# CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

## SCHEME OF TEACHING & EXAMINATION

### B.E. VIII SEMESTER MECHANICAL ENGINEERING

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Board of Study</th>
<th>Subject Code</th>
<th>Subject</th>
<th>PerIODS per Week</th>
<th>Scheme of Examination</th>
<th>Total Marks</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
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<td>T</td>
<td>P</td>
</tr>
<tr>
<td>1</td>
<td>Mech. Engg.</td>
<td>337811 (37)</td>
<td>Robotics</td>
<td>4 1 -</td>
<td>80</td>
<td>20</td>
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<tr>
<td>2</td>
<td>Mech. Engg.</td>
<td>337812 (37)</td>
<td>Refrigeration &amp; Air Conditioning</td>
<td>4 1 -</td>
<td>80</td>
<td>20</td>
<td>20</td>
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<tr>
<td>3</td>
<td>Mech. Engg.</td>
<td>337813 (37)</td>
<td>Production Management</td>
<td>4 1 -</td>
<td>80</td>
<td>20</td>
<td>20</td>
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<tr>
<td>4</td>
<td>Refer Table – 3</td>
<td>Professional Elective – III</td>
<td>4 1 -</td>
<td>80</td>
<td>20</td>
<td>20</td>
<td>120</td>
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<tr>
<td>5</td>
<td>Refer Table -3</td>
<td>Open Elective – IV</td>
<td>4 1 -</td>
<td>80</td>
<td>20</td>
<td>20</td>
<td>120</td>
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<tr>
<td>6</td>
<td>Mech. Engg.</td>
<td>337821 (37)</td>
<td>Robotics Lab</td>
<td>- - 2</td>
<td>40</td>
<td>-</td>
<td>20</td>
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<tr>
<td>7</td>
<td>Mech. Engg.</td>
<td>337822 (37)</td>
<td>Refrigeration &amp; Air Conditioning Lab</td>
<td>- - 2</td>
<td>40</td>
<td>-</td>
<td>20</td>
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<tr>
<td>8</td>
<td>Mech. Engg.</td>
<td>337823 (37)</td>
<td>Production Management Lab</td>
<td>- - 2</td>
<td>40</td>
<td>-</td>
<td>20</td>
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<tr>
<td>9</td>
<td>Mech. Engg.</td>
<td>337824 (37)</td>
<td>Major Project</td>
<td>- - 6</td>
<td>100</td>
<td>-</td>
<td>80</td>
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<tr>
<td>10</td>
<td>Mech. Engg.</td>
<td>300825 (37)</td>
<td>Report Writing &amp; Seminar</td>
<td>- - 2</td>
<td>-</td>
<td>-</td>
<td>40</td>
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<tr>
<td>11</td>
<td>Library</td>
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<td>- - 1</td>
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</tbody>
</table>

**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

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Branch</th>
<th>Code</th>
<th>Name of Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mechanical</td>
<td>337871 (37)</td>
<td>Mechatronics</td>
</tr>
<tr>
<td>2</td>
<td>Mechanical</td>
<td>337872 (37)</td>
<td>Vibration &amp; noise Control</td>
</tr>
<tr>
<td>3</td>
<td>Mechanical</td>
<td>337873 (37)</td>
<td>Optimization Techniques</td>
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<tr>
<td>4</td>
<td>Mechanical</td>
<td>337874 (37)</td>
<td>Energy Management and Audit</td>
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<tr>
<td>5</td>
<td>Mechanical</td>
<td>337875 (37)</td>
<td>Cryogenic Engineering</td>
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<tr>
<td>6</td>
<td>Mechanical</td>
<td>337876 (37)</td>
<td>Environmental Pollution &amp; Control</td>
</tr>
</tbody>
</table>

**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

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

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.
UNIT – I
Introduction to Robotics

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 Transormation Matrix.

UNIT – V
Introduction to Inverse Kinematic model
UNIT – IV
Robotic Sensors and Vision

UNIT – V
Robot Applications

TEXT BOOKS

REFERENCE BOOKS
2. Kinematics and Synthesis of linkages - Hartenberg and Denavit - McGrew Hill Book Co
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.

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, pyschormetric 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
4. Refrigeration and Air Conditioning – W.F. Stooker
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
3. Production planning and Control – By Samuel Eilon, Navneet Prakashan Ltd., Bombay
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, Quantitizing 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 book 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

REFERENCE BOOKS
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 undamped 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

REFERENCE BOOKS
1. Mechanical Vibrations – G.K. Grover - S. Chand & CO.
2. Acoustics for Engineers - Turner & Pretlove - Macmillan
4. Industrial Noise Control: Fundamentals and Applications - Bell and Bell, Marcel-Dekker
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 Erie quality, application and complementary function.

UNIT- V
Dynamic Programming
Multistage Decision processes. Principles of optimality, continuous dynamic programming.

TEXT BOOKS

REFERENCE BOOKS
2. Introduction to optimum Design – J.S. Arora – Mc. Grawhill publishers
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
2. Energy Management – Paul O'Callaghan –

REFERENCE BOOKS
2. Energy Management in illuminating System – Kao Chen – CRC Publishers
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, liquefication 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

REFERENCE BOOKS
2. High Vacuum Technology – A. Guthree – New Age International Publication
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 $\text{SO}_2$, $\text{CO}_2$, $\text{NO}_2$, $\text{H}_2\text{S}$ 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. Ningalmam 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 electroscopic 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
2. Air Pollution & Control – KVSG Murali Krishnan – Kaushal & Company
3. Air Pollution & Control Technologies – Y. Anjaneyulu – Allied Publishers
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
Chhattisgarh Swami Vivekanand Technical University, Bhilai

Subject: Refrigeration & Air Conditioning Lab Code: 337822 (37)
Total Practical Periods: 28 Total Marks in End Semester Exam: 40

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

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.
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

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:

Reference Books:
1. Sunita Mishra, "Communication Skills for Engineers" Pearson Education
2. Davies J.W. "Communication for engineering students", Longman
UNIT-I
[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:
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

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)
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

[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:

Reference Books:
3. Plsek, Creativity, Innovation and Quality, PHI
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, Time Model Based Management Systems, Access to Models Understandability of Results, Integrating Models Sensitivity of a Decision,
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,

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.


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 Branch: Common to All Branches.
 Subject: Software Technology Code: 300885 (22)
 Total Theory Periods: 4 per week. Total Tut Periods: Nil.
 Total Marks in End Semester Exam: 80.
 Minimum number of class tests to be conducted: 02.

UNIT-1
ASSEMBLY LANGUAGE PROGRAMMING
Pentium Assembly languages - Registers, Memory Model, Addressing mode, 1source Link, Installation, Assembler Directives.
ASSEMBLER DESIGN

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
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
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.
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.
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 continued 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. Faweett and Wood
Personal Protective Equipment – NSC Bombay

REFERENCE BOOKS
Ergonomics - P. Krishna Murthy
Fire Prevention Hand Book – Derek James
Semester: VIII                  Branch: Common to All Branches
Subject: Bioinformatics      Code:  300890 (22)
Total Theory Periods: 4 per week.                       Total Tut Periods: Nil.
Total Marks in End Semester Exam: 80.
Minimum number of class tests to be conducted: 02.

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 Marcov 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
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
4. Current Topics in Computational Molecular Biology (Computational Molecular Biology),
Tao Jiang, Ying Xu, Michael Zhang (Editors), 2002, MIT Press
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

UNIT – III
Energy in Manufacturing

UNIT – IV
Heat Recovery System

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
2. Energy Management – Paul O’Callaghan –

REFERENCE BOOKS
2. Energy Management in Illuminating System – Kao Chen – CRC Publishers
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

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


References:

1. Guozhong Cao, “Nanostructures and Nanomaterials”, Imperial College Press, London
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

Unit-I

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

REFERENCES
Compendium on Value Engineering – H.G. Tufty – Indo American Society
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)
Earthquake engineering damage assessment and structural design – S.F. Borg
Disasters and development – Cuny F (Oxford University Press Publication)
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-Builders-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

Unit 4
Labour, Material and Equipment Utilization

Unit 5
Cost Estimation

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

Name of Reference Books:
Construction Project Management – Frederick E.Gould (Wentworth Institute of Technology, Vary E.Joyce, Massachusetts Institute of Technology, 2000)
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 alternation 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. (------)
Unit I

Unit II

Unit III

Unit IV

Unit V

Name of Text Books:
1. John A Duffie & William A Beckman: Solar Energy Thermal processes Wiley Inter science publication

Name of Reference Books:
UNIT I:

UNIT II:

UNIT III:

UNIT IV:

UNIT V:

Text Books:

Reference Books: