Shivaji University, Maharashtra
B.E./B.Tech CSE Sem 1 syllabus

Engineering Mathematics-I

Engineering Mathematics-I

SECTION I
Unit 1: Matrices and Solution of Linear System Equations

(Weightage 15 Marks in Shivaji Uni Exam of 70 marks)
1. Rank of matrix: definition, normal form and echelon form
2. Consistency of linear system equations
3. System of linear homogeneous equations
4. System of linear Non-homogeneous equations

Unit 2: Eigen Values and Eigen vectors
(Weightage 10 Marks in Shivaji Uni Exam of 70 marks)
1. Eigen Values
2. Properties of Eigen Values
3. Eigen vectors
3. Properties of Eigen vectors
4. Cayley-Hamilton's theorem (Without proof)

Unit 3: Complex Numbers
(Weightage 10 Marks in Shivaji Uni Exam of 70 marks)
1. De Moivre's Theorem (Without proof)
2. Roots of complex numbers by using De Moivre's Theorem
3. Expansion of sinnθ and cosnθ in powers of sinθ and /or cosθ.
4. Circular functions of a complex variable - definitions
5Hyperbolic and Inverse Hyperbolic Functions- definitions .

SECTION II
Unit 4: Numerical Solution of linear simultaneous equations: (Weightage 10 Marks in Shivaji Uni Exam of 70 marks)
1. Gauss elimination method
2. Gauss-Jordan method

3. Jacobi’s iteration method
4. Gauss-Seidel iteration method

Unit 5: Expansion of Functions and Indeterminate forms: (Weightage 10 Marks in Shivaji Uni Exam of 70 marks)
1. Maclaurin's theorem
2. Standard expansions
3. Taylor's theorem
4. Indeterminate forms and L' Hospital's rule

Unit 6: Partial Differentiation: (Weightage 15 Marks in Shivaji Uni Exam of 70 marks)
1. Partial derivatives: Introduction
2. Total derivatives
3. Differentiation of implicit function
4. Euler's theorem on homogeneous function of two variables
5. Jacobian and its Properties .
6. Maxima and Minima of functions of two variables

Recommended Books:
1. A text book of Applied Mathematics, Vol.I by P. N. Wartikar& J. N. Wartikar, Pune Vidyarthi Griha Prakashan, Pune.
2. Higher Engineering Mathematics by Dr. B. S. Grewal, Khanna Publishers, Delhi.

Reference Books:
1. Advanced Engineering Mathematics by Erwin Kreyszig, Wiley India Pvt. Ltd.
2. Advanced Engineering Mathematics by H. K. Dass, S. Chand, New Delhi.
3. A text book of Engineering Mathematics Volume I by Peter V. O’Neil and Santosh K.Sengar, Cengage Learning.
4. Mathematical methods of Science and Engineering by Kanti B. Datta, Cengage Learning.
5. Numerical methods by Dr. B. S. Grewal, Khanna Publishers, Delhi.
6. A text book of Engineering Mathematics by N. P. Bali, Iyengar, Laxmi Publications (P) Ltd.,NewDelhi.

Fundamentals of Electronics and Computer

Fundamentals of Electronics and Computer

Unit 1: Semiconductor Devices and Applications
(Weightage 12 Marks in Shivaji Uni Exam of 70 marks)

Semiconductor Diode, Half wave, Full wave, Bridge rectifier, Voltage Regulator Using Zener
Diode,BJT: characteristics, CE configuration, CE as an amplifier. Load Line, Operating Point, Leakage
Currents, Saturation and Cut off Mode of Operations.

Unit 2: Digital Electronics
(Weightage 11 Marks in Shivaji Uni Exam of 70 marks)
Logic Gates, Boolean algebra, Comparison of Specifications of Logic Families, Combinational Logic,
Half Adder, Full Adder, Multiplexer, De-Multiplexer.

Unit 3: Applications
(Weightage 12 Marks in Shivaji Uni Exam of 70 marks)
A) Transducers: for Displacement (LVDT), Temperature (RTD), Pressure (Strain Gauge), Speed (Shaft
Encoder), Range, Specifications and Limitations.
B) Appliances: Operation of Appliances: Digital Thermometer, Weighing Machine, Washing Machine,
Microwave Oven and Tachometer.

SECTION II

Unit 4: Computer Basics and Hardware
(Weightage 12 Marks in Shivaji Uni Exam of 70 marks)
A) Generations & Classification of Computers.
B) Computer System Architecture– CPU, Input Unit, Output Unit, Storage Unit.
C) Applications of Computers.

Unit 5: Data Representation and Computer Software
(Weightage 11 Marks in Shivaji Uni Exam of 70 marks)

A) Data Representation In Computer: Types Of Number System – Binary, Octal, Decimal, Hexadecimal & Their Conversions, Coding Schemes – ASCII, Unicode.
B) Computer Software:
A) Operating System: Types Of Operating System, Functions, Unix/Linux Commands: Listing, Changing, Copying, And Moving Files & Directories (ls, cd, cat, mkdir, rmdir)
B) System Software: Assembler, Interpreter, Compiler.
C) Application Software's: Word Processor, Spreadsheets, Presentation andtheir Applications.

Unit 6: Computer Programming and Networks
(Weightage 12 Marks in Shivaji Uni Exam of 70 marks)
A) Computer Programming: Program Development Cycle, Algorithm, Flowchart, Programming Control Structures – Sequence, Selection, and Repetition.
B) Introduction to Computer Networks: Definition Of Computer Network, Need, Standards: OSI, TCP/IP, Types of Networks: LAN, WAN, MAN, Network Topologies.

Text Books:
1. A Text Book of Applied Electronics by R S Sedha, S. Chand
2. Basic Electronics Engineering by Vijay Baru, RajendraKaduskar, S T Gaikwad (Wiley/ DREAMTECH)
3. Digital Principles & Applications by Albert Malvino, Donald Leach, TMGH Publication.
4. Principle of Electronics by V.K. Mehata, S. Chand
5. Electronic Instrumentation by H. S. Kalasi, Tata McGraw Hills Publication

Reference Books:
1) Electronics Devices and Circuit Theory by Robert L. Boylestad and Louis Nashelsky (Pearson Education Publication)
2) Fundamental of Digital Circuits by A. Anand Kumar (PHI-Publication)
3) Fundamental of Electronics Engineering by R.Prasad(CENGAGE-Learning)
4) Introduction to Information Technology, ITL Education Solutions LTD. Pearson Education
5) Fundamentals of Computers by V. Rajaram, PHI Publications.
6) UNIX concepts and applications by Sunitabha Das, TMGH.
7) Computer FundamentalsArchetucture and Organization by B.Ram New Age International Publishers.

Basic Mechanical Engineering

Basic Mechanical Engineering

Unit1:Thermodynamics
Thermodynamic State, Process, Cycle, Thermodynamic System, Heat, work, Internal Energy,First Law
of Thermodynamics, Application of First Law to steady Flow processes,Limitations of First Law
(Numerical Treatment) Statements of Second Law of

Thermodynamics.(12 marks)

Unit 2: Introduction to I C Engine
Carnot Engine, Construction and Working of C.I. and S.I., Two stroke, Four Stroke Cycles,Air standard
cycles- Carnot Cycle, Joule Cycle, Otto Cycle, Air Standard efficiency (DescriptiveTreatment only) (12
marks)

Unit 3: Introduction to Refrigeration and Air Conditioning
Carnot refrigerator, Refrigerant types and properties, Vapour compression and vapourabsorption system,
solar refrigeration, Window Air Conditioning, Psychometric properties ofmoistair, Applications of
refrigeration and air conditioning (Descriptive Treatment only).(11 marks)

Unit4:EnergySources and power plants
Renewable and nonrenewable, Solar-flat plate collector, concentric collector–Parabolic andcylindrical,
Photovoltaic cell, Wind, Hydropower plant, Steam Power plant,Bio-gas, Bio-Diesel (Descriptive
Treatment only). (12 marks)

Unit 5: Mechanical Power Transmission and Energy conversion devices
Type of Belt and belt drives, chain drive, Types of gears and gear Trains, (Numerical Treatment on belt
drive), Construction, workingand applications of centrifugal Pump, Reciprocating compressor and
Peloton wheel Turbine.(12 marks)

Unit 6: Manufacturing Processes
Introduction to manufacturing processes - Casting Process, Steps involved in castingprocesses, and their
applications, Metal removing processes (Lathe, milling & drilling operations) Metal JoiningProcesses –
Arc welding, soldering and brazing and their applications.(11 marks)

Reference Books:
1. Solar Energy by Dr.S.P. Sukathame,Tata Mc-Graw Hill Publication
2. Non-Conventional Sources of Energy by G.D. Rai, Khanna Publication
3.Engineering Thermodynamics by R.Joel, The English Language

Book Society.
4.Engineering Thermodynamics by Achultan, Prentice Hall of India.
5.Thermal Engineering by R.K. Rajput, Laxmi Publication, Delhi.
6.Elements of Heat Engine Vol.I,II,III by Patel and Karamchandani, Acharya Book Depot.
7.Power Plant Engineering by Arora and Domkunwar, Dhanpat Rai and Sons.
8. Manufacturing Technology Volume I and II by P. N. Rao, Tata Mc-Graw Hill Publication
9. Elements of Workshop Technology, Vol.I and II by HajaraChoudhari, Media Promoters
10. Basic Mechanical Engineering by Basant Agrawal & C. M. Agrwal, Wiley India Pvt. Ltd.
11.Energy Technology by S. Rao and Dr.B.B. Parulekar, Khanna Publication.

Basic Electrical Engineering

Basic Electrical Engineering

SECTION I

Unit1: Analysis of D.C. circuits:
(Weightage 12 Marks in Shivaji Uni Exam of 70 marks)
Concept of E.M.F, Potential Difference, Current, Resistance, Ohm's Law Kirchhoff's laws, mesh and node analysis
(Numerical on Mesh and Nodal Analysis of Two loops)

Unit 2:Magnetic circuits:
(Weightage 11 Marks in Shivaji Uni Exam of 70 marks)
Concept of mmf, reluctance, magnetic flux, Magnetic Flux density, Magnetic field strength, BH curve, magnetic leakage, fringing, Comparison of Electric and Magnetic circuit, series magnetic circuits (Theoretical Concepts only).

Unit 3: Single phase AC Circuits: (Weightage 12 Marks in Shivaji Uni Exam of 70 marks)
Fundamentals of Alternating quantities, Faraday's Law, Types of Induced E.M.F ,Generation of sinusoidal voltage, concept of R.M.S. & Average value, form factor, Peak Factor, Pure Resistive, Inductive, Capacitive , R-L, R-C, R-L-C series circuits, powers, Significance of power factor.
(Numerical Treatment on Series R-L, R-C, R-L-C circuits)

SECTION II

Unit 4: Three phase A.C. Circuits (Weightage 12 Marks in Shivaji Uni Exam of 70 marks)
Advantages of 3 phase system, Generation of 3 phase AC supply, balanced 3 phase load, relation between line and phase quantities for star connected circuit and delta connected circuit.

Unit 5:Earthing and lamps: (Weightage 11 Marks in Shivaji Uni Exam of 70 marks)
Necessity of Earthing, Earthing methods, Fuse (rewireble and HRC). MCB, Incandescent Lamp, Fluorescent tube, CFL, LED lamp, Mercury vapour lamp, single line diagram of electrical systems.

Unit 6: Single phase Transformer: (Weightage 12 Marks in Shivaji Uni Exam of 70 marks)
Construction, operating principle, Types, emf equation, Ratios of voltage and current, operation on no load and with load, power losses, efficiency, voltage regulation, applications.
(Numerical Treatment on E.M.F Equations &Transformer losses and Efficiency)

Reference books:
1. P.V.Prasad and S.Shivan Raju – Electrical Engineering concepts and Applications – Cengage learning.
2. B.L.Theraja – Electrical Technology vol.1. – S.Chand.
3. B.L.Theraja – Electrical Technology vol.2. – S.Chand.
4. NagrathI.J. and D.P.kothari – Basic Electrical Engineering(2001) – Tata McGraw Hill.
5. .BharatiDwivedi and AnurasgTripathi – Fundamentals of Electrical Engineering – Willey Precise

Engineering Graphics

Engineering Graphics

SECTION I

Unit1: Fundamentals of Engineering Graphics& Engineering Curves

A) Fundamentals of Engineering Graphics: Introduction to Drawing instruments and their uses.
Layout of drawing sheets, different types of lines used in drawing practice, Dimensioning system as per
BIS (Theoretical treatment only)

B) Engineering curves: Construction of regular polygons (up to hexagon). Construction of Ellipse – (Directrix-Focus & Arcs of circle Method) Parabola-(Directrix-Focus & Rectangle Method) , Hyperbola-(Directrix-Focus & Rectangular Method), Involutes, Archimedian spiral and Cycloid only.
(10 marks)

Unit 2: Projections of lines & Planes
A) Projections of lines: Introduction to First angle and third angle methods of projection.
Projections of points on regular reference planes. Projections of horizontal, frontal and Profile lines on regular and auxiliary reference planes. Projection of oblique lines it's True length and angle with reference planes by rotation and auxiliary plane method. Concept of grade and bearing of line.
B) Projections of planes: Projections on regular and on auxiliary reference planes. Types of planes (horizontal, frontal, oblique and Profile planes). Edge view and True shape of a Plane. Angles made by the plane with Principle reference planes. Projections of plane figures inclined to both the planes. (Circle and regular polygon) (15 marks)

Unit 3: Projections of solids
Projections of Prisms, Pyramids, Cylinder and Cones inclined to both referenceplanes(Excluding frustum and sphere)(10 marks)

SECTION- II

Unit 4: Orthographic Projections
Orthographic views: lines used, Selection of views, spacing of views, dimensioning and sections. Drawing required views (any two views) from given pictorial views (Conversion of pictorial view into orthographic view) including sectional orthographic view. (15 marks)

Unit 5: Isometric projections
Isometric projections: Introduction to isometric, Isometric scale, Isometric projections and Isometric views / drawings. Circles in isometric view. Isometric views of simple solids and objects. (10 marks)

Unit 6: Development of plane and curved surfaces
Development of plane and curved surfaces: of the solids, Prisms, Pyramids, Cylinders and Cones along with cutting planes (Solids in simple position only). (10 marks)

Reference Books:

1. Engineering Drawing by N. D. Bhatt, Charotor Publication House, Bombay
2. Fundamentals of Engineering by W. J. Luzadder, Drawing, Prentice Hall of India.
3. Engineering Design and Visualization by Jon M.Duff,William A. Ross, CENGAGE Learning
4. Machine Drawing by N. D. Bhatt, Charotor Publication House, Bombay.
5. Graphic Science by French and Vierck, Mc-Graw Hill International.
6. Engineering Drawing and Graphics by K. Venugopal, New Age Publication
7. A text book of Engineering Drawing by R. K. Dhawan, S. Chand and Co.
8. Machine Drawing by K. L. Narayana, New Age Publication
9. Engineering Drawing by N. B. Shaha and B. C. Rana, Pearson Education.
10. Engineering Drawing and Graphics Using AutoCAD by T. Jeyapoovan, Vikas Publication.
11. Engineering Drawing by Prof. Amar Pathak, WIELY India Publication.

Professional Communication-I

Professional Communication-I

Unit 1: Understanding Communication

1. Introduction, nature and importance
2. Process of communication
3. Basic types of communication- Verbal and Non- verbal
4. Barriers and filters of communication

Unit 2: Grammar and Vocabulary

1. Forms of Tenses
2. LSRW skills
3. Developing vocabulary (synonyms, antonyms, confused words etc.)

Unit 3: Phonetics

1. Understanding Phonetics and its alphabets
2. Transcription practices

Unit 4: Developing Oral Skills

1. Importance and techniques of spoken language.
2. Techniques of formal speech, meetings, Elocution, Extempore etc.

Unit 5: Professional Correspondence
1. Importance, language and style, formats (British & American)
2. Letter Writing – Simple letter (seeking permission regarding absence etc.),
3. Preparation of technical events information broacher and manuals.

Reference Books:
1. Handbook for Technical Writingby David A. McMurrey, Joanne Buckley, Cengage.
2. A Course in Englishby J.D. O'Connor.
3. Better English Pronunciation by J.D. O'Connor.
4. Communication Skills Handbook: How to succeed in written and oral communication by Jane Summers, Brette Smith, Wiley India Pvt.Ltd.
5. Personal Development for Life and Work by Masters, Wallace, Cengage.
6. Soft Skills for Managers by Dr. T. KalyanaChakravarthi, Dr. T. LathaChakravarthi, Biztantra.
7. Soft Skills for every one by Jeff Butterfield, Cengage.
8. Behavioural Science by Dr.Abha Singh, Wiley India Pvt.Ltd.
9. An Introduction to Professional English and Soft Skills by Bikram K. Das, KalyaniSamantray, Cambridge University Press New Delhi.
10. Speaking Accurately, K.C. Nambiar, Cambridge University Press New Delhi.
11. Speaking Effectivelyby Jeremy Comfort, Pamela Rogerson, Cambridge University Press New Delhi.
12. Cambridge English for Job Hunting by ColmDownes, Cambridge University Press New Delhi.
13. Body Language by Allen Pease.
14. The Ace of Soft Skills by Gopalswami Ramesh, Mahadevan Ramesh, Pearson Publication, Delhi.
15. Decision Making Skills by Khanka S.S.
16. Business Ethics and Communication by C.S. TejpalSheth.
17. Write Right by Syed AbdurRaheem.

Engineering Chemistry

Engineering Chemistry

Unit 1: Water
Introduction, impurities in natural water, water quality parameters total solids, acidity, alkalinity,
chlorides, and dissolved oxygen (definition, causes, significance),

hardness of water types of hardness,
units of hardness, ill effects of hard water in steam generation in boilers (scale & sludge formation),
numerical on hardness, treatment of hard water (ion exchange and reverse osmosis).

Unit 2: Instrumental methods of chemical analysis
Introduction, advantages and disadvantages of instrumental methods-----
A)Spectrometry: Introduction, Laws of spectrometry (Lamberts and Beer-Lambert's law),Single beam
spectrophotometer (schematic, working and applications).
B)Chromatography: Introduction, types, gas-liquid chromatography (GLC), basic principle,
instrumentation and applications.

Unit 3: Advanced materials
A)Polymers: Introduction, plastics, thermo softening and thermosetting plastics, industrially important
plastics like phenol formaldehyde, urea formaldehyde and epoxy resins, Conducting polymers and
Biopolymers(Introduction, examples and applications.)
B)Composite materials: Introduction, Composition, properties and uses of fiber reinforced plastics
(FRP) and glass reinforced plastic (GRP).

SECTION II

Unit 4: Fuels
Introduction, classification, calorific value, definition, units (calorie, kcal, joules, kilojoules), characteristics of good fuels, comparison between solid, liquid and gaseous fuels, types of calorific value (higher and lower), Bomb calorimeter and Boy's calorimeter.
Numerical problems on Bomb and
Boy's calorimeter.

Unit.5: Corrosion:
Introduction, causes, classification, atmospheric corrosion (oxidation corrosion), electrochemical corrosion (hydrogen evolution and oxygen absorption mechanism), factors affecting rate of corrosion.
Prevention of corrosion by proper design and material selection,cathodic protection, Protective coatings-
hot dipping (galvanizing and tinning,), electroplating.

Unit 6: Metallic materials & Green Chemistry

A)Metallic materials: Introduction, Alloy- definition and classification, purposes of making alloys.

Ferrous alloys: Plain carbon steels (mild, medium and high), stainless steels. Nonferrous alloys: Copper alloy (Brass), Nickel alloy (Nichrome), Aluminum alloy (Duralumin and Alnico).

B)Green Chemistry: Definition, Twelve principles of Green Chemistry.

Reference books:

1.Engineering Chemistry by Jain and Jain, DhanpatRai Publishing Company Ltd., New Delhi.
2.A Textbook of Engineering Chemistry by S. S. Dara and S. S. Umare, S. Chand & Company Ltd., New Delhi.
3.A Textbook of Engineering Chemistry by C. P. Murthy, C. V. Agarwal and A. Naidu, BS Publications, Hyderabad.
4.Chatwal and Anand, Instrumental Methods of Chemical Analysis, Himalaya Publishing House, New Delhi.
5.Engineering Chemistry by Dr. A. K. Pahari and Dr. B. S. Chauhan, Laxmi Publications (P) Ltd, New Delhi.
6.A text Book of Engineering Chemistry by ShashiChawla, DhanpatRai& Co. (Pvt.) Ltd, Delhi.
7.Engineering Chemistry by Wiley India.
8.Engineering Chemistry by RenuBapna and Renu Gupta, MacMillan Publishers (India) Ltd, Delhi.

Basic Civil Engineering

Basic Civil Engineering

SECTION I

Unit 1: Relevance of Civil Engineering and Building Planning

Introduction, branches of civil engineering, application of civil engineering in other allied fields.Principles of planning, introduction to Bye-Laws regarding building line, height of building, open space requirements, F.S.I., setbacks, ventilation, sanitation as per municipal corporation area requirement.

Unit 2: Components of Building

A) Sub-structure: Types of soil and rocks as foundation strata, concept of bearing capacity,types of foundations i.e. shallow and deep and their suitability. Shallow

foundation such as wall foundation,
isolated foundation, deep foundation such as pile foundation.
B) Super-structure: Elements of super-structures and their functions

Unit 3: Building Materials and Design
Use and properties of the following materials--Concrete – ingredients and grades, plain and reinforced
cement concreteand ready mixconcrete, bricks, steel, timber, roofingmaterials etc.
Introduction to types of loads, load bearing and framed structures.

SECTION II

Unit 4: Linear and Angular Measurements
Principles of surveying, Classification of surveys, Chain Surveying, Introduction to metricchain and
tapes, error in chaining, nominal scale and R.F., ranging, chaining and offsetting, index plan, location
sketch and recording of field book, Chain and compass survey, Meridian, bearing and its types, system
of bearing, Types of compass: prismatic and surveyor's compass. Calculation Of included angles, correction for local attraction.

Unit 5: Leveling
Terms used in leveling, use of Dumpy level and Auto Level, temporary adjustments.Methods of reduction of levels, types of leveling, Contours, characteristics of contours, use of contour
maps.Introduction and use of EDM's with special reference to Total Station.Measurement of area by planimeter – mechanical and digital.

Unit 6: Introduction to Transportation, Environmental and Irrigation Engineering
Components of rigid and flexible pavement, components of railway track (Broad Gauge) Components of
water supply scheme (flow diagram), Necessity of Irrigation, Types of Dams (Earthen and Gravity Dam)

Reference Books:
1. Basic Civil Engineering by S. S. Bhavikatti, New Age International Publications.
2. Civil Engineering Materials - Technical Teacher's Training Institute, Chandigarh
3. Surveying by N. Basak, Tata Mc-Graw Hill Publication.

4. Basic Civil Engineeringby G. K. Hiraskar, DhanpatRai Publication.
5. Surveying Vol.I, Vol.II, Vol.III by B.C. Punmia, Laxmi Publication.
6. Irrigation Engineering by B. C. Punmia, DhanpatRai Publications

Engineering Physics

Engineering Physics

SECTION – I

Unit 1.Diffraction and Polarization of Light :(12 Marks)

Diffraction : Diffraction- Concept and types (Fresnel and Fraunhofer diffraction), Diffraction grating –
construction and theory, resolving power of planetransmission grating.

Polarization:

Introduction, double refraction, Huygens' theory (positive and negative crystals), Optical Activity,
Specific Rotation, Laurent's half shade polarimeter.

Unit 2. Laser and FibreOptics:(12 Marks)

LASER :

Absorption, spontaneous emission, stimulated emission, pumping, population inversion, Ruby laser,
characteristics of laser, Holography (construction and reconstruction)

Fibre Optics:

Total Internal Refection, structure of opticalfibre, acceptance angle, acceptance cone, numerical aperture
and fractional refractive index change (noderivation), fibre optic communication system, advantages of
optical fibres.

Unit 3. Sound: (11 Marks)

Conditions for good acoustics, Reverberation, Reverberation time, Sabine's formula for reverberation
time (no derivation), Absorption coefficient, Factors affecting architectural acoustics and their remedy.

SECTION – II

Unit 4.Crystal Physics: (12 Marks)

Space Lattice, Basis and Crystal structure, Unit cell, Seven crystal system, number of atoms per unit
cell, coordination number, atomic radius, packing fraction, relation

between density and lattice constant,
Miller indices - procedure, features and sketches for differentplanes, symmetry elements of cubic
crystal,Bragg's law for X-ray diffraction.

Unit 5. Physics of Nano-materials: (12 Marks)
Concept- Nanomaterial, Nanoscience and Nanotechnology, production techniques(Top down and
bottom up), Ball milling and Colloidal technique for synthesis of nano particles, Types of Nanomaterial,
Tools- Scanning Tunneling Microscope and Atomic Force Microscope, properties and applications of
nano-materials.

Unit 6.QuantumMechanics (11 Marks)
Wave-particle duality of light, dual nature of matter (De-Broglie's concept of matter waves) Wavelength
of matter wave in terms of K.E. and P. D., Properties of matter waves, Heisenberg's uncertainty
principle for position and momentum, Compton Effect (Statement, explanation and experimental
verification).

References :
1. R. K. Gaur & Gupta S. L, Engineering Physics -DhanapatRai Publication.
2. M. N. Avadhanulu& P. G. Kshirsagar - A Text Book of EngineeringPhysics -S. Chand Publication.
3. B. L. Theraja -Modern Physics - S. Chand & Company Ltd., Delhi.
4. Subramanyam&BrijLal, A Text Book of Optics –S. Chand & Company (P.) Ltd.
5. B. K. Pandey and S. Chaturvedi- EngineeringPhysics, Cengage Learning-2012
6. S. O. Pillai, Solid State Physics : Structure & Electron Related Properties,Eastern Ltd,, New Age International Ltd.
7. Charles Kittle, Introduction to Solid State Physics - Wiley India Pvt. Ltd.(8thEdtion).
8. V. Rajendran – Engineering Physics- Mc. Graw Hills
9. Alan Giambattista and others- Fundamentals of physics, Tata Mc. Graw Hills
10. Vijay Kumari- Engineering Physics, Vikas Publications
11. ResnickHalliday, Physics Volume-I, Krane -John Wiley & Sons Pub.
12. ResnickHalliday, Physics Volume-II, Krane -John Wiley & Sons Pub.

13. Hitendra K. Malik, A. K. Singh – Engineering Physics - Tata Mc. Graw Hills Education Private Ltd.
14. A. Beiser – Concepts of Modern Physics - Tata Mc. Graw Hills
15. L. J. Schiff – Quantum Mechanics - Tata Mc. Graw Hills

Applied Mechanics

Applied Mechanics

Unit 1: Fundamentals of Statics

Basic Concepts and Fundamental Laws, Force, Moment and Couple, System of Forces, Resultant, Resolution and Composition of Forces, Varignon's Theorem, Law of Moments.

Unit 2: Equilibrium

Lami s' Theorem, Free Body Diagram, Equilibrium of Forces, Equilibrium conditions, Surface friction for bodies on horizontal and inclined planes.
Beams: Types of Loads, Types of supports, Analysisof Simple beams, Virtual work method forsupport reactions.

Unit 3: Centroid and Moment of Inertia

Centroid and Center of Gravity, Moment of Inertia of Standard shapes from first principle, Parallel and perpendicular axis theorem, Moment of Inertia of plain and composite figures, Radius of Gyration.

SECTION II

Unit 4: Kinetics of Linear

Introduction to Kinematics of Linear motion (no numerical on kinematics), Kinetics of linear motion, Newton's Laws, D'Alembert's Principle, Work- Energy Principle, Impulse Momentum Principal

Unit 5: Kinetics of Circular Motion

Introduction to Kinematics of Circular motion (no numerical on kinematics), Rotation with
constant and variable angular acceleration, centripetal and centrifugal force, condition of
skidding and overturning.

Unit 6: Impact and Collision

Impact, Types of Impact, Law of conservation of Momentum, Coefficient of Restitution,Numerical on Direct central Impact.

Reference Books:

1.Engineering Mechanics by S. S. Bhavikattis, New Age International Pvt. Ltd.
2.Engineering Mechanics by R. K. Bansal and Sanjay Bansal.
3.Vector Mechanics for Engineers Vol.I and II by F. P. Beer and E. R. Johnston, Tata Mc-Graw Hill Publication.
4.Engineering Mechanics by Manoj K Harbola, Cengage Learning
5.Engineering Mechanics by K. I. Kumar, Tata Mc-Graw Hill Publication
6.Engineering Mechanics by S. B. Junnerkar.
7.Engineering Mechanics by Irving H. Shames, Prentice Hall of India, New Delhi.
8.Applied Mechanics by S. N. Saluja, Satya Prakashan, New Delhi.
9.Engineering Mechanics by Statics and Dynamics by Ferdinand Singer, Harper and Row Publications
10.Engineering Mechanics by R. S. Khurmi, S. Chand Publications
11.Fundamentals of Engineering Mechanics by S. Rajasekaran, G. Sankarasubramanian,VikasPublishing House
12) “Applied Mechanics- Dynamics &Statics ” by I.B.Prasad, Khanna Publisher, Delhi