduction: Entrepreneurship in Knowledge economy, abundant & accessible information, implication, impact & consequence, knowledge based opportunities, aims, scope, and objectives.

Unit-II

Managing knowledge & intellectual capital:

Knowledge management, loss of knowledge, knowledge implementation, knowledge creation, property intellectual capital.

Unit-III

Contemporary information problems:

Information overload, winning & losing barrier to entry, emerging issues, customers, investors, myth of inevitable program.

Unit-IV

Creating enterprise cultures:

Working with employer, organizing for entrepreneurship, unity & diversity, ten essential freedoms, freedom of operation, effective issue monitoring, establish search criteria.

Unit-V

Becoming a knowledge entrepreneur:

Entrepreneur qualities, knowledge entrepreneur, challenge of launching new product, creating launch support tool, examples of best practice.

Text & Reference Books

Amrit Tiwana ,The Knowledge Management tool kit, Pearson Education.

Lunlin Conlson, Knowledge Entrepreneur, Thomas Press.

Catheriue L Mann, Knowledge entrepreneurship, Oxford

Heinke Robkern ,Knowledge entrepreneurship,.

Bonnie Montano,Knowledge Management, , IRM Press, London

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester: VIII
Subject: Financial Management
Total Theory Periods: 3
Total Marks in End Semester Exam: 80
Minimum No. Of Class test to be conducted: 2

Branch: **Common to All Branches**
Code: 300887(36)
Total tutorial Period: 12

UNIT I

Financial Management –an overview: Introduction, finance and other disciplines, objectives and scope of financial management, role and responsibility of finance manager.

[No of Periods: 8 + 2]

UNIT II

Working capital management-nature, need, importance and concept of working capital, trade off between profitability and risk, Determining finance mix.

[No of Periods: 8 + 2]

UNIT III

Inventory management-Introduction, objectives, ordering cost, carrying cost, lead time, economic order quantity and safety stock, deterministic model.

[No of Periods: 8 + 2]

UNIT IV

Management of cash-introduction motives for holding cash, objectives of cash management and technique/process of cash management.

[No of Periods: 8 + 2]

UNIT V

Receivables management-introduction, objectives, credit terms, credit policies and collection policies.

[No of Periods: 8 + 2]

Text books:

Basic financial management, M Y Khan and P K Jain, TMH
Financial Management, I M Pandey.

References books:

Financial management and policy, V K Bhalla, Anmol publications pvt. Ltd.
Financial management, Van Horne.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester : VIII
Subject : Project planning management and Evaluation
Total Theory Periods : 40
Total Marks in End Semester Exam :80
Minimum No. Of Class test to be conducted : 2

Branch : **Common to All Branches**
Code : 300888 (36)
Total tutorial Period : 12

UNIT I

Identification of projects-generation and screening of idea, monitoring corporate appraisal, preparing project profiles and project rating index.

UNIT II

Feasibility studies: Market and demand analysis, technical analysis, financial analysis and economic viability.

UNIT III

Project appraisal: Criteria, net present value, internal rate of return, payback period and accounting rate of return method.

UNIT IV

Project management and implementation-

Project planning, project control, prerequisites of implementation. Network techniques of project management-Project evaluation and review technique (PERT) and critical path method (CPM).

UNIT V

Project review and control-

Initial review, performance evaluation, abandonment analysis and its behavioral issues.

Text books:

Project planning, analysis, selection, implementation and review by Prasanna Chandra, TMH.

Reference Books:

Project management-Dr. Harold Kerzner.

Total Project management-Dr. P K Macmillan.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester: VIII
Subject: **Safety Engineering**
Total Theory Periods: 50
Total Marks in End Semester Exam: 80
Minimum number of class tests to be conducted: 2

Branch: **Common to All Branches**
Code: 300889 (37)
Total Tutorial Period : 12

UNIT – I

Safety Philosophy and principles of Accident prevention
Introduction, accident, injury, unsafe act, unsafe condition, reportable accidents, need for safety, break down of accidents, hazardous industries.
Theories & Principle of accidents
Casualty, cost of accident, computation of cost, utility of cost data.
Accident reporting & Investigation
Identification of the key facts, corrective actions, classification of facts.
Regulation
American (OSHA) and Indian Regulation.

UNIT – II

Safety Management
Division of responsibility, Location of Safety function, size of safety department, qualification for safety specialist, safety committee – structure and functions.

UNIT – III

Safe Working Condition and Their Development
SOP for various Mechanical equipments, Incidental safety devices and methods, statutory of provisions related to safeguarding of Machinery and working condition.

UNIT – IV

Safety in Operation and Maintenance
Operational activities and hazards, starting and shut down procedures, safe operation of pumps, compressor, heaters, reactors, work permit system, entry into confined spaces.

UNIT – V

Safety in Storage and Emergency Planning
Safety in storage, handling of chemicals and gases, storage layout, ventilation, safety in chemical laboratories, emergency preparedness on site plan, off site plan, toxic hazard control.

TEXT BOOKS

Safety and Accident Prevention in Chemical Operation – H.H. Fawcett and Wood
Personal Protective Equipment – NSC Bombay

REFERENCE BOOKS

Ergonomics - P. Krishna Murthy
Fire Prevention Hand Book – Derek James

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester: VIII

Subject: Bioinformatics

Total Theory Periods: 4 per week.

Total Marks in End Semester Exam: 80.

Minimum number of class tests to be conducted: 02.

Branch: **Common to All Branches**

Code: 300890 (22)

Total Tut Periods: Nil.

UNIT-1

Bioinformatics-introduction, Application, Data Bases and Data Management, Central Dogma; information search and Data retrieval, Genome Analysis and Gene mapping- Analysis, Mapping, Human Genome Project (HGP).

UNIT-2

Alignment of Pairs and Sequences; Alignment of Multiple Sequences and Phylogenetic Analysis; Tools for similarity Search and Sequence Alignment- FASTA BLAST.

UNIT-3

Profiles and Hidden Markov Models (HMMs); Gene Identification and Prediction-Basics, Pattern Recognition, Methods and Tools; Gene Expression and Micro arrays.

UNIT-4

Protein Classification and Structure Visualization; Protein Structure Prediction; Proteomics; Computational methods-Analysis of Pathways, Metabolic Network Properties, Metabolic Control Analysis, Stimulation of Cellular Activities, Biological Mark Up Languages.

UNIT-5

Drug Discovery-Introduction, Technology and Strategies, Cell Cycle, G-protein, Coupled, Receptors.

Computer Aided Drug Design-Introduction, Drug Design Approaches, Designing methods, ADME-Tox Property Prediction.

TEXT BOOKS

- I. BIOINFORMATICS by S.C. Rastogy, 2nd Edition, Prentice Hall of India.
- II. BIOINFORMATICS by V. R Srinivas, Prentice Hall of India

REFERENCES

1. BIOINFORMATIC COMPUTING by Bergeron, MIT Press.
2. Evolutionary Computation in Bioinformatics, Gary B. Fogel, David W. Corne (Editors), 2002
3. Introduction to Bioinformatics, Arthur M. Lesk, 2002, Oxford University Press
4. Current Topics in Computational Molecular Biology (Computational Molecular Biology), Tao Jiang, Ying Xu, Michael Zhang (Editors), 2002, MIT Press

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester: VIII
Subject: Energy Conservation & Management
Total Theory Periods: 50
Total Marks in End Semester Exam: 80
Minimum number of class tests to be conducted: 2

Branch: **Common to All Branches**
Code: 300891 (37)
Total Tutorial Period : 12

UNIT – I

Energy Scenario

Commercial and Non-commercial energy, primary energy resources, commercial energy production, final energy consumption, energy needs of growing economy, long term energy scenario, energy pricing, energy sector reforms, energy and environment, energy security, energy conservation and its importance, re-structuring of the energy supply sector, energy strategy for the future, air pollution, climate change, Energy Conservation Act – 2001 and its features.

UNIT – II

Energy Conservation in Electric Utility and Industry

Energy costs and two-part tariff, Energy conservation in utility by improving load factor, Load curve analysis, Energy efficient motors, Energy conservation in illumination systems, Importance of Power factor in energy conservation – Power factor improvement methods, Energy conservation in industries, case studies.

UNIT – III

Energy in Manufacturing

Introduction, Energy and Environmental Analysis of Products, Energy Consumption in Manufacturing, Energy Conservation, Transportation Systems, Water Conservation, Rules for the Efficient Conservation of Energy and Materials, Laws of Energy and Materials Flows.

UNIT – IV

Heat Recovery System

Sources of waste heat and its potential applications, heat recovery systems in Shell & Tube Heat Exchangers, Plate Heat Exchangers, Tubular Heat Exchangers. Vapour recompression and Energy conservation in Evaporator systems. Thermal Wheel, Heat Pipe, Heat Pumps. Waste Heat Boilers – Low Pressure & High Pressure Applications.

UNIT – V

Energy Conservation Economics

Basic discounting, life cycle costing and other methods, factors affecting economics, energy pricing and incentives for conservation, energy conservation of available work identification of irreversible processes, primary energy sources, Optimum use of prime movers, energy efficient house keeping, energy recovery in thermal systems, waste systems and waste heat recovery in thermal systems, waste heat recovery techniques, conservation in energy intensive industries, thermal insulation.

TEXT BOOKS

1. Energy Management – W.R. Murphy, G. Mckay –
2. Energy Management – Paul O'Callaghan –
3. Engineering Economics & Engineering Management – R. Raju – Anuradha Agencies

REFERENCE BOOKS

1. Principles of Energy Conversion – Archie W. Culp – Jr. International Student Edition – McGraw Hill Publishers
2. Energy Management in illuminating System – Kao Chen – CRC Publishers
3. Industrial Energy Recovery - D.A. Reay – Wiley Publishers
4. Thermal Energy Recovery – T.L. Boyer – Wiley Publishers
5. Energy Conservation Through Control – E.G. Shinsky – Academic Press
6. Economics of Solar Energy & Conservation Systems, Vol-I & II – F. Kreith & R.E. West – CRC Press

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester: VIII
Subject: Nanotechnology
Total Theory Periods: 50
Total Marks in End Semester Exam: 80
Minimum No. of Class test to be conducted:2

Branch: Common to All Branches
Code: 300892 (47)
Total tutorial Period: NIL

Unit I : Introduction to nanotechnology: background, definition , basic ideas about atoms and molecules, physics of solid state, review of properties of matter and quantum mechanics

Unit II : Preparation of Nanostructured Materials : Lithography : nanoscale lithography, E-beam lithography, dip pen lithography, nanosphere lithography. Sol gel technique Molecular synthesis, Self-assembly, Polymerization

Unit III : Characterization of Nanostructured materials : Microscopy: TEM, SEM, SPM techniques, confocal scanning microscopy,, Raman microscopy-Basic principles, applicability and practice to colloidal, macromolecular and thin film systems. Sample preparation and artifacts. Polymer fractionation techniques: SEC, FFF, Gel electrophoresis.: Basic theory, principles and practice.

Thermal analysis: Basic principles, theory and practice. Micro DSC in the study of phase behavior and conformational change.

Mass spectrometry of polymers: MALDI TOF MS – Basic theory, principles and practice. Applicability to proteins, polyethers, controlled architecture systems

Unit IV : Cross-cutting Areas of Application of Nanotechnology :Energy storage, Production and Conversion. Agriculture productivity enhancement Water treatment and remediation. Disease diagnosis and screening. Drug delivery systems. Food processing and storage. Air pollution and remediation. Construction. Health monitoring..Vector and pest detection, and control. Biomedical applications. Molecular electronics. Nanophotonics. Emerging trends in applications of nanotechnology

Unit V : Industrial Implications of Nanotechnology : Development of carbon nanotube based composites. Nanocrystalline silver Antistatic conductive coatings. Nanometric powders. Sintered ceramics. Nanoparticle ZnO and TiO₂ for sun barrier products. Quantum dots for biomarkers. Sensors. Molecular electronics. Other significant implications

References:

1. Guozhong Cao, "Nanostructures and Nanomaterials", Imperial College Press, London
2. Mark Ratner and Daniel Ratner, "A Gentle Introduction to Next Big Thing", Pearson Education 2005

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester: VIII

Subject: Intellectual Property Rights

Total Theory Periods: 40

Total Marks in End Semester Exam: 80

Minimum No. Of Class test to be conducted:2

Branch: **Common to All Branches**

Code: 300893 (36)

Total tutorial Period: 12

Unit-I

Basic Concepts of Intellectual Property: Introduction to intellectual property rights, laws and its Scope, Trade Related Aspects of Intellectual Property Rights.

Unit-II

Patents: Introduction to patent law and condition for patentability, Procedure for obtaining patents, Rights of a patentee, Patent infringements, Biotechnology patents and patents on computer programs, Patents from an international perspective.

Unit-III

Trademark and 'geographical Indications: Statutory authorities and registration procedure, Rights conferred by registration, Licensing, assignment and transfer of trademark rights, Trademark infringement, Geographical Indication of Goods & Appellations of Origin.

Unit-IV

Copyright: Registration procedure and copyright authorities, Assignment and transfer of copyright, copyright infringement and exceptions to infringement, Software copyright

Unit-V

Introduction to the law on Industrial Designs, Registration and piracy, International perspective, Introduction to the law on semiconductor layout design, Registration, commercial exploitation and infringement.

Text Books:

1. Vinod V Sople ,Managing Intellectual Property, – PHI
2. Kumar K ,Cyber law, intellectual property and ecommerce security, Dominent Publication and distribution, New Delhi.

Reference Books:

1. Inventors Guide to Trademarks and Patents- Craig Fellenstein, Rachel Ralson- Pearson Education.
2. Intellectual Property –David Bainbridge, Longman

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester: VIII

Subject: Value Engineering

Total Theory Periods: 50

Total Marks in End Semester Exam: 80

Minimum number of class tests to be conducted: 2

Branch: **Common to All Branches**

Code: 300894 (37)

Total Tutorial Period: 12

UNIT – I

Basic Concepts

Meaning of the term value, basic kind, reasons for poor value, value addition, origin and history. Benefits, relevance in Indian scenario.

UNIT – II

Techniques

Different techniques, organizing value engineering study, value engineering and quality.

UNIT – III

Job Plan

Different phases, General phase, Information phase, Functional Phase, Creation Phase, Evaluation Phase, Investigation Phase, Implementation Phase, Audit.

UNIT – IV

Selection of evaluation of VE Projects

Project selection, method selection, value standard, application of methodology.

UNIT – V

Value Engineering Program

VE operations in maintenance and repair activities, VE Cost, life cycle, cost model, training for VE, general value engineering, case studies.

TEXT BOOKS

Value Engineering – S.S. Iyer – New Age International Publishers, New Delhi

Industrial Engineering & Management – O.P. Khanna – Dhanpat Rai & Sons

REFERENCES

Techniques of Value Analysis and Engineering – L.D. Miles – McGraw Hill, New York

Value Engineering, A Systematic Approach – A.E. Mudge – McGraw Hill, New York

Compendium on Value Engineering – H.G. Tufty – Indo American Society

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester: VIII

Subject: Disaster Management

Total Theory Periods: 40

Total Marks in End Semester Exam: 80

Minimum number of class tests to be conducted: 2

Branch: **Common to All Branches**

Code: 300895 (20)

Total Tutorial Periods: 12

Unit 1

Nature of disasters – natural and other disasters, Earthquakes, floods, draught, cyclones, fire and other environmental disasters.

Unit 2

Behaviour of structures in disaster prone areas, Disaster zoning, Hazard assessment, Environmental Impact Assessment

Unit 3

Methods of mitigating damage during disasters, disaster preparedness.

Unit 4

Management systems during disasters, Construction Technology for mitigation of damage of structures.

Unit 5

Short-term and long-term relief measures.

Name of Text Books:

Design of Earthquake Resistant Buildings – Minoru Wakabayashi (McGraw Hill Publication)

Dynamics of Structures: Theory and Application to Earthquake Engineering (2nd edition) – Anil K Chopra (Pearson Education Publication)

Name of Reference Books:

Fundamentals of Vibrations – Anderson, R.A. (Mc Millan)

IS – 1893 (Part I): 2002, IS – 13920: 1993, IS – 4326: 1993, IS-13828: 1993

Earth quake engineering damage assessment and structural design – S.F. Borg

Disasters and development – Cuny F (Oxford University Press Publication)

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester: VIII
Subject: Construction Management
Total Theory Periods: 40
Total Marks in End Semester Exam: 80
Minimum number of class tests to be conducted: 2

Branch: **Common to All Branches**
Code: 300896 (20)
Total Tutorial Periods: 12

Unit 1

The Owner's Perspective

Introduction-The project life cycle-Major Types of Construction-Selection of Professional Services-Construction contractors-Financing of constructed facilities-Legal and regulatory Requirements-The changing Environment of the construction Industry-The Role Project Managers

Unit 2

Organizing for Project Management

What is project management? – Trends in Modern Management-Strategic planning and project programming- Effects of project risks on organization-Organization of Project Participants-Traditional designer-Constructor sequence-Professional construction management-Owner-Builder-Operation-Turnkey operation-Leadership and Motivation for the Project team-Interpersonal behaviour in project organization-perceptions of Owners and Contractors

Unit 3

The Design and Construction Process

Design and construction as an integrated system-Innovation and technological Feasibility-Innovation and technological feasibility-Design Methodology-Functional Design-Physical Structures-Geo-Technical Engineering Investigation-Construction Site Environment-Value engineering-Construction Planning-Industrialized Construction and Prefabrication-Computer - Aided Engineering

Unit 4

Labour, Material and Equipment Utilization

Historical Perspective – Labour Productivity-Factors Affecting Job-Site Productivity-Labor Relations in construction-Problems in collective bargaining-Materials Management-Materials Procurement and Delivery- Inventory control-Tradeoffs of cost in Material Management-Construction Equipment-Choice of Equipment and Standard production Rates-Construction Processes Queues and Resource Bottlenecks

Unit 5

Cost Estimation

Costs Associated with Construction Facilities-Approaches to cost estimation-Type of construction cost estimates- Effects of scale on construction cost-Unit cost-Method of estimation-Methods for allocation of joint costs- Historical cost data-Cost indices-Applications of cost Indices to Estimating-Estimate based on Engineers List of Quantities-Allocation of Construction costs over time-Computer Aided cost Estimation-Estimation of operating costs

Name of Text Books:

Construction Project Management Planning, Scheduling and Control – Chitkara, K.K. (Tata McGraw Hill Publishing Co., New Delhi, 1998)

Project Management: A systems Approach to Planning, Scheduling and Controlling – Harold Kerzner (CBS Publishers & Distributors, Delhi, 1988)

Name of Reference Books:

Project management for Construction: Fundamental Concepts for owners, Engineers, Architects and Builders – Chris Hendrickson and Tung Au, (Prentice Hall, Pittsburgh, 2000)

Construction Project Management – Frederick E.Gould (Wentworth Institute of Technology, Vary E.Joyce, Massachusetts Institute of Technology, 2000)

Project Management – Choudhury, S. (Tata McGraw Hill Publishing Co., New Delhi, 1988)

Applied project Engineering and Management – Ernest E. Ludwig (Gulf Publishing Co., Houston, Texas, 1988)

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester: VIII

Subject: Ecology and Sustainable Development

Total Theory Periods: 40

Total Marks in End Semester Exam: 80

Minimum number of class tests to be conducted: 2

Branch: **Common to All Branches**

Code: 300897 (20)

Total Tutorial Periods: 12

Unit 1

Nature of ecology and sustainable development

Definition, scope of ecology and sustainable development, geomorphology, oceanography, climatology and biogeography.

Unit 2

Energy and environment

Introduction of energy environment, use of solar cells for heating and operated drills, methane gas digesters, environmentally friendly method of energy conservation, difference between conventional and non-conventional energy sources, future trends of energy systems.

Unit 3

Theory of isostasy

Concept of isostasy for sustainable development, discovery of the concept, concept of Hayford and Bowie, Joly, and Holmes, Global isostatic adjustment.

Unit 4

Physical geography and man human impact on the natural environment

Modification of land forms, direct alteration of land forms, wind deflation, coastal erosion and deposition, modification of the atmosphere, ultration process in eco and energy systems.

Unit 5

Obstacles in sustainable development

Pollution growth, species extinction, restriction of bat lands, desertification, soil erosion, soil pollution, characterisation of contaminated soil, global warming and ozone depletion etc.

Name of Text Books:

Energy and environment – Fowler (McGraw Hill, New Delhi)

Restoration Ecology and sustainable development – Krystyna M. Urbanska et.al. (Cambridge University Press, U.K.)

Name of Reference Books:

Reuniting Economy and Ecology in Sustainable Development – Russ Beaton et.al. (-----)

Theory and implementation of economic models for sustainable development – Jeroen C.J.M. Van Den Bergh (-----)

Economy and Ecology: Towards sustainable development – F. Archibugi et.al. (-----)

Evaluating Sustainable Development: Giving People a voice in their destiny – Okechukwu Ukaga et.al. (-----)

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester: VIII

Branch: **Common to All**

Branches

Subject: Non Conventional Energy Sources

Code: 300898 (19)

Total Theory Periods: 50

Total Tutorial Periods: 00

Total Marks in End Semester Exam: 80

Minimum number of class tests to be conducted: 02

Note: Internal Choice may be given in any three units.

Unit I

Environmental Aspects of Power Generation, Heat Transfer for Solar Energy, Utilization Flat Plate Collectors: Physical principles of conversion of solar radiation into heat, Thermal losses and efficiency of FPC, Practical considerations for flat plate collectors, Applications of FPC – Water heating and drying .Focusing Type Collectors: Orientation and sun tracking systems, Types of concentrating collectors – Cylindrical parabolic collector, Compound parabolic collector, Thermal performance of focusing collectors, Testing of solar collectors.

Unit II

Solar cooking, solar desalination, solar ponds and solar space heating Solar Industrial process heating and Solar power generation. Solar Green Houses, Solar thermo mechanical power, solar refrigeration & air conditioning and Solar High Temperature Applications Gasifier- Classification, Chemistry, Application, advantages, disadvantages and application.

Unit III

Energy from Biomass: Type of biomass sources, biomass generation, factors affecting biodigestion, classification, advantages and disadvantages of biogas plants, community biogas plants, problems related to biogas plants, utilization of biogas. Energy plantation, methods for obtaining energy from biomass, thermal gasification of biomass.

Unit IV

Chemical Energy Sources: Fuel cells: Design, principle, classification, types, advantages and disadvantages Hydrogen Energy: Properties of hydrogen, methods of hydrogen production, physical and chemical principles, storage, advantages and application

Unit V

Wind Energy: Basic principle, wind energy conversion, wind energy conversion systems, design consideration, performance and application. Alcohol fuels: Overview, feedstock, methods for alcohol production, alcohol as an engine fuel; LPG, CNG Hydrogen and Ethanol as an alternative liquid fuel; engine performance with alcohol fuels. Tidal Energy.

Name of Text Books:

1. John A Duffie & William A Beckman: Solar Energy Thermal processes Wiley Inter science publication
2. H P Garg & J Prakash, Solar Energy – Fundamentals and Applications: - Wiley Inter science

Name of Reference Books:

1. G D Rai, Solar Energy Utilization – Khanna publishers.
2. S P Sukhatme, Solar Energy – Principles of thermal Collection & Storage – Tata McGraw Hill Publishing company ltd., New Delhi

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester: VIII
Subject: Energy Auditing
Total Theory Periods: 50
Total Marks in End Semester Exam: 80
Minimum number of Class tests to be conducted: 2

Branch: **Common to All Branches**
Code: 300899 (24)
Total Tut Periods: Nil

UNIT I:

History of Energy Management: Energy forecasting, Limitations of energy resources. Renewable energy resources. Load management. Energy management. Demand side management (DSM) Energy conservation in realistic distribution system. Short term load forecasting for de-centralized load management.

UNIT II:

Energy Situation and Global Energy Sources: World energy consumption. Energy in developing countries. Firewood crises. Indian energy sources. Non-conventional renewable energy sources. Potential of renewable energy sources. Solar energy types. Wind energy. Wave, tidal and OTEC. Super-conductors in power system. Wind power generation for large scale generation of electricity. Wind driven induction generators.

UNIT III:

Energy Auditing as Applicable to an Industry: Classification of energy audit System optimization. Power factor improvement. Preventive maintenance. Process modification. Non-conventional energy sources. Electricity tariffs. Types of off-peak tariffs.

UNIT IV:

Elements of Energy Auditing and Metering Methodologies(Case Studies): Capacity utilization. Technology up-gradation. Fine tuning, Energy conservation. Concept and methods of energy conservation.

UNIT V:

Demand Side Management: Introduction to DSM. Concept of DSM. Benefits from DSM. DSM techniques. Time of day pricing, Multi-utility exchange model. Time of day pricing models for planning, load management. Load priority technique. Peak clipping. Peak shifting. Valley filling. Strategic conservation. Energy efficient equipment, Socioeconomic awareness programs.

Text Books:

1. Ashok.V.Desai(ED)-Energy Demand: Analysis, Management and Conservation, Wiley Eastern Ltd., New Delhi.
2. S. Rao, Parulekar, Energy technology, Khanna Pbs.

Reference Books:

1. Jyothi Prakash- Demand Side Management, Tata McGraw-Hill Publishers.
2. N.K.Bansal, Kleeman Millin-Renewable Energy Sources and Conservation Technology, Tata McGraw-Hill Publishers.