

**Bharath Postgraduate College
In collaboration with**



KARNATAKA STATE OPEN UNIVERSITY
Manasagangotri, Mysore – 570006,

B.Tech IN MECHANICAL ENGINEERING

SEMESTER SYSTEM

I Year Syllabus
(Basic Engineering)
(Common to all Branches)

Subject Code	Subject Title	Max marks	Max Credits
Semester-I			
BE1001	English-I	100	2
BE1002	Mathematics-I	100	2
BE1003	Engineering Physics-I	100	2
BE1004	Engineering Chemistry-I	100	2
BE1005	Fundamentals of Computing and Programming	100	3
BE1006	Physics & Chemistry Laboratory – I	100	2
BE1007	Computer Application Lab– I	100	2
Semester -II			
BE2001	Technical English	100	2
BE2002	Mathematics-II	100	2
BE2003	Engineering Physics-II	100	2
BE2004	Engineering Chemistry-II	100	2
BE2005	Engineering Graphics	100	3
BE2006	Computer Application Lab -II	100	2
BE2007	Engineering Practices Laboratory	100	2

MECHANICAL ENGINEERING

III SEMESTER

Subject Code	Subject Title	Max marks	Max Credits
ME 3001	Mathematics – III	100	2
ME 3002	Engineering Mechanics	100	3
ME 3003	Engineering Thermodynamics	100	3
ME 3004	Fluid Mechanics and Machinery	100	3
ME 3005	Manufacturing Technology I	100	3
MEP 001	Fluid Mechanics and Machinery Lab	100	2
MEP 002	Manufacturing Technology Lab I	100	2

IV SEMESTER

Subject Code	Subject Title	Max marks	Max Credits
ME 4001	Numerical Methods	100	2
ME 4002	Strength of Materials	100	3
ME 4003	Engineering Materials and Metallurgy	100	3
ME 4004	Basic Electrical and Electronics Engineering	100	3
ME 4005	Manufacturing Technology II	100	2
MEP 003	Strength of Materials Lab	100	2
MEP 004	Electrical Engineering Lab	100	2

V SEMESTER

Subject Code	Subject Title	Max marks	Max Credits
ME 5001	Thermal Engineering	100	3
ME 5002	Design of Machine Elements	100	3
ME 5003	Industrial Hydraulics and Pneumatics	100	3
ME 5004	Electrical drives and Controls	100	3
ME 5005	Industrial Engineering	100	2
MEP 005	Thermal Engineering Lab	100	2
MEP 006	Manufacturing Technology Lab II	100	2

VI SEMESTER

Subject Code	Subject Title	Max marks	Max Credits
ME 6001	Engineering Metrology	100	3
ME 6002	Power Plant Engineering	100	3
ME 6003	Electronics and Microprocessor	100	3
ME 6004	Operations Research	100	3
ME 6005	Personnel Management	100	3
MEP 007	Metrology and Dynamics Lab	100	2
MEP 008	Electronics and Microprocessor Lab	100	2

VII SEMESTER

Subject Code	Subject Title	Max marks	Max Credits
ME 7001	CAD / CAM/ CIM	100	3
ME 7002	Mechatronics	100	2
ME 7003	Automobile Engineering	100	2
	Elective – I	100	3
	Elective – II	100	3
MEP 009	CAD / CAM Lab	100	2
MEP 010	Mechatronics Lab	100	2

VIII SEMESTER

Subject Code	Subject Title	Max marks	Max Credits
ME 8001	Total Quality Management	100	3
	Elective –III	100	3
	Elective – IV	100	3
MEP 011	Automobile Engineering Lab	100	2
MEP 012	Project Work	300	6

Total Marks : 5600

Total Credits : 136

Elective Subjects

Subject Code	Subject Title
MEE 001	Heat and Mass Transfer
MEE 002	Design of production Tools
MEE 003	Non Conventional Sources of Energy
MEE 004	Computer Integrated Manufacturing
MEE 005	Non conventional Machining Techniques
MEE 006	Composite materials
MEE 007	Reverse Engineering
MEE 008	Environmental Science and Engineering

SEMESTER : I

Subject Code : BE 1001

Subject Title : English - I

Structure of the Course Content

BLOCK 1 Focus on Language (Grammar)

Unit 1: Prefixes, Suffixes and Synonyms & Antonyms

Unit 2: Framing of Questions and Subject Verb and Agreement

Unit 3: Five Major Pattern and Voice

Unit 4: Preposition, Phrasal Verbs and Use of Conditionals

BLOCK 2 Reading

Unit 1: Skimming the Text

Unit 2: Scanning the Text

Unit 3: Note Making

Unit 4: Comprehension

BLOCK 3 Writing

Unit 1: Definition

Unit 2: Description

Unit 3: Process Description

Unit 4: Formal and Informal Letter Writing

BLOCK 4 Listening

Unit 1: Extensive Listening

Unit 2: Intensive Listening

Unit 3: Note Making

Unit 4: Inferential Comprehension

BLOCK 5 Speaking

Unit 1: Developing Confidence & Introducing One self

Unit 2: Describing Objectives

Unit 3: Analysing Problem & Providing Solutions

Unit 4: Expressing Opinions and giving instruction

Books:

1. A.S.Hornby, 'The advanced learners Dictionary of current English', Oxford university press.
2. Longman Basic English dictionary 1st Edition Pearson Longman
3. Department of Humanities and Social Sciences, Anna University, English for Engineers and Technologists, Vol.1, 2nd Edition, Orient Longman Ltd., 2002.
4. Chellammal, V., Learning to Communicate: A Resource Book for Scientists and Technologists, Allied Pub. Pvt. Ltd., Chennai, 2003.
5. Sharon J. Gerson, Steven M. Gerson, Technical Writing – Process and Product,

- 3rd Edition, Pearson Education (Singapore) Pvt. Ltd., New Delhi, 2004.
6. Vocabulary in Practice - Part 1 to 4 by Glennis Pye, Cambridge University Press,
 7. Learn Correct English by Shiv K. Kumar & Hemalatha Nagarajan, Pearson Longman, 2005
 8. Essential English Grammar by Raymond Murphy, Cambridge University Press.
 9. Common Errors in English by M.Thomas, Lotus Press, New Delhi, 2006
 10. Basic English Usage by Michael Swan, ELBS/OUP, 1989

SEMESTER : I

Subject Code : BE 1002

Subject Title : Mathematics - I

Structure of the Course Content

BLOCK 1 Matrices

- Unit 1: Rank of a matrix – Consistency of linear system of equations
- Unit 2: Eigen value problem
- Unit 3: Cayley –Hamilton theorem
- Unit 4: Orthogonal matrices – Orthogonal transformation of a symmetric matrix to diagonal form

BLOCK 2 Three Dimensional Analytical Geometry

- Unit 1: Direction cosines and ratios – Angle between two lines
- Unit 2: Equations of a plane – Equations of a straight line – Coplanar lines
- Unit 3: Shortest distance between skew lines – Sphere – Tangent plane
- Unit 4: Plane section of a sphere – Orthogonal spheres

BLOCK 3 Geometrical Applications Of Differential Calculus

- Unit 1: Curvature – Cartesian and polar co-ordinates
- Unit 2: Centre and radius of curvature
- Unit 3: Circle of curvature
- Unit 4: Involutives and evolutes – Envelopes

BLOCK 4 Functions Of Several Variables

- Unit 1: Functions of two variables – Partial derivatives – Total differential
- Unit 2: Taylor's expansion, Maxima and minima
- Unit 3: Lagrange's Multiplier method – Jacobians
- Unit 4: Differentiation under integral sign.

BLOCK 5 Ordinary Differential Equations

- Unit 1: Simultaneous first order linear equations with constant coefficients
- Unit 2: Linear equations of second order with constant and variable coefficients
- Unit 3: Homogeneous equations of Euler type
- Unit 4: Equations reducible to homogeneous form – Method of variation of parameters.

Books:

1. Veerarajan, T., "Engineering Mathematics (for First Year)," Second Edition, Tata McGraw-Hill Pub. Co. Ltd., New Delhi, 2002.
2. Venkataraman, M.K., "Engineering Mathematics, Volume I," Fourth

Edition, The National Pub. Co., Chennai, 2003.

3. Kreyszig, E., "Advanced Engineering Mathematics", Eighth Edition, John Wiley and Sons (Asia) Ltd., Singapore, 2001.
4. Grewal, B.S., "Higher Engineering Mathematics", Thirty Sixth Edition, Khanna Publishers, Delhi, 2001.
5. Kandasamy, P., Thilagavathy, K., and Gunavathy, K., "Engineering Mathematics" Volume I, Fourth Revised Edition, S. Chand & Co., New Delhi, 2000.
6. Widder, D.V. "Advanced Calculus", Second Edition, Prentice Hall of India, New Delhi, 2000.
7. Engineering Mathematics Vol-III by Dr. B. Krishna Gandhi , Dr. T.K.V Iyengar, S.Ranganatham, , S.Chand & Co, New Delhi
8. Introduction to Engineering Mathematics by H.K. Dass, Dr.Rama Verma, S.Chand & Co, New Delhi
9. Applied Engineering Mathematics Vol-II by H.K.Dass, S.Chand & Co.
10. Advanced Engineering Mathematics by N.Bali,M.Goyal,C.Watkins,Lakshmi Publications (Pvt) Ltd, New Delhi

SEMESTER : I

Subject Code : BE 1003

Subject Title : Engineering Physics - I

Structure of the Course Content

BLOCK 1 Acoustics and Ultrasonic

Unit 1: Sound and Weber Fechner law

Unit 2: Factors affecting acoustics of buildings

Unit 3: Ultrasonic production

Unit 4: SONAR, Measurement of velocity of blood flow & movement of heart

BLOCK 2 Crystallography & Non-Destructive Testing

Unit 1: Space lattice, unit cell, Bravais space lattices, Lattice planes

Unit 2: Miller indices Calculation of number of atoms per unit cell, Atomic Radius

Unit 3: coordination number & packing factor for simple cubic

Unit 4: NDT methods

BLOCK 3 Wave Optics

Unit 1: Air wedge and testing of flat surfaces

Unit 2: Michelson interferometer, Types of fringes

Unit 3: Theory of plane and Photo elasticity

Unit 4: Isoclinic and iso-chromatic fringes – Photo elastic bench

BLOCK 4 Quantum Physics

Unit 1: Planck's quantum theory of black body radiation, Photo electric effect

Unit 2: Compton effect

Unit 3: Schrödinger wave equation

Unit 4: Physical significance of wave function & electrons in a metal

BLOCK 5 Laser & Fibre Optics

Unit 1: Einstein's coefficients and Laser

Unit 2: Material processing, CD-ROM & Holography

Unit 3: Optical fibre

Unit 4: Fibre optics communication system

Books:

1. Rajendran V. and Marikani A., Applied Physics for Engineers, 3rd Edition, Tata McGraw-Hill Publishing Company Limited, New Delhi, 2003.
2. Arumugam M., Engineering Physics, 5th Edition, Anuradha Agencies, Kumbakonam, 2003.
3. Palanisamy P.K., Physics for Engineers, Vol.1 & Vol.2, 2nd Edition, Scitech

Publications, Chennai, 2003.

4. Gaur R.K. and Gupta S.L., Engineering Physics, 8th edition, Dhanpat Rai Publications (P) Ltd., New Delhi, 2003.
5. Uma Mukherji, Engineering Physics, Narosa Publishing House, New Delhi, 2003.
6. Modern Engineering Physics by A.S.Vasudeva, S. Chand Publishers, New Delhi
7. Engineering Physics Fundamentals & Modern Applications by P.Khare and A.Swarup, Lakshmi Publications (Pvt) Ltd, New Delhi
8. Engineering Physics by Dipak Chandra Ghosh, Nipesh Chandra chosh, Prabir Kumar Haldar, Lakshmi Publications (Pvt) Ltd, New Delhi
9. Engineering Physics by Vikram Yadav, Tata McGraw Hill, New Delhi
10. Schaum's Outline of Physics for Engineering and Science by Michael Browne, Tata McGraw Hill, New Delhi

SEMESTER : I

Subject Code : BE 1004

Subject Title : Engineering Chemistry - I

Structure of the Course Content

BLOCK 1 Electro Chemistry

Unit 1: Galvanic cells – reversible and irreversible cells

Unit 2: Single electrode potential, standard electrodes, electrochemical series

Unit 3: Nernst equation and Metal

Unit 4: Glass electrode, concentration cells and Kohlrausch law

BLOCK 2 Thermodynamics

Unit 1: Thermodynamic terms – definition of system

Unit 2: Thermodynamic equilibrium

Unit 3: Law of thermodynamics

Unit 4: Entropy of phase transitions, Gibbs Helmholtz equation

BLOCK 3 Chemical Kinetics

Unit 1: Kinetics of second order reaction

Unit 2: Kinetics of opposing, parallel and consecutive reactions

Unit 3: Decomposition of diethyl ether in gaseous phase – radioactive decay of polonium

Unit 4: Effect of temperature on reaction rate – theory of absolute reaction rate

BLOCK 4 Surface Chemistry And Catalysis

Unit 1: Adsorption

Unit 2: Freundlich, Langmuir isotherms

Unit 3: Catalysis

Unit 4: Michaelis – Menton equation – acid base catalysis

BLOCK 5 Spectroscopy

Unit 1: Electromagnetic spectrum

Unit 2: Electronic transition, Vibrational transition and rotational transition

Unit 3: Lambert's Law –colorimetric analysis – estimation of concentration of a solution by colorimetry

Unit 4: Visible & UV spectroscopy, IR spectroscopy

Books:

1. Puri B.R., Sharma L.R. and Madan S. Pathania, Principles of Physical Chemistry, Shoban Lal Nagin Chand & Co., Jalandhar, 2000.
2. Jain P.C and Renuka Jain, Physical Chemistry for Engineers, Dhanpat

Rai & Sons, New Delhi. 2001.

3. Bahl B.S., Tuli G.D., and Arun Bahl, Essentials of Physical Chemistry, S.Chand & Company Ltd., New Delhi, 2004.
4. Kuriacose J.C. & Rajaram J, Chemistry in Engineering & Technology, Vol. 1, Tata McGraw-Hill publishing company, New Delhi, 1996.
5. Introduction to Engineering Chemistry by Minaxi B Lohani, Upma Misra, S.Chand & Co, New Delhi
6. Engineering Chemistry by Dr.A.K.Pahari,Dr.B.S.Chauhan, Lakshmi Publications (Pvt) Ltd, New Delhi
7. Advanced Engineering Chemistry by M.Senapati, Lakshmi Publications (Pvt) Ltd, New Delhi
8. Engineering chemistry by Uppal , Khanna publishers
9. Environmental chemistry & Pollution control by Dara .SS, S. Chand&co
10. Environmental Pollution by, Tripathy .SN , Sunakar panda - Vrinda publication

SEMESTER : I

Subject Code : BE 1005

Subject Title : Fundamentals of Computing and Programming

Structure of the Course Content

BLOCK 1 Introduction to Computer

Unit 1: Introduction, Evaluation and generation of Computer

Unit 2: Classification of Computers

Unit 3: Basic Computer organization

Unit 4: Number Systems

BLOCK 2 COMPUTER ARITHMETIC AND SOFTWARE

Unit 1: Computer Codes

Unit 2: Computer Arithmetic

Unit 3: Computer Software

Unit 4: Logical System Architecture – Software Development Steps

BLOCK 3 PROBLEM SOLVING AND OFFICE AUTOMATION

Unit 1: Planning the Computer Program – Purpose

Unit 2: Algorithm – Flow Charts – Pseudocode

Unit 3: Application Software Packages- Word Processing – Spreadsheet

Unit 4: Graphics – Personal Assistance.

BLOCK 4 INTRODUCTION TO C

Unit 1: Overview of C – Constants, Variables and Data Types

Unit 2: Operators and Expression – Managing Input and Output Operators

Unit 3: Decision Making and Branching

Unit 4: Decision Making and Looping

BLOCK 5 FUNCTIONS AND POINTERS

Unit 1: Arrays – Handling of Character Strings

Unit 2: User-Defined Functions- Structures and Unions

Unit 3: Pointers

Unit 4: Developing a C Programs

Books:

1. Pradeep K.Sinha and Priti Sinha, “Computer Fundamentals: Concepts, Systems and Applications”, BPB Publications, 2003.
2. E.Balagurusamy, “Programming in ANSI C”, TMH, New Delhi, 2002.
3. Allen B.Tucker et.al, “Fundamentals of Computing I”, TMH New Delhi, 1998.
4. V.Rajaraman, “Fundamentals of Computers”, Prentice-Hall of India, 2002.
5. Herbert Schidt, “C Made Easy”, McGraw-Hill.

SEMESTER : I

Subject Code : BE 1006

Subject Title : Physics & Chemistry Laboratory

Structure of the Course Content

Practical

List of Experiments for Physics

1. Torsional Pendulum – determination of rigidity modulus of wire and moment of inertia of disc.
2. Non Uniform Bending - Young modulus determination
3. Viscosity –Determination of co-efficient of Viscosity of liquid by Poiseuilles flow
4. Lee’s disc – Determination of thermal conductivity of a bad conductor
5. Air wedge – Determination of thickness of a thin wire
6. Newton rings – Determination of Focal length of a lens
7. Spectrometer – Dispersive power of a prism
8. Determination of wavelength of Laser using Grating and Particle size determination.

List of Experiments Chemistry

I. Weighing and preparation of standard solutions

1. Preparation of molar and normal solutions of the following substances - oxalic acid, sodium carbonate, sodium hydroxide, hydrochloric acid.
2. Preparation of buffer solutions: borate buffer, phosphate buffer using Henderson equation.

II. Water Analysis

1. Determination of total hardness, temporary & permanent hardness of water by EDTA method.
2. Determination of DO content by Winkler’s method.
3. Determination of alkalinity in a water sample.
4. Determination of chloride content of water sample by argentometric method.

III. Conductometry

1. Conduct metric titration of mixture of acids.
2. Conduct metric precipitation titration using $\text{BaCl}_2 - \text{Na}_2\text{SO}_4$.

SEMESTER : I

Subject Code : BE 1007

Subject Title : Computer Application Lab - I

Structure of the Course Content

Practical

MS-OFFICE

a) Word Processing

1. Document creation, Text manipulation with Scientific notations.
2. Table creation, Table formatting and Conversion.
3. Mail merge and Letter preparation.
4. Drawing - flow Chart

b) Spread Sheet

1. Chart - Line, XY, Bar and Pie.
2. Formula - formula editor.
3. Spread sheet - inclusion of object, Picture and graphics, protecting the document and sheet.
4. Sorting and Import / Export features.

C Programming

1. Data types, Expression Evaluation, Condition Statements.
2. Functions, Recursion and parameter passing mechanisms.
3. Arrays
4. Structures and Unions
5. Pointers and Functions
6. File Processing
7. Dynamic allocation & Linked List

SEMESTER : II

Subject Code : BE 2001

Subject Title : Technical English

Structure of the Course Content

BLOCK 1 Focus on Language

- Unit 1: Cause and Effect Expression
- Unit 2: Connectives & Imperative and Modal Verbs
- Unit 3: Infinitives, Gerunds and Reporting Verbs
- Unit 4: Varied Grammatical Functions of the same word

BLOCK 2 Reading

- Unit 1: Reading Comprehension
- Unit 2: Guided note Making
- Unit 3: Evaluating the style
- Unit 4: Cloze Reading

BLOCK 3 Writing

- Unit 1: Formal Letter Writing
- Unit 2: Technical Report
- Unit 3: Industrial Report
- Unit 4: Project Proposal

BLOCK 4 Listening

- Unit 1: Listening for global Comprehension and Specification information
- Unit 2: Listening to speech Segments
- Unit 3: Listening to recorded telephonic conversation
- Unit 4: Listening to Short and Long conversion

BLOCK 5 Speaking

- Unit 1: Activities related to professional skills
- Unit 2: Role plays activities and Conversational etiquette
- Unit 3: Group discussion & Mock interview
- Unit 4: Academic skills

Books:

1. A.S.Hornby, 'The advanced learners Dictionary of current English', Oxford university press.
2. Longman Basic English dictionary 1st Edition Pearson Longman
3. Department of Humanities and Social Sciences, Anna University, English for Engineers and Technologists, Vol.2, Orient Longman Ltd., 2002, 2nd Edition.
4. T M Farhathullah, Communication Skills for Technical Students, Orient

Longman Ltd., 2002.

5. Andrea J. Rutherford, Basic Communication Skills for Technology, 1st Edn., Pearson Education Asia (Singapore) Pvt. Ltd., Bangalore, 2001.
6. Vocabulary in Practice - Part 1 to 4 by Glennis Pye, Cambridge University Press,
7. Learn Correct English by Shiv K. Kumar & Hemalatha Nagarajan, Pearson Longman, 2005
8. Essential English Grammar by Raymond Murphy, Cambridge University Press.
9. Common Errors in English by M.Thomas, Lotus Press, New Delhi, 2006
10. Basic English Usage by Michael Swan, ELBS/OUP, 1989

SEMESTER : II

Subject Code : BE 2002

Subject Title : Mathematics - II

Structure of the Course Content

BLOCK 1 Multiple Integrals

- Unit 1: Double integration – Cartesian and polar coordinates
- Unit 2: Change of order of integration – Area as a double integral
- Unit 3: Triple integration in Cartesian coordinates
- Unit 4: Change of variables between Cartesian and polar coordinates

BLOCK 2 Vector Calculus

- Unit 1: Gradient, divergence and curl
- Unit 2: Line, surface and volume integrals
- Unit 3: Green's, Gauss divergence
- Unit 4: Stoke's theorems

BLOCK 3 Analytic Functions

- Unit 1: Function of a complex variable – Analytic function
- Unit 2: Cauchy, Riemann equations in Cartesian coordinates
- Unit 3: Determination of harmonic conjugate by Milne – Thomson method
- Unit 4: Conformal mapping and bilinear transformation.

BLOCK 4 Complex Integration

- Unit 1: Cauchy's theorem and Cauchy's integral formula
- Unit 2: Taylor and Laurent expansion – Singularities
- Unit 3: Residues – Cauchy's residue theorem
- Unit 4: Contour integration – Unit circle and semi-circular contours

BLOCK 5 Laplace Transform

- Unit 1: Transforms of elementary functions – Basic properties
- Unit 2: Inverse transforms
- Unit 3: Derivatives and integrals of transforms
- Unit 4: Convolution theorem – Transform of periodic functions

Books:

1. Grewal, B.S., "Higher Engineering Mathematics", Thirty Sixth Edition, Khanna Publishers, Delhi, 2001.
2. Kreyzig, E., "Advanced Engineering Mathematics", Eighth Edition, John Wiley & Sons (Asia) Pte, Ltd., Singapore, 2001.

3. Narayanan, S., Manicavachagom Pillay, T.K. and Ramaniah, G., “Advanced Mathematics for Engineering Students”, Volumes I and III, S. Viswanathan (Printers and Publishers) Pvt. Ltd., Chennai, 2002.
4. Grewal, B.S., “Higher Engineering Mathematics”, Thirty Sixth Edition, Khanna Publishers, Delhi, 2001.
5. Kandasamy, P., Thilagavathy, K., and Gunavathy, K., “Engineering Mathematics” Volume II, Fourth Revised Edition, S. Chand & Co., New Delhi, 2000.
6. Widder, D.V. “Advanced Calculus”, Second Edition, Prentice Hall of India, New Delhi, 2000.
7. Engineering Mathematics Vol-III by Dr. B. Krishna Gandhi , Dr. T.K.V Iyengar, S.Ranganatham, , S.Chand & Co, New Delhi
8. Veerarajan,T., “Engineering Mathematics (for First Year),” Second Edition , Tata McGraw–Hill Pub. Co. Ltd., New Delhi, 2002.
9. Venkataraman, M.K., “Engineering Mathematics, Volume II,” Fourth Edition, The National Pub. Co., Chennai, 2003.
10. Kreyszig, E., “Advanced Engineering Mathematics”, Eighth Edition, John Wiley and Sons (Asia) Ltd., Singapore, 2001.

SEMESTER : II

Subject Code : BE 2003

Subject Title : Engineering Physics - II

Structure of the Course Content

BLOCK 1 Crystal Defects

Unit 1: Crystal imperfection – point defects-line defects

Unit 2: Dislocations

Unit 3: Burger Vector – Dislocation climb

Unit 4: Strengthening mechanisms for the improvement of mechanical Properties

BLOCK 2 Conducting and Semi conducting Materials

Unit 1: Drawbacks of classical theory- Fermi distribution function

Unit 2: Origin of band gap in solids – Concept of effective mass of electron and hole

Unit 3: Types of Semiconductor

Unit 4: Hall effect

BLOCK 3 Magnetic and Dielectric Materials

Unit 1: Origin of magnetic moment – Bohr magneton

Unit 2: Weiss theory of Para magnetism, Determination of paramagnetic Susceptibility of a solid

Unit 3: Ferromagnetism, Anti-ferromagnetic materials and Ferrites magnetic Recording and readout

Unit 4: Storage of magnetic data

BLOCK 4 Nuclear Physics

Unit 1: Nuclear forces – Einstein’s mass energy relation– binding energy

Unit 2: Nuclear fission

Unit 3: Nuclear reactor

Unit 4: Nuclear power station

BLOCK 5 New Engineering Materials

Unit 1: Superconducting

Unit 2: Meissner effect, Isotope effect

Unit 3: Magnetic levitation and SQUIDS - Metallic glasses

Unit 4: Nano phase materials

Books:

1. Arumugam M, Materials Science, 3rd Edition, Anuradha Agencies,

- Kumbakonam, 2003.
2. Srivastava C.M. and Srinivsan C, Science of Engineering Materials, 2nd Edition, New Age International (P) Ltd, Publications, New Delhi, 1997.
 3. Rajendran V. and Marikani A., Applied Physics for Engineers, 3rd Edition, Tata McGraw–Hill Publishing Company Limited, New Delhi, 2003.
 4. Palanisamy, P.K., Materials Science, 2nd Edition, Scitech Publications (India), Pvt. Ltd., Chennai, 2003
 5. Murthy V.S.R., Jena AK, Gupta K.P. and Murthy G.S., Structure and Properties of Engineering Materials, Tata McGraw-Hill Publishing Company Ltd, New Delhi, 2003.
 6. Kenneth G. Budinski, Michel K. Budinski, Engineering Materials Properties and Selection, 7th Edition, Pearson, Singapore (Prentice Hall), 2002.
 7. Vasudeva A.S., Modern Engineering Physics, 2nd Edition, S.Chand & Co. Ltd., New Delhi, 2003.
 8. Modern Engineering Physics by A.S.Vasudeva, S. Chand Publishers, New Delhi
 9. Engineering Physics Fundamentals & Modern Applications by P.Khare and A.Swarup, Lakshmi Publications (Pvt) Ltd, New Delhi
 10. Engineering Physics by Dipak Chandra Ghosh, Nipesh Chandra chosh, Prabir Kumar Haldar, Lakshmi Publications (Pvt) Ltd, New Delhi

SEMESTER : II

Subject Code : BE 2004

Subject Title : Engineering Chemistry - II

Structure of the Course Content

BLOCK 1 Fuels And Combustion

- Unit 1: Classification of fuels
- Unit 2: Coal varieties, coke and cracking
- Unit 3: Synthetic petrol and Fischer
- Unit 4: Gaseous fuels

BLOCK 2 Mechanical Engineering Materials

- Unit 1: Abrasives
- Unit 2: Refractories
- Unit 3: Lubricants
- Unit 4: Polymer blends and alloys

BLOCK 3 Water Technology And Corrosion

- Unit 1: Corrosion
- Unit 2: Sacrificial anode - boiler feed water
- Unit 3: Boiler compounds – caustic embrittlement – boiler corrosion
- Unit 4: Priming and foaming – desalination by reverse osmosis

BLOCK 4 Phase Rule And Physical Metallurgy

- Unit 1: Phase rule
- Unit 2: Thermal analysis
- Unit 3: Physical metallurgy - powder metallurgy
- Unit 4: Mixing and blending – compacting – sintering

BLOCK 5 Analytical Techniques

- Unit 1: Gravimetry analysis of Pb, Fe, Al, and Ni - complex metric titrations
- Unit 2: Estimation of Ni, Zn, and Mg - redox titrations
- Unit 3: Estimation of iron by dichrometry and copper by iodometry
- Unit 4: Atomic absorption spectroscopy, quantitative estimation of Ni and Cr.

Books:

1. Jain P.C. and Monika Jain, Engineering Chemistry, Dhanpat Rai Pub. Co. (P) Ltd., New Delhi, Edition 2002.
2. Dara S.S., A text book of Engineering Chemistry, S. Chand Co. (P) Ltd.,

New Delhi, 2003.

3. Vogel A.I., A text book Quantitative Inorganic Analysis, ELBS, London, 2000.
4. Engineering chemistry by Uppal , Khanna publishers
5. Environmental chemistry & Pollution control by Dara .SS, S. Chand & co.
6. Environmental Pollution by . Tripathy .SN , Sunakar panda - Vrinda publication
7. Rain water Harvesting-hand book by Chennai Metro Water
8. Introduction to Engineering Chemistry by Minaxi B Lohani, Upma Misra, S.Chand & Co, New Delhi
9. Engineering Chemistry by Dr.A.K.Pahari, Dr.B.S.Chauhan, Lakshmi Publications (Pvt) Ltd, New Delhi
10. Advanced Engineering Chemistry by M.Senapati, Lakshmi Publications (Pvt) Ltd, New Delhi

SEMESTER : II

Subject Code : BE 2005

Subject Title : Engineering Graphics

Structure of the Course Content

BLOCK 1 Projection of Points, Lines And Surfaces

- Unit 1: General principles of presentation of technical drawings as per BIS
- Unit 2: First angle projection. And Orthographic projection of points
- Unit 3: Projections of straight lines located in first quadrant only
- Unit 4: Projections of plane surfaces like polygonal lamina and circular lamina

BLOCK 2 Projections of Solids

- Unit 1: Projection of simple prism
- Unit 2: Projection of simple pyramid
- Unit 3: Projection of simple cylinder
- Unit 4: Projection of simple cone

BLOCK 3 Sections of Solids and Development

- Unit 1: Sectioning of simple prisms
- Unit 2: Sectioning of simple pyramids
- Unit 3: Sectioning of simple cylinder
- Unit 4: Sectioning of simple cone and sphere

BLOCK 4 Pictorial Projections

- Unit 1: Isometric views of simple truncated prisms
- Unit 2: Isometric views of pyramids
- Unit 3: Isometric views of cylinders
- Unit 4: Isometric views of cones

BLOCK 5 Free-Hand Sketching

- Unit 1: Free hand sketching techniques
- Unit 2: sketching of orthographic views
- Unit 3: Hand dimensioning.
- Unit 4: Sketching pictorial views from given orthographic views.

Books:

1. Natarajan K.V, “Engineering Drawing and Graphics “, Private Publisher, Chennai, 17th Ed. 2003.

2. Venugopal K., “Engineering Graphics”, New Age International (P) Limited, 2002.
3. Bertoline and Wiebe, Fundamentals of Graphics Communication, Third edition, McGraw-Hill, 2002
4. Warren J. Luzadder and Jon. M.Duff, “Fundamentals of Engineering Drawing”, Prentice Hall of India Pvt. Ltd., Eleventh Edition, 2001.
5. Gopalakrishna K.R., “Engineering Drawing (Vol. I & II)”, Subhas Publications, 1998.
6. Engineering Drawing by Shah/Rana, Ist Edition Pearson Longman
7. Machine Drawing with AutoCAD by Pohit/Ghosh, Ist Edition Pearson Longman
8. Engineering Graphics by Prof.P.J.Shah, S.Chand & Co, New Delhi
9. Engineering Graphics by Dhawan R.K, S.Chand & Co, New Delhi

Standards :

1. IS 10711 - 2001 Technical Product Documentation - Sizes of drawing sheets
2. IS 9609 - 1983 Lettering on technical drawings
3. IS 10714 - 1983 General Principles of presentation of technical drawings
4. IS 11669 - 1986 General Principles of dimensioning of technical drawings

SEMESTER : II

Subject Code : BE 2006

Subject Title : Computer Application Lab - II

Structure of the Course Content

Practical

1. UNIX COMMANDS

- (i) Study of Unix OS - Basic Commands - Process Management Commands - Unix Editor

2. SHELL PROGRAMMING

- (i) Simple Shell program - Conditional Statements - Testing and Loops
- (ii) Commands line substitution

3. C PROGRAMMING AND FILE MANAGEMENT

- (i) C Program to implement Unix Commands

4. PROCESS MANAGEMENT AND SIGNAL HANDLING

- (i) Programs in C for signal handling and Process management

SEMESTER : II

Subject Code : BE 2007

Subject Title : Engineering Practices Laboratory

Structure of the Course Content

Practical

1. CIVIL ENGINEERING PRACTICE

Plumbing

Basic pipe connections involving the fittings like valves, taps

Wood Work

Sawing, planing, making common joints: T-Joint, Dovetail joint.

2. ELECTRICAL ENGINEERING PRACTICE

Basic household wiring using switches, fuse, indicator-lamp, Tube Light

3. MECHANICAL ENGINEERING PRACTICE

Fitting

Sheet Metals

4. ELECTRONIC ENGINEERING PRACTICE

Soldering simple electronic circuits and checking continuity

SEMESTER : III
Subject Code : ME 3001
Subject Title : Mathematics - III

Structure of the Course Content

BLOCK 1 PARTIAL DIFFERENTIAL EQUATIONS

- Unit 1: Formation of partial differential equations
- Unit 2: Solution of standard types of first order partial differential equations
- Unit 3: Lagrange's linear equation
- Unit 4: Linear partial differential equations of second and higher order

BLOCK 2 Fourier Series

- Unit 1: General Fourier series – Odd and even functions
- Unit 2: Half range Sine and Cosine series
- Unit 3: Complex form of Fourier series
- Unit 4: Parseval's identify and Harmonic Analysis

BLOCK 3 Boundary value problems

- Unit 1: Second order quasi linear partial differential equations
- Unit 2: One dimensional wave and heat equation
- Unit 3: Steady state solution of two-dimensional heat equation
- Unit 4: Fourier series solutions in Cartesian coordinates

BLOCK 4 Fourier Transform

- Unit 1: Fourier integral theorem (without proof) and Fourier transform pair
- Unit 2: Sine and Cosine transforms – Properties
- Unit 3: Transforms of simple functions
- Unit 4: Convolution theorem and Parseval's identity

BLOCK 5 Z -Transform and Difference Equations

- Unit 1: Z-transform - Elementary properties
- Unit 2: Inverse Z – transform
- Unit 3: Convolution theorem
- Unit 4: Formation of difference equations

Books:

1. Grewal, B.S., "Higher Engineering Mathematics", Thirty Sixth Edition, Khanna Publishers, Delhi, 2001.
2. Kandasamy, P., Thilagavathy, K., and Gunavathy, K., "Engineering Mathematics Volume III", S. Chand & Company ltd., New Delhi, 1996.
3. Wylie C. Ray and Barrett Louis, C., "Advanced Engineering Mathematics", Sixth Edition, McGraw-Hill, Inc., New York, 1995
4. Andrews, L.A., and Shivamoggi B.K., "Integral Transforms for Engineers and Applied Mathematicians," Macmillen , New York ,1988.
5. Narayanan, S., Manicavachagom Pillay, T.K. and Ramaniah, G., "Advanced Mathematics for Engineering Students", Volumes II and III, S. Viswanathan (Printers and Publishers) Pvt. Ltd. Chennai, 2002.
6. Churchill, R.V. and Brown, J.W., "Fourier Series and Boundary Value Problems", Fourth Edition, McGraw-Hill Book Co., Singapore, 1987

SEMESTER : III
Subject Code : ME 3002
Subject Title : Engineering Mechanics

Structure of the Course Content

BLOCK 1 Introduction

- Unit 1: Fundamentals of mechanics
- Unit 2: Elements of vector algebra and vector quantities
- Unit 3: Equivalent force system
- Unit 4: Equations of equilibrium

BLOCK 2 Statics

- Unit 1: Statics of particle – Concurrent forces in plane
- Unit 2: Statics of particle – Concurrent forces in space
- Unit 3: Statics of Rigid bodies – Non – concurrent forces in plane
- Unit 4: Statics of rigid bodies – Non – concurrent forces in space

BLOCK 3 Mechanics

- Unit 1: Centroid
- Unit 2: Centre of gravity
- Unit 3: Moment of inertia
- Unit 4: Mass moment of inertia

BLOCK 4 Kinematics

- Unit 1: Kinematics of particle – Rectilinear motion
- Unit 2: Kinematics of particle – Curvilinear motion
- Unit 3: Kinematics of rigid bodies
- Unit 4: Friction

BLOCK 5 Kinetics

- Unit 1: Kinetics of particle – Newton’s second law of motion
- Unit 2: Kinetics of particle – Work and energy
- Unit 3: Kinetics of particle – Impulse and momentum
- Unit 4: Kinetics of rigid bodies

Text Books :

1. Engineering Mechanics – Shames – Pearson Education
2. Engineering Mechanics – S.Rajasekar – Vikas publishing house Pvt. Ltd
3. Beer,F.P and Johnson Jr. E.R, “Vector Mechanics for Engineers”, Vol. 1 Statics and Vol. 2 Dynamics, McGraw-Hill International Edition, 1997.
4. Hibbeler, R.C., Engineering Mechanics, Vol. 1 Statics, Vol. 2 Dynamics, Pearson Education Asia Pvt. Ltd., 2000
5. Ashok Gupta, Interactive Engineering Mechanics – Statics – A Virtual Tutor (CDROM), Pearson Education Asia Pvt., Ltd., 2002
6. Palanichamy, M.S., Nagan, S., Engineering Mechanics – Statics & Dynamics, Tata McGraw-Hill, 2001.
7. Irving H. Shames, Engineering Mechanics - Statics and Dynamics, IV Edition - Pearson Education Asia Pvt. Ltd., 2003
8. Rajasekaran, S, Sankarasubramanian, G, Fundamentals of Engineering Mechanics, Vikas Publishing House Pvt. Ltd., 2000

SEMESTER : III

Subject Code : ME 3003

Subject Title : Engineering Thermodynamics

Structure of the Course Content

BLOCK 1 Introduction

Unit 1: Basic concepts of thermodynamics

Unit 2: Properties of pure substances

Unit 3: First law of thermodynamics

Unit 4: Second law of thermodynamics

BLOCK 2 Air cycles

Unit 1: Availability and Reversibility

Unit 2: Properties of gases and mixtures

Unit 3: Gas power cycles

Unit 4: Vapour power cycles

BLOCK 3 Refrigeration

Unit 1: Air refrigeration system

Unit 2: Simple vapour refrigeration system

Unit 3: Vapour absorption system

Unit 4: Refrigerents

BLOCK 4 Heat transfer

Unit 1: Heat transfer by conduction

Unit 2: Heat transfer by convection

Unit 3: Heat transfer by radiation

Unit 4: Heat exchangers

BLOCK 5 Ideal and real gases

Unit 1: Introduction

Unit 2: Thermodynamics relations

Unit 3: Chemical thermodynamics

Unit 4: Psychometrics

Books:

1. Engineering Thermodynamics – P.K.Nag – Tata Mc grahill Publishing Company Ltd.
2. Engineering Thermodynamics – R.K.Rajput – Laxmi publications Ltd.
3. Cengel, “Thermodynamics” An Engineering Approach, Third Edition – 2003, Tata Mc Graw Hill, New Delhi.
4. Holman.J.P., “Thermodynamics”, 3rd Ed. McGraw-Hill, 1995.
5. Venwylen and Sontag, “Classical Thermodynamics”, Wiley Eastern, 1987
6. Arora C.P, “ Thermodynamics”, Tata McGraw-Hill, New Delhi, 2003.

7. Merala C, Pother, Craig W, Somerton, “ Thermodynamics for Engineers”, Schaum Outline Series, Tata McGraw-Hill, New Delhi, 2004.
8. Sri Vastava R.C, Saha S. K, Jan A. K, “ Thermodynamics” Prentice Hall of India, New Delhi, 2004.

SEMESTER : III

Subject Code : ME 3004

Subject Title : Fluid Mechanics and Machinery

Structure of the Course Content

BLOCK 1 Fundamentals

- Unit 1: Fundamental concepts
- Unit 2: Fluid Properties
- Unit 3: Fluid forces
- Unit 4: Fluid statics

BLOCK 2 Fluid flow in pipes

- Unit 1: Boundary layer flow
- Unit 2: Laminar flow
- Unit 3: Turbulant flow
- Unit 4: Analysis of flow

BLOCK 3 Flow measurements

- Unit 1: Measurement of flow in pipes
- Unit 2: Measurement of velocity
- Unit 3: Flow through orifices
- Unit 4: Measurements of flow in open channels

BLOCK 4 Turbines

- Unit 1: Introduction
- Unit 2: Hydraulic turbines
- Unit 3: Performance of turbines
- Unit 4: Impact of free jets

BLOCK 5 Pumps

- Unit 1: Introduction
- Unit 2: Reciprocating pumps
- Unit 3: Centrifugal pumps
- Unit 4: Performance of pumps

Books:

1. Fluid Mechanics – Dr. A.K.Jain – Khanna publishers
2. Hydraulics and Fluid Mechanics including Hydraulic machines – Dr. S.M.Seth – Standard Book house
3. Streeter, V.L., and Wylie, E.B., “Fluid Mechanics”, McGraw-Hill, 1983.
4. Kumar, K.L., “Engineering Fluid Mechanics”, Eurasia Publishing House (P) Ltd, New Delhi (7th edition), 1995.
5. Vasandani, V.P., “Hydraulic Machines - Theory and Design”, Khanna Publishers.1992

6. Bansal, R.K., "Fluid Mechanics and Hydraulics Machines", (5th edition), Laxmi publications (P) Ltd, New Delhi, 1995
7. White, F.M., "Fluid Mechanics", Tata McGraw-Hill, 5th Edition, New Delhi, 2003.
8. Ramamirtham, S., "Fluid Mechanics and Hydraulics and Fluid Machines", Dhanpat Rai and Sons, Delhi, 1998.
9. Som, S.K., and Biswas, G., "Introduction to Fluid Mechanics and Fluid Machines", Tata McGraw-Hill, 2nd Edition, 2004.

SEMESTER : III

Subject Code : ME 3005

Subject Title : Manufacturing Technology I

Structure of the Course Content

BLOCK 1 Foundry

Unit 1: Introduction

Unit 2: Moulding and core making

Unit 3: Casting processes

Unit 4: Furnaces

BLOCK 2 Forging

Unit 1: Introduction

Unit 2: Ferrous and Non ferrous alloy forging

Unit 3: Operations

Unit 4: Defects and testing of forging

BLOCK 3 Welding

Unit 1: Introduction

Unit 2: Welding of metals

Unit 3: Welding of Non metals

Unit 4: Inspection and testing of welds

BLOCK 4 Lathe

Unit 1: Introduction

Unit 2: Work holding devices

Unit 3: Tool holding devices

Unit 4: Operations

BLOCK 5 Semi automatic and automatic lathe

Unit 1: Introduction

Unit 2: Work holding and tool holding devices

Unit 3: operations

Unit 4: Automatic lathe

Books:

1. Foundry Technology – Dharmendra kumar – CBS Publishers
2. Welding Technology – O.P.Khanna – Dhanpat Rai publications
3. Workshop Technology (Vol II) – S.K.Hajra Chowdary – Media Promoters and publishers Pvt. Ltd.
4. Rao, P.N. “Manufacturing Technology”, Metal Cutting and Machine Tools, Tata McGraw–Hill, New Delhi, 2003.

5. Richard R. Kibbe, John E. Neely, Roland O. Merges and Warren J. White, "Machine Tool Practices", Prentice Hall of India, 2003.
6. HMT – "Production Technology", Tata McGraw-Hill, 1998.
7. P.C. Sharma, "A Text Book of Production Engineering", S. Chand and Co. Ltd, IV edition, 1993.
8. Hajra Choudry, "Elements of Work Shop Technology – Vol. II", Media Promoters. 2002
9. Geoffrey Boothroyd, "Fundamentals of Metal Machining and Machine Tools", McGraw Hill, 1984.

SEMESTER : III

Subject Code : MEP 001

Subject Title : Fluid Mechanics and Machinery Lab

Structure of the Course Content

List of Experiments

1. Determination of the Coefficient of discharge of given Orifice meter.
2. Determination of the Coefficient of discharge of given Venturi meter.
3. Calculation of the rate of flow using Rota meter.
4. Determination of friction factor for a given set of pipes.
5. Conducting experiments and drawing the characteristic curves of centrifugal pump / submersible pump
6. Conducting experiments and drawing the characteristic curves of reciprocating pump.
7. Conducting experiments and drawing the characteristic curves of Gear pump.
8. Conducting experiments and drawing the characteristic curves of Pelton wheel.
9. Conducting experiments and drawing the characteristics curves of Francis turbine.
10. Conducting experiments and drawing the characteristic curves of Kaplan turbine.

SEMESTER : III

Subject Code : MEP 002

Subject Title : Manufacturing Technology Lab I

Structure of the Course Content

List of Experiments

1. Foundry

a. Preparation of sand mould:

i. Solid pattern

1. Stepped pulley
2. Bearing top
3. Gear wheel

ii. Split pattern

1. Pipe bend
2. Thumbles

iii. Study of Core making

1. Cylindrical core

iv. Melting and casting - (Not for Examination, only for Class exercises)

1. Melting non ferrous metal and making sand casting using any one of the pattern in any one of the following furnace.
2. Oil fired crucible furnace
3. Pit furnace

2. Welding

a. Arc welding

- i. Lap joint (Material : 25mm x 3mm Ms Flat)
- ii. Butt joint (Material : 25mm x 6mm Ms Flat)
- iii. T- joint (Material : 25mm x 3mm Ms Flat)
- iv. Corner joint (Material : 25mm x 3mm Ms Flat)

b. Gas welding

- i. Lap joint (Material : 25mm x 3mm Ms Flat)
- ii. Butt joint (Material : 25mm x 6mm Ms Flat)
- iii. Gas cutting : Profile cutting

c. Soldering and Brazing (Demonstration only)

3. Smithy

- a. Round rod to hexagonal rod
- b. Round rod to square rod
- c. Round rod to square headed bolt
- d. Round rod to hexagonal headed bolt
- e. Round rod to flat with width 25mm

SEMESTER : IV

Subject Code : ME 4001

Subject Title : Numerical Methods

Structure of the Course Content

BLOCK 1 Solution of Equations and Eigen value Problems

Unit 1: Linear interpolation methods – Newton’s method

Unit 2: Solution of linear system by Gaussian elimination and Gauss-Jordon Methods

Unit 3: Iterative methods: Gauss Jacobi and Gauss-Seidel methods

Unit 4: Inverse of a matrix by Gauss Jordon method – Eigen value of a matrix

BLOCK 2 Interpolations and Approximation

Unit 1: Lagrangian Polynomials

Unit 2: Divided differences

Unit 3: Interpolating with a cubic spline

Unit 4: Newton’s forward and backward difference formulas

BLOCK 3 Numerical Differentiations and Integration

Unit 1: Divided differences and finite differences

Unit 2: Numerical integration by trapezoidal and Simpson’s 1/3 and 3/8 rules

Unit 3: Two and Three point Gaussian Quadrature formulas

Unit 4: Double integrals using trapezoidal and Simpsons’s rules

BLOCK 4 Initial Value Problems for Ordinary Differential Equations

Unit 1: Taylor series method

Unit 2: Euler and modified Euler methods

Unit 3: Fourth order Runge Kutta method for solving first and second order Equations

Unit 4: Multi step methods

BLOCK 5 Boundary Value Problems

Unit 1: Finite difference solution of second order ordinary differential equation

Unit 2: Finite difference solution of one dimensional heat equation

Unit 3: One dimensional wave equation and two dimensional Laplace

Unit 4: Poisson equations

Books:

1. C.F. Gerald and P.O. Wheatley, ‘Applied Numerical Analysis’, Sixth Edition, Pearson Education Asia, New Delhi, 2002.
2. E. Balagurusamy, ‘Numerical Methods’, Tata McGraw Hill Pub.Co.Ltd, New

Delhi, 1999.

3. P. Kandasamy, K. Thilagavathy and K. Gunavathy, 'Numerical Methods', S.Chand Co. Ltd., New Delhi, 2003.
4. R.L. Burden and T.D. Faires, 'Numerical Analysis', Seventh Edition, Thomson Asia Pvt. Ltd., Singapore, 2002.

SEMESTER : IV

Subject Code : ME 4002

Subject Title : Strength of Materials

Structure of the Course Content

BLOCK 1 Stress and Strain

Unit 1: Mechanical properties of materials

Unit 2: stress

Unit 3: strain

Unit 4: Stress – Strain calculation

BLOCK 2 Beams

Unit 1: Introduction

Unit 2: Shear force and Bending Moment

Unit 3: Simply supported beams

Unit 4: Cantilever beams

BLOCK 3 Stresses in Beams

Unit 1: Bending stresses in simple beams

Unit 2: Bending stresses in composite beams

Unit 3: Shearing stresses in simple beams

Unit 4: Direct and bending stresses

BLOCK 4 Deflection

Unit 1: Deflection of beams

Unit 2: Deflection of cantilever

Unit 3: Deflection of moment area method

Unit 4: Deflection of conjugate beam method

BLOCK 5 Torsion

Unit 1: Torsion of circular shaft

Unit 2: Springs

Unit 3: Thin cylindrical and spherical shells

Unit 4: Thick cylindrical and spherical shells

Books:

1. Strength of materials - R.S.Khurmi – S.Chand & Co
2. Strength of materials – R.S.Lehri – S.K.Kataria & sons
3. Popov E.P, “Engineering Mechanics of Solids”, Prentice-Hall of India, New Delhi, 1997.
4. Beer F. P. and Johnston R, “Mechanics of Materials”, McGraw-Hill Book Co, Third Edition, 2002.
5. Nash W.A, “Theory and problems in Strength of Materials”, Schaum Outline Series, McGraw-Hill Book Co, New York, 1995

6. Kazimi S.M.A, "Solid Mechanics", Tata McGraw-Hill Publishing Co, New Delhi, 1981
7. Ryder G.H, "Strength of Materials", Macmillan India Ltd., Third Edition, 2002
8. Ray Hulse, Keith Sherwin & Jack Cain, "Solid Mechanics", Palgrave ANE Books, 2004.
9. Singh D.K "Mechanics of Solids" Pearson Education 2002.
10. Timoshenko S.P, "Elements of Strength of Materials", Tata McGraw-Hill, New Delhi 1997.

SEMESTER : IV
Subject Code : ME 4003
Subject Title : Engineering Materials and Metallurgy

Structure of the Course Content

BLOCK 1 Introduction to Engineering Materials

Unit 1: Properties of engineering materials
Unit 2: Selection of materials
Unit 3: Ferrous materials
Unit 4: Non – Ferrous materials

BLOCK 2 Materials

Unit 1: Composite materials
Unit 2: Plastic materials
Unit 3: Ceramic materials
Unit 4: Insulating materials

BLOCK 3 Extractive metallurgy

Unit 1: Ferrous extractive metallurgy
Unit 2: Extraction of Aluminium and Copper
Unit 3: Extraction of Magnesium, Zinc and Lead
Unit 4: Extraction of Tin and Nickel

BLOCK 4 Physical Metallurgy

Unit 1: Phase diagram
Unit 2: Iron carbon diagram
Unit 3: Heat treatment processes
Unit 4: Heat treatment furnaces

BLOCK 5 Mechanical Metallurgy

Unit 1: Testing of materials
Unit 2: Powder metallurgy
Unit 3: Failure of metals
Unit 4: Mechanical working processes

Books:

1. Material science and Metallurgy – O.P.Khanna – Dhanpat Rai Publications
2. Kenneth G.Budinski and Michael K.Budinski “Engineering Materials” Prentice-Hall of India Private Limited, 4th Indian Reprint 2002.
3. S.William D Callsber “Material Science and Engineering”, John Wiley and Sons 1997.
4. Raghavan.V “Materials Science and Engineering”, Prentice Hall of India Pvt., Ltd., 1999.
5. Sydney H.Avner “Introduction to Physical Metallurgy” McGraw Hill Book Company, 1994.

SEMESTER : IV

Subject Code : ME 4004

Subject Title : Basic Electrical and Electronics Engineering

Structure of the Course Content

BLOCK 1 FUNDAMENTAL OF D.C AND A.C CIRCUITS

Unit 1: Definitions of DC Parameters and Basic Laws

Unit 2: Kirchoff's Law and Mesh Analysis's

Unit 3: Definitions of AC Components

Unit 4: RLC Circuits

BLOCK 2 D.C AND A.C MACHINES

Unit 1: DC Generator

Unit 2: DC Motor

Unit 3: Single Phase AC Motor

Unit 4: Three Phase AC Motor

BLOCK 3 Basic House Wiring

Unit 1: Wiring Equipments

Unit 2: Electrical Items Fitting Plan Preparation

Unit 3: Material Schedule Preparation with Cost Estimation

Unit 4: IE Rules

BLOCK 4 Basic Electronics

Unit 1: Semiconductor Technology

Unit 2: Diodes

Unit 3: Transistors

Unit 4: Regulators

BLOCK 5 Applications of Electronics Devices

Unit 1: Power Supply Unit

Unit 2: Inverter

Unit 3: Refrigerator

Unit 4: Commercial AC System

Books:

1. Electric Circuit Theory By Dr M. Arumugam, Dr N. Premkumar, Khanna Publishers
2. Electric Circuits By Joseph Edminister, Schaum Series
3. Principle of Electronics By VK Metha
4. Electronic Principles by Malvino, Tata MC Publishers
5. A Course in Electrical Engg (Vol II) By BL Theraja, S.Chnad Publishers

6. Electrical Technology By JB Gupta, S.K. Kataria & Sons
7. Electrical Machines by SK Bhattacharya, Tata Mc Hill Publishers
8. Power Electronics by MD Singh & KB Khanchandaniata Tata MC Hill
9. Fundamentals of Electrical Drives by GK Dubey, Narosa Publishing
10. Electrical Wiring, Estimating and Costing By Dr.S.L.Uppal, Khanna Publishers.
11. Electrical Design Estimating and Costing By K.B.Raina & S.K.Battacharya. New age international Publishers

SEMESTER : IV

Subject Code : ME 4005

Subject Title : Manufacturing Technology II

Structure of the Course Content

BLOCK 1 Shaper, Planner and Slotter

Unit 1: Shaper

Unit 2: Planner

Unit 3: Slotter

Unit 4: Cutting speed, Feed and Depth of cut

BLOCK 2 Drilling Machines

Unit 1: Introduction

Unit 2: Work holding devices

Unit 3: Tool holding devices

Unit 4: Operations

BLOCK 3 Milling Machines

Unit 1: Introduction

Unit 2: Work holding devices

Unit 3: Tool holding devices

Unit 4: Operations

BLOCK 4 Grinding machines

Unit 1: Introduction

Unit 2: Work holding machines

Unit 3: Tool holding machines

Unit 4: Operations

BLOCK 5 Non conventional machining processes

Unit 1: Introduction

Unit 2: Ultrasonic machining

Unit 3: Machining using chemicals

Unit 4: Laser beam machining and Plasma machining

Books:

1. Work shop Technology (Vol II) – s.k.Hajra Chowdary – Media promoters and Publishers
2. Rao, P.N. “Manufacturing Technology”, Metal Cutting and Machine Tools, Tata McGraw–Hill, New Delhi, 2003.
3. Richerd R. Kibbe, John E. Neely, Roland O. Merges and Warren J. White, “Machine Tool Practices”, Prentice Hall of India, 2003.
4. HMT – “Production Technology”, Tata McGraw-Hill, 1998.

5. P.C. Sharma, "A Text Book of Production Engineering", S. Chand and Co. Ltd, IV edition, 1993.
6. Hajra Choudry, "Elements of Work Shop Technology – Vol. II", Media Promoters. 2002
7. Geoffrey Boothroyd, "Fundamentals of Metal Machining and Machine Tools", McGraw Hill, 1984.

SEMESTER : IV

Subject Code : MEP 003

Subject Title : Strength of Materials Lab

Structure of the Course Content

List of Experiments

1. Tension test on a mild steel rod
2. Double shear test on Mild steel and Aluminium rods
3. Torsion test on mild steel rod
4. Impact test on metal specimen
5. Hardness test on metals - Brinnell and Rockwell Hardness Number
6. Deflection test on beams
7. Compression test on helical springs
8. Strain Measurement using Rosette strain gauge
9. Effect of hardening- Improvement in hardness and impact resistance of steels.
10. Tempering- Improvement Mechanical properties Comparison
 - a. Unhardened specimen
 - b. Quenched Specimen and
 - c. Quenched and tempered specimen.
11. Microscopic Examination of Hardened samples and
 - a. Hardened and tempered samples.

SEMESTER : IV

Subject Code : MEP 004

Subject Title : Electrical Engineering Lab

Structure of the Course Content

LIST OF EXPERIMENTS

1. Load test on DC Shunt & DC Series motor
2. O.C.C & Load characteristics of DC Shunt and DC Series generator
3. Speed control of DC shunt motor (Armature, Field control)
4. Load test on single phase transformer
5. O.C & S.C Test on a single phase transformer
6. Regulation of an alternator by EMF & MMF methods.
7. V curves and inverted V curves of synchronous Motor
8. Load test on three phase squirrel cage Induction motor
9. Speed control of three phase slip ring Induction Motor
10. Load test on single phase Induction Motor.
11. Study of DC & AC Starters

SEMESTER : V
Subject Code : ME 5001
Subject Title : Thermal Engineering

Structure of the Course Content

BLOCK 1 Expansion of steam

Unit 1: Introduction
Unit 2: Properties of steam
Unit 3: Processes
Unit 4: Calorimeters

BLOCK 2 Steam boilers

Unit 1: Introduction
Unit 2: Types of boilers
Unit 3: Performance of boilers
Unit 4: Heat balance sheet

BLOCK 3 Power plants

Unit 1: Thermal power plant
Unit 2: Steam turbines
Unit 3: Steam condensers
Unit 4: Steam nozzles

BLOCK 4 Energy engineering and management

Unit 1: Introduction
Unit 2: Nuclear power plant
Unit 3: Reactors
Unit 4: Conventional sources of Energy

BLOCK 5 Refrigeration

Unit 1: Absorption refrigeration
Unit 2: Steam jet refrigeration
Unit 3: Psychometry
Unit 4: Air conditioning

Books:

1. Thermal Engineering – P.L.Balleney
2. Rajput, “Thermal Engineering”, S. Chand publishers, 2000.
3. Rudramoorthy R, “Thermal Engineering”, Tata McGraw-Hill, New Delhi, 2003.
4. Kothandaraman.C.P., Domkundwar.S. and A.V.Domkundwar., “A course in Thermal Engineering”, Dhanpat Rai & Sons, Fifth edition, 2002
5. Holman. J.P., “Thermodynamics”, McGraw-Hill, 1985.
6. Rogers, Meyhew, “Engineering Thermodynamics”, ELBS, 1992.
7. Arora.C.P., “Refrigeration and Air conditioning”, TMH, 1994.
8. Sarkar B.K, “ Thermal Engineering”, Tata McGraw-Hill, 1998.

SEMESTER : V
Subject Code : ME 5002
Subject Title : Design of Machine Elements

Structure of the Course Content

BLOCK 1 Introduction

Unit 1: Engineering materials properties
Unit 2: Manufacturing consideration in machine design
Unit 3: Simple stresses in machine parts
Unit 4: shafts

BLOCK 2 Joints

Unit 1: Cotter joint
Unit 2: Knuckle joint
Unit 3: Riveted joint
Unit 4: Screwed joint

BLOCK 3 Gears

Unit 1: spur gear
Unit 2: Helical gear
Unit 3: Bevel gear
Unit 4: Worm gear

BLOCK 4 Bearings, Clutches and Springs

Unit 1: Sliding contact bearings
Unit 2: Rolling contact bearings
Unit 3: Clutches
Unit 4: Springs

BLOCK 5 Belt drives

Unit 1: Flat belts
Unit 2: V Belts
Unit 3: Rope drives
Unit 4: Chain drives

Books:

1. A text book of machine design – R.S.Khurmi – S.Chand & Co
2. Juvinall R.C, and Marshek K.M, “Fundamentals of Machine Component Design”, John Wiley & Sons, Third Edition, 2002.
3. Bhandari V.B, “Design of Machine Elements”, Tata McGraw-Hill Book Co, 2003.
4. Norton R.L, “Design of Machinery”, Tata McGraw-Hill Book Co, 2004.
5. Orthwein W, “Machine Component Design”, Jaico Publishing Co, 2003.
6. Ugural A.C, “Mechanical Design – An Integral Approach, McGraw-Hill Book Co, 2004.
7. Spotts M.F., Shoup T.E “Design and Machine Elements” Pearson Education, 2004.

STANDARDS

1. IS 10260 : Part 1 : 1982 Terms, definitions and classification of Plain bearings Part 1 : Construction.
2. IS 10260 : Part 1 : 1982 Terms, definitions and classification of Plain bearings Part 2 : Friction and Wear.
3. IS 10260 : Part 1 : 1982 Terms, definitions and classification of Plain bearings Part 3 : Lubrication.

SEMESTER : V
Subject Code : ME 5003
Subject Title : **Industrial Hydraulics and Pneumatics**

Structure of the Course Content

BLOCK 1 Basic Principle

Unit 1: Hydraulic principle
Unit 2: Hydraulic pumps
Unit 3: Hydraulic Actuators
Unit 4: Hydraulic Valves

BLOCK 2 Hydraulic Circuits

Unit 1: Reciprocating Circuits
Unit 2: Accumulator circuits
Unit 3: Safety and Industrial circuits
Unit 4: Electro hydraulics

BLOCK 3 Designs and Selection - Hydraulics

Unit 1: Design of Hydraulic circuits
Unit 2: Selection of components
Unit 3: Installation of Hydraulic power packs
Unit 4: Maintenance of Hydraulic power packs

BLOCK 4 Pneumatic Systems

Unit 1: Introduction
Unit 2: Logic circuits
Unit 3: Pressure sensing and switching
Unit 4: Electro pneumatics

BLOCK 5 Designs and Selection - Pneumatics

Unit 1: Design of pneumatic circuits
Unit 2: Selection on pneumatic components
Unit 3: Installation on pneumatic systems
Unit 4: Maintenance of pneumatic systems

Books:

1. Pneumatic and Hydraulic systems – W.Bolton – Butter worth.
2. Anthony Esposito, “Fluid Power with Applications”, Pearson Education 2000.
3. Majumdar S.R., “Oil Hydraulics”, Tata McGraw-Hill, 2000.
4. Majumdar S.R., “Pneumatic systems – Principles and maintenance”, Tata McGraw Hill, 1995
5. Anthony Lal, “Oil hydraulics in the service of industry”, Allied publishers, 1982.
6. Harry L. Stevart D.B, “Practical guide to fluid power”, Taraoeala sons and Port Ltd. Broadey, 1976.
7. Michael J, Prinches and Ashby J. G, “Power Hydraulics”, Prentice Hall, 1989.
8. Dudelyt, A. Pease and John T. Pippenger, “Basic Fluid Power”, Prentice Hall, 1987.

SEMESTER : V

Subject Code : ME 5004

Subject Title : Electrical drives and Controls

Structure of the Course Content

BLOCK 1 Introduction

Unit 1: Types of Electric Drives

Unit 2: Factors influencing the choice of electrical drives

Unit 3: Loading conditions and classes of duty

Unit 4: Selection of power rating for drive mot

BLOCK 2 DRIVE MOTOR CHARACTERISTICS

Unit 1: Mechanical characteristics

Unit 2: Various types of Loads and Drive Motor

Unit 3: Braking of DC motors

Unit 4: Braking of AC motors

BLOCK 3 STARTING METHODS

Unit 1: Types of D.C Motor starters

Unit 2: Typical control circuits for shunt and series motors

Unit 3: Three phase squirrel cage

Unit 4: Slip ring induction motors

BLOCK 4 CONVENTIONAL AND SOLID STATE SPEED CONTROL OF D.C. DRIVES

Unit 1: Speed control of DC series and shunt motors

Unit 2: Armature and field control, Ward-Leonard control system

Unit 3: Using controlled rectifiers and DC choppers

Unit 4: Applications

BLOCK 5 CONVENTIONAL AND SOLID STATE SPEED CONTROL OF A.C. DRIVES

Unit 1: Speed control of three phase induction motor

Unit 2: Voltage control, voltage / frequency control

Unit 3: Slip power recovery scheme

Unit 4: Inverters and AC voltage regulators

Books:

1. VEDAM SUBRAHMANYAM, "Electric Drives (concepts and applications)", Tata mcgraw-Hill, 2001
2. NAGRATH.I.J. & KOTHARI.D.P, "Electrical Machines", Tata mcgraw-Hill, 1998
3. PILLAI.S.K "A first course on Electric drives", Wiley Eastern Limited, 1998
4. M.D.SINGH, K.B.KHANCHANDANI, "Power Electronics", Tata mcgraw-Hill, 1998
5. H.Partab, "Art and Science and Utilisation of electrical energy", Dhanpat Rai and Sons, 1994

SEMESTER : V
Subject Code : ME 5005
Subject Title : **Industrial Engineering**

Structure of the Course Content

BLOCK 1 Work Study and Work Measurement

Unit 1: Work Study
Unit 2: Techniques
Unit 3: Method Study
Unit 4: Work Measurement

BLOCK 2 Site Selection, Plant Layout and Material Handling

Unit 1: Site Selection
Unit 2: Plant Layout
Unit 3: Techniques in Plant Layout
Unit 4: Material Handling

BLOCK 3 Ergonomics

Unit 1: Introduction
Unit 2: Techniques
Unit 3: Equipment Design
Unit 4: Human Effectiveness Improvement through Ergonomics

BLOCK 4 Wages and Incentives

Unit 1: Wages
Unit 2: Principles of Wage Administration
Unit 3: Incentives
Unit 4: Administration of Wage Incentives

BLOCK 5 Enterprise Resource Planning

Unit 1: Introduction
Unit 2: MRP I and MRP II
Unit 3: ERP Packages
Unit 4: Lean Manufacturing

Books:

1. Industrial Engineering and Management – O.P.Khanna – Khanna Publishers
2. Industrial Management - K.K.Ahuja – Khanna Publishers
3. Industrial Engineering and Production Management – M.Mhajan – Dhanpat Rai Publishers
4. Industrial Engineering – B.Kumar – Khanna Publishers
5. Industrial Engineering and Production Management – Martand and Telsang

SEMESTER : V

Subject Code : MEP 005

Subject Title : Thermal Engineering lab

Structure of the Course Content

List of Experiments

1. Valve Timing and Port Timing Diagrams.
2. Performance Test on 4-stroke Diesel Engine.
3. Heat Balance Test on 4-stroke Diesel Engine.
4. Morse Test on Multicylinder Petrol Engine.
5. Retardation Test to find Frictional Power of a Diesel Engine.
6. Determination of Viscosity – Red Wood Viscometer.
7. Determination of Flash Point and Fire Point.
8. Study of Steam Generators and Turbines.
9. Performance and Energy Balance Test on a Steam Generator.
10. Performance and Energy Balance Test on Steam Turbine.

SEMESTER : V

Subject Code : MEP 006

Subject Title : Manufacturing Technology lab II

Structure of the Course Content

List of Experiments

1. Two or More Metal Cutting Experiments
 - a. (Example: Shear Angle Measurement, Cutting Force Measurement, Cutting Temperature Measurement, Tool Wear Measurement, Life Measurement etc.)
2. One or More Exercises in Milling Machines
 - a. (Example: Milling Polygon Surfaces, Gear milling, Keyway milling, Helical Groove milling etc.)
3. Two or More Exercises in Grinding / Abrasive machining
4. (Example: Surface Grinding, Cylindrical Grinding, Centreless Grinding, Lapping, Honing etc.)
5. Two or More Exercises in Machining Components for Assembly of different fits.
 - a. (Example: Machining using Lathes, Shapers, Drilling, Milling, Grinding Machines etc.)
6. One or More Exercises in Capstan or Turret Lathes
7. One or More Exercises in Gear Machining
 - a. (Example: Gear Cutting, Gear Shaping, Gear Hobbing etc.)
8. One or More Exercises in CNC Machines
 - a. (Example: CNC Programming, CNC Tooling, CNC Machining etc.)

SEMESTER : VI

Subject Code : ME 6001

Subject Title : Engineering Metrology

Structure of the Course Content

BLOCK 1 Basic Concept of Measurements

- Unit 1: Need for Measurement
- Unit 2: Precision and Accuracy
- Unit 3: Reliability
- Unit 4: Errors in Measurements and its Causes

BLOCK 2 Linear and Angular Measurements

- Unit 1: Linear Measurements of Engineering Components
- Unit 2: Design and Application of linear measuring Instruments
- Unit 3: Angular Measurements in Engineering Components
- Unit 4: Design and Applications in Angular measuring Instruments

BLOCK 3 Form Measurements

- Unit 1: Principles of form measuring instruments
- Unit 2: Measurements of screw threads
- Unit 3: Measurements of gears
- Unit 4: Surface finishes Measurements

BLOCK 4 Laser Metrology

- Unit 1: Introduction
- Unit 2: Precision instrument based on Laser
- Unit 3: Application of Linear and Angular Measurements
- Unit 4: Testing of Machine tools using Laser

BLOCK 5 Advances in Metrology

- Unit 1: Coordinate Measuring Machine
- Unit 2: CNC – CMM Applications
- Unit 3: Computer Aided Inspection
- Unit 4: Machine Vision

Books:

1. Engineering Metrology – R.K.Jain – Khanna Publishers
2. Jain R.K., “Engineering Metrology”, Khanna Publishers, 1994
3. Alan S. Morris, “The Essence of Measurement”, Prentice Hall of India, 1997
4. Gupta S.C, “Engineering Metrology”, Dhanpat rai Publications, 1984
5. Jayal A.K, “Instrumentation and Mechanical Measurements”, Galgotia Publications 2000
6. Beckwith T.G, and N. Lewis Buck, “Mechanical Measurements”, Addison Wesley, 1991
7. Donald D Eckman, “Industrial Instrumentation”, Wiley Eastern, 1985.

SEMESTER : VI

Subject Code : ME 6002

Subject Title : Power Plant Engineering

Structure of the Course Content

BLOCK 1 Introduction to Power Plants and Boilers

- Unit 1: Layouts
- Unit 2: Selection
- Unit 3: Steam Boilers
- Unit 4: Fluidised Bed Boilers

BLOCK 2 Steam Power Plants

- Unit 1: Fuel and Ash Handling
- Unit 2: Equipments for Burning Coal
- Unit 3: Electrostatic Pulvariser
- Unit 4: Condensers and Cooling Towers

BLOCK 3 Nuclear and Hydel Power Plant

- Unit 1: Nuclear Power Plant
- Unit 2: Reactors
- Unit 3: Hydel Power Plants
- Unit 4: Selection of Turbines

BLOCK 4 Diesel and Gas Turbine Power plant

- Unit 1: Diesel Power Plant
- Unit 2: Selection of Engine Type
- Unit 3: Gas Turbine Power plant
- Unit 4: Regeneration and Inter cooling

BLOCK 5 Other Power Plants and Economics of Power plants

- Unit 1: Geo Thermal Power plant
- Unit 2: OTEC
- Unit 3: Cost of Electrical Energy
- Unit 4: Economics of Load Sharing

Books:

1. Power Plant Engineering – P.K.Nag – Tata MacGraw Hill
2. EI- Wakil M.M, “Power Plant Technology”, McGraw-Hill 1984.
3. Arora S.C and Domkundwar S, “A course in Power Plant Engineering”, Dhanpatrai, 2001.
4. G.R. Nagpal, “Power Plant Engineering”, Hanna Publishers, 1998.
5. K.K.Ramalingam, “Power Plant Engineering”, Scitech Publications, 2002.

6. G.D.Rai, "Introduction to Power Plant Technology", Khanna Publishers, 1995.
7. R.K.Rajput, "Power Plant Engineering", Laxmi Publications, 1995.
8. Frank D.Graham "Power Plant Engineers Guide", D.B. Taraporevala Sons & Co, New Delhi, 1993.
9. T.Morse Frederick, "Power Plant Engineering", Prentice Hall of India, 1998

SEMESTER : VI

Subject Code : ME 6003

Subject Title : Electronics and Microprocessor

Structure of the Course Content

BLOCK 1 Semiconductors and Rectifiers

Unit 1: Classification of solids based on energy band theory

Unit 2: PN Junction and Zener Diode

Unit 3: Half Wave Rectifier and Full Wave Rectifier

Unit 4: Voltage Regulator

BLOCK 2 Transistors and Amplifiers

Unit 1: Bipolar junction transistor

Unit 2: Biasing circuits-Class A, B and C amplifiers

Unit 3: Field effect transistor

Unit 4: SCR, Diac, Triac, UJT

BLOCK 3 Digital Electronics

Unit 1: Binary number system

Unit 2: Basic Gates

Unit 3: Flip Flops

Unit 4: Half and Full adder, Counters and Registers

BLOCK 4 8085 MICROPROCESSOR

Unit 1: Architecture of 8085

Unit 2: Instruction set

Unit 3: Addressing modes

Unit 4: Simple programs using arithmetic and logical operations

BLOCK 5 Interfacing and Applications of Microprocessor

Unit 1: Interfacing of Input and Output devices

Unit 2: Applications of microprocessor Temperature control

Unit 3: Applications of microprocessor Stepper motor control

Unit 4: Applications of microprocessor traffic light control

Books

1. Milman and Halkias, "Integrated Electronics", Tata McGraw-Hill publishers, 1995.
2. Ramesh Goankar, "Microprocessor Architecture", Programming and Applications with 8085, Wiley Eastern, 1998.
3. Malvino and Leach, "Digital Principles and Applications", Tata McGraw-Hill, 1996
4. Mehta V.K, "Principles of Electronics", S. Chand and Company Ltd, 1994
5. Douglas V.Hall, "Microprocessor and Interfacing", Programming and Hardware, Tata McGraw-Hill, 1999.
6. Salivahanan S, Suresh Kumar N, Vallavaraj A, "Electronic Devices and Circuits" First Edition, Tata McGraw-Hill, 1999.

SEMESTER : VI

Subject Code : ME 6004

Subject Title : Operations Research

Structure of the Course Content

BLOCK 1 Linear Model

Unit 1: Linear Programming – Graphical Method

Unit 2: Linear Programming – Simplex Method

Unit 3: Transportation problems

Unit 4: Assignment problems

BLOCK 2 Network Models

Unit 1: Introduction

Unit 2: PERT

Unit 3: CPM

Unit 4: Sequencing Models

BLOCK 3 Inventory Models

Unit 1: Introduction

Unit 2: Economic Order Quantity (EOQ)

Unit 3: Stochastic Inventory Models

Unit 4: Multi Product Models

BLOCK 4 Queuing Theories

Unit 1: Introduction

Unit 2: Single server and Multi server Model

Unit 3: Exponential service Models

Unit 4: Simulation Techniques

BLOCK 5 Decision Models

Unit 1: Game Theory – Graphical Solution

Unit 2: Game Theory – Linear Programming Solution

Unit 3: Replacement Models

Unit 4: Case Studies

Books:

1. Operations Research – H.A.Taha – Prentice Hall of India
2. Resource Management – Ganapathy Subramaniam, A.R. Publications
3. Operations Research – Philip and Ravindran – John Willey
4. Operations Research – Hiller and Leiberman
5. Operations Research for Managers – Sheonnoy, Srivesta – Willey Eastern

SEMESTER : VI

Subject Code : ME 6005

Subject Title : Personnel Management

Structure of the Course Content

BLOCK 1 Nature and Organisation of Personnel Management

Unit 1: Introduction

Unit 2: Personnel Management in India

Unit 3: Role of Personnel Manager

Unit 4: Organisation of Personnel Department

BLOCK 2 Recruitment and Development

Unit 1: Human Resource Planning

Unit 2: Recruitment and Selection

Unit 3: Career Planning and Development

Unit 4: Performance Appraisal

BLOCK 3 Compensation

Unit 1: Wage and Salary Administration

Unit 2: Principles of Wage Fixation

Unit 3: Incentive Plans

Unit 4: Job Evaluation

BLOCK 4 Employee's Welfare

Unit 1: Introduction

Unit 2: Safety in Industries

Unit 3: Employee's Social Security Benefits

Unit 4: Welfare and Safety in Factories Act

BLOCK 5 Industrial Relation

Unit 1: Introduction

Unit 2: Measures to Improve Industrial Relations

Unit 3: Workers Participation in Management

Unit 4: Bargaining

Books:

1. Human Resource Management – Chhabra – Dhanpat Rai & Co
2. Personnel Management – Arunmonappa and Saiyudin - TMH
3. Personnel Management - Edwin B. Flippo – MacGraw Hill Publications

SEMESTER : VI

Subject Code : MEP 007

Subject Title : Metrology and Dynamics Lab

Structure of the Course Content

List of Experiments

1. Calibration of Vernier / Micrometer / Dial Gauge
2. Checking Dimensions of part using slip gauges
3. Measurements of Gear Tooth Dimensions
4. Measurement of Taper Angle using sine bar / tool makers microscope
5. Measurement of straightness and flatness
6. Measurement of thread parameters
 - a. Checking the limits of dimensional tolerances using comparators (Mechanical / Pneumatic / Electrical)
7. Measurement of Temperature using Thermocouple / Pyrometer
8. Measurement of Displacement (Strain Gauge / LVDT / Wheatstone Bridge)
9. Measurement of Force
10. Measurement of Torque
11. Measurement of Vibration / Shock
12. Governors - Determination of sensitivity, effort, etc. for Watt, Porter, Proell, Hartnell governors
13. Cam - Study of jump phenomenon and drawing profile of the cam.
14. Motorised Gyroscope-Verification of laws -Determination of gyroscopic couple.
15. Whirling of shaft-Determination of critical speed of shaft with concentrated loads.

SEMESTER : VI

Subject Code : MEP 008

Subject Title : Electronics and Microprocessor Lab

Structure of the Course Content

List of Experiments

ELECTRONICS

30

1. VI Characteristics of PN Junction Diode
2. VI Characteristics of Zener Diode
3. Characteristics of CE Transistor
4. Characteristics of JFET
5. RC or Wein Bridge Oscillator
6. Study of Logic Gates (Basic Gates)
7. Half Adder and Full Adder
8. Shift Registers and Counters
9. Operational Amplifier (Adder, Subtractor, Differentiator, Integrator, Inverting and Non - Inverting)

MICROPROCESSOR

10. Block Transfer
11. 8 bit Addition, Subtraction
12. Multiplication and Division
13. Maximum and Minimum of block of data
14. Sorting
15. Stepper Motor Interfacing

SEMESTER : VII

Subject Code : ME 7001

Subject Title : Computer Aided Design and Manufacturing

Structure of the Course Content

BLOCK 1 Introduction

Unit 1: Design Process

Unit 2: CAD Hardware

Unit 3: CAD Software

Unit 4: Design for Manufacturability

BLOCK 2 Solid Modelling

Unit 1: Display Transformation in 2D and 3D

Unit 2: Geometrical Modelling

Unit 3: Wire frame and Surface Modelling

Unit 4: Parametric and Feature based Modelling

BLOCK 3 Finite Element Analyses

Unit 1: Introduction

Unit 2: Elements Types

Unit 3: Assembly and Boundary Conditions

Unit 4: Introduction to FEA Package

BLOCK 4 CAD / CAM Interface

Unit 1: Introduction

Unit 2: Group Technology

Unit 3: Design for Manufacturing and Assembly

Unit 4: Rapid Prototyping

BLOCK 5 Fundamentals of CNC Machines

Unit 1: Introduction

Unit 2: Constructional Features for CNC Machines

Unit 3: Part programming for CNC Machines

Unit 4: Production planning and Control

Books:

1. CAD / CAM – Groover - Prentice Hall
2. CAD / CAM – Ibrahim Zeid
3. CAD / CAM /CIM – P. Radhakrishnan and S.Subramaniam – Willey Eastern Limited

SEMESTER : VII
Subject Code : ME 7002
Subject Title : Mechatronics

Structure of the Course Content

BLOCK 1 Introduction

Unit 1: Systems
Unit 2: Measurement systems
Unit 3: Control System
Unit 4: Mechatronic Approach

BLOCK 2 Sensors and Transducers

Unit 1: Introduction
Unit 2: Displacement, Position and Proximity Sensors
Unit 3: Pressure, Temperature and Light Sensors
Unit 4: Selection of Sensors and Signal Processing

BLOCK 3 System Models

Unit 1: Introduction
Unit 2: Mathematical Models
Unit 3: Electro Mechanical System
Unit 4: Hydraulic Mechanical System

BLOCK 4 Programmable Logic Control (PLC)

Unit 1: Introduction
Unit 2: Input / Output Processing
Unit 3: Analog – Input / Output
Unit 4: Selection of PLC

BLOCK 5 Design of Mechatronic System

Unit 1: Introduction
Unit 2: Traditional Design
Unit 3: Mechatronic Design
Unit 4: Case Studies

Books:

1. Mechatronics – W.Bolton – Longman
2. W. Bolton, “Mechatronics”, Pearson Education, Second Edition, 1999.
3. Michael B. Hstand and David G. Alciatore, “ Introduction to Mechatronics and Measurement Systems”, McGraw-Hill International Editions, 2000.
4. Bradley D. A., Dawson D., Buru N.C. and. Loader A.J, “Mechatronics”, Chapman and Hall, 1993.

5. Dan Neculescu, "Mechatronics", Pearson Education Asia, 2002 (Indian Reprint).
6. Lawrence J. Kamm, "Understanding Electro – Mechanical Engineering", An Introduction to Mechatronics, Prentice – Hall of India Pvt., Ltd., 2000.
7. Nitaigour Premchand Mahadik, "Mechatronics", Tata McGraw-Hill publishing Company Ltd, 2003

SEMESTER : VII
Subject Code : ME 7003
Subject Title : Automobile Engineering

Structure of the Course Content

BLOCK 1 Power generation system

Unit 1: Engine operation
Unit 2: Engine construction
Unit 3: Engine performance
Unit 4: Engine maintenance

BLOCK 2 Fuel systems

Unit 1: Engine fuels
Unit 2: Fuel feed system
Unit 3: Carburetor
Unit 4: Fuel injection system

BLOCK 3 Cooling systems

Unit 1: Engine cooling
Unit 2: Bearings
Unit 3: Lubricants
Unit 4: Exhaust systems

BLOCK 4 Electrical systems

Unit 1: Battery
Unit 2: Generator
Unit 3: Ignition
Unit 4: Lighting and Wiring

BLOCK 5 Transmission Systems

Unit 1: Clutch
Unit 2: Transmission
Unit 3: Propeller shaft and Final drive
Unit 4: Differential and rear axle

Books:

1. Automobile Engineering – R.B.Gupta – Satya publishers
2. Sethi H.M, “Automobile Technology”, Tata McGraw-Hill-2003
3. Kirpal Singh “Automobile Engineering Vol. 1& 2”, Standard Publishers, New Delhi.
4. Crouse and Anglin “Automotive Mechanism”, 9th Edition. Tata McGraw-Hill, 2003.
5. Newton, Steeds and Garet, “Motor vehicles”, Butterworth Publishers, 1989.
6. Srinivasan.S , “Automotive Mechanics” 2nd edition, 2003, Tata McGraw-Hill.
7. Joseph Heitner, “Automotive Mechanics”, 2nd edition, East-West Press, 1999.

SEMESTER : VII

Subject Code : MEP 009

Subject Title : CAD / CAM Lab

Structure of the Course Content

List of Experiments

COMPUTER AIDED DESIGN (CAD)

- 1 3D Part modeling – protrusion, cut, sweep, draft, loft, blend, rib
- 2 Editing – Move, Pattern, Mirror, Round, Chamfer
- 3 Assembly – creating assembly from parts – assembly constraints
- 4 Conversion of 3D solid model to 2D drawing - different views, sections, isometric view and dimensioning
- 5 Introduction to Surface Modeling
- 6 Introduction to File Import, Export – DXF, IGES, STL, STEP
- 7 3D modeling of machine elements like Flanged coupling, screw jack, Tailstock, Machine Vise etc.

COMPUTER AIDED MANUFACTURING (CAM)

MANUAL PART PROGRAMMING (Using G and M Codes) in CNC lathe

1. Part programming for Linear and Circular interpolation, Chamfering and Grooving, Canned Cycle , Thread Cutting

MANUAL PART PROGRAMMING (using G and M codes) in CNC milling

- 1 Part programming for Linear and Circular interpolation and Contour motions.
- 2 Part programming involving canned cycles for Drilling, Peck drilling, and Boring.

SEMESTER : VII

Subject Code : MEP 010

Subject Title : Mechatronics Lab

Structure of the Course Content

List of Experiments

1. Design and testing of fluid power circuits to control
 - (i) velocity (ii) direction and (iii) force of single and double acting actuators
2. Design of circuits with logic sequence using Electro pneumatic trainer kits.
3. Simulation of basic Hydraulic, Pneumatic and Electric circuits using software.
4. Circuits with multiple cylinder sequences in Electro pneumatic using PLC.
5. Servo controller interfacing for open loop
6. Servo controller interfacing for closed loop
7. PID controller interfacing
8. Stepper motor interfacing with 8051 Micro controller
 - (i) Full step resolution (ii) half step resolution
9. Modeling and analysis of basic electrical, hydraulic and pneumatic systems using LAB VIEW
10. Computerized data logging system with control for process variables like pressure flow and temperature.

SEMESTER : VIII

Subject Code : ME 8001

Subject Title : Total Quality Management

Structure of the Course Content

BLOCK 1 Introduction

Unit 1: Quality control and TQC

Unit 2: Customer focus

Unit 3: Total waste elimination

Unit 4: Total employee involvement and TQM Gurus

BLOCK 2 Quality

Unit 1: Quality assurance

Unit 2: Quality of product design and development

Unit 3: Quality of conformance

Unit 4: Quality improvement

BLOCK 3 SPC and SQC

Unit 1: Introduction

Unit 2: Statistics

Unit 3: SPC

Unit 4: SQC

BLOCK 4 ISO

Unit 1: ISO 9000, 9001, 9002, 9003

Unit 2: Bench marking

Unit 3: TQM Implementation

Unit 4: Quality function deployment and policy deployment

BLOCK 5 Value Engineering

Unit 1: Introduction

Unit 2: Concurrent Engineering

Unit 3: Team work

Unit 4: Design of Experiment

Books:

1. Total Quality Management – Dr.K.C.Arora – S.K.Kataria & Sons.
2. Dale H.Besterfield, et al., “Total Quality Management”, Pearson Education, Inc. 2003. (Indian reprint 2004). ISBN 81-297-0260-6.
3. James R.Evans & William M.Lindsay, “The Management and Control of Quality”, (5th Edition), South-Western (Thomson Learning), 2002 (ISBN 0-324-06680-5).
4. Feigenbaum.A.V. “Total Quality Management”, McGraw Hill, 1991.
5. Oakland.J.S. “Total Quality Management”, Butterworth – Heinemann Ltd., Oxford. 1989.
6. Narayana V. and Sreenivasan, N.S. “Quality Management – Concepts and Tasks”, New Age International 1996.
7. Zeiri. “Total Quality Management for Engineers”, Wood Head Publishers, 1991.

SEMESTER : VIII

Subject Code : MEP 011

Subject Title : Automobile Engineering lab

Structure of the Course Content

List of Experiments

1. Dismantling , Overhauling and Assembling of piston and connecting rod assembly.
2. Dismantling , Inspecting , Overhauling and assembling of crankshaft.
3. Dismantling , Inspecting , Overhauling and assembling of Valve actuating mechanism (I head and L head).
4. Adjusting Valve clearance on I head and L type engines.
5. Cylinder bore inspection , measurement , reboring and honing of cylinder block.
6. Removing , Overhauling and Replacing of water pump.
7. Dismantling , Overhauling Assembling and Testing of mechanical fuel pump.
8. Dismantling , Inspecting , Overhauling and assembling of Solex Carburetter.
9. Dismantling , Inspecting and assembling of Inline Diesel pump.
10. Removing , Inspecting , Overhauling , Assembling and testing of fuel injectors.
11. Dismantling , Overhauling assembling and adjusting of clutches (use of clutch adjusting fixture)
12. Dismantling , Overhauling and assembling of sliding mesh , Constant mesh and synchro mesh gear boxes.
13. Dismantling , Overhauling , assembling and adjusting steering gear box and checking steering column end play , cross shaft end play and back lash of steering gear.
14. Front wheel alignment.
15. Dismantling , Inspecting , Overhauling and assembling of Starter motor.
16. Dismantling , Inspecting Overhauling and Assembling of Alternator.
17. Study of Engine Tune up procedure.

SEMESTER : VIII

Subject Code : MEP 012

Subject Title : Project Work

Structure of the Course Content

The objective of the project work is to enable the students in convenient groups of not more than 4 members on a project involving theoretical and experimental studies related to the branch of study. Every project work shall have a guide who is the member of the faculty of the institution. Six periods per week shall be allotted in the time table and this time shall be utilized by the students to receive the directions from the guide, on library reading, laboratory work, computer analysis or field work as assigned by the guide and also to present in periodical seminars on the progress made in the project.

Each student shall finally produce a comprehensive report covering background information, literature survey, problem statement, project work details and conclusion. This final report shall be typewritten form as specified in the guidelines.

ELECTIVES

Subject Code : MEE 001

Subject Title : Heat and Mass Transfer

Structure of the Course Content

BLOCK 1 Conduction

- Unit 1: Introduction
- Unit 2: Conduction with heat generation
- Unit 3: Extended surface Heat transfer
- Unit 4: Applications of Numerical Methods

BLOCK 2 Radiations

- Unit 1: Introduction
- Unit 2: Radiation Shields
- Unit 3: Electrical Analogy
- Unit 4: Gaseous Emission and Absorption

BLOCK 3 Convective Heat Transfer

- Unit 1: Introduction
- Unit 2: Laminar and Turbulent Flows
- Unit 3: Free and Forced Convection
- Unit 4: Flow over bank of tubes

BLOCK 4 Phase change Heat transfer and Heat Exchangers

- Unit 1: Introduction
- Unit 2: Nusselt theory of condensation
- Unit 3: Types of Heat exchangers
- Unit 4: Methods of Analysis

BLOCK 5 Mass Transfer

- Unit 1: Introduction
- Unit 2: Mass diffusion in binary Mixture
- Unit 3: Forced Convective Heat transfer
- Unit 4: Heat and Mass transfer Analogies

Books:

1. Heat and Mass Transfer – R.Yadav – Central Publishing House
2. Sachdeva R C, “Fundamentals of Engineering Heat and Mass Transfer” New Age International, 1995.
3. Yadav R “Heat and Mass Transfer” Central Publishing House, 1995.
4. Ozisik M.N, “Heat Transfer”, McGraw-Hill Book Co., 1994.
5. Nag P.K, “ Heat Transfer”, Tata McGraw-Hill, New Delhi, 2002
6. Holman J.P “Heat and Mass Transfer” Tata McGraw-Hill, 2000.
7. Kothandaraman C.P “Fundamentals of Heat and Mass Transfer” New Age International, New Delhi, 1998
8. Frank P. Incropera and David P. DeWitt, “Fundamentals of Heat and Mass Transfer”, John Wiley and Sons, 1998.
9. Velraj R, “Heat & Mass Transfer”, Ane Books, New Delhi, 2004

Subject Code : MEE 002

Subject Title : Design of Production Tools

Structure of the Course Content

BLOCK 1 Locating and Clamping Devices

Unit 1: Introduction

Unit 2: Locating Principles

Unit 3: Locating Elements

Unit 4: Clamping Devices

BLOCK 2 Jigs

Unit 1: Introduction

Unit 2: Types of Jigs

Unit 3: Automated Drill Jigs

Unit 4: Air Operated Jig Components

BLOCK 3 Fixtures

Unit 1: Introduction

Unit 2: Drilling and Milling Fixtures

Unit 3: Inspection and Welding Fixtures

Unit 4: Modular Fixtures

BLOCK 4 Press Tools

Unit 1: Introduction

Unit 2: Press Working Terminologies

Unit 3: Design and Development of Types of Cutting

Unit 4: Combination Dies

BLOCK 5 Design and Development of Jigs and Fixtures for Given Components

Unit 1: Lathe Components

Unit 2: Drilling Components

Unit 3: Milling Components

Unit 4: Welding and Inspection Components

Books:

1. Design of Jigs, Fixture and Press tools – M.Vijay, C.Elanchezian – Central Publishing House
2. Joshi, P.H. “Jigs and Fixtures”, Second Edition, Tata McGraw Hill Publishing Co., Ltd., New Delhi, 2004.
3. Donaldson, Lecain and Goold “Tool Design”, III rd Edition Tata McGraw Hill, 2000.
4. K. Venkataraman, “Design of Jigs Fixtures & Press Tools”, Tata McGraw Hill, New Delhi, 2005.
5. Kempster, “Jigs and Fixture Design”, Hoddes and Stoughton – Third Edition 1974.
6. Joshi, P.H. “Press Tools” – Design and Construction”, Wheels publishing, 1996.

7. Hoffman “Jigs and Fixture Design” – Thomson Delmar Learning, Singapore, 2004.
8. ASTM Fundamentals of Tool Design Prentice Hall of India.
9. Design Data Hand Book, PSG College of Technology, Coimbatore.

Subject Code : MEE 003

Subject Title : Non Conventional Sources of Energy

Structure of the Course Content

BLOCK 1 Introduction

Unit 1: Role and Potential of new and Renewable source

Unit 2: Environmental Impact on Solar Power

Unit 3: Principle of Solar Radiation

Unit 4: Instruments for Measuring Solar Radiation

BLOCK 2 Solar Energy Collections

Unit 1: Introduction

Unit 2: Classification of Concentrating Collectors

Unit 3: Solar Energy Storage

Unit 4: Photo voltaic Energy Conversion

BLOCK 3 Wind Energy

Unit 1: Introduction

Unit 2: Sources and Potential

Unit 3: Biomass

Unit 4: Applications of Bio gas

BLOCK 4 Geo Thermal Energy

Unit 1: Introduction

Unit 2: Methods of Harnessing

Unit 3: OTEC

Unit 4: Tidal and Wave Energy

BLOCK 5 Direct Energy Conventions

Unit 1: Introduction

Unit 2: MHD

Unit 3: Power Generation Systems

Unit 4: Fuel Cells

Books:

1. Non – Conventioanl Energy Sources – G.D.Rai – Prentice Hall
2. G.D. Rai, Non Conventional Energy Sources, Khanna Publishers, New Delhi, 1999.
3. S.P. Sukhatme, Solar Energy, Tata McGraw-Hill Publishing Company Ltd., New
4. Delhi, 1997.
5. Godfrey Boyle, Renewable Energy, Power for a Sustainable Future, Oxford
6. University Press, U.K., 1996.
7. Twidell, J.W. & Weir, A., Renewable Energy Sources, EFN Spon Ltd., UK, 1986.
8. G.N. Tiwari, solar Energy – Fundamentals Design , Modelling and applications,
9. Narosa Publishing House, New Delhi, 2002.
10. L.L. Freris, Wind Energy Conversion systems, Prentice Hall, UK, 1990.

Subject Code : MEE 004

Subject Title : Computer Integrated Manufacturing

Structure of the Course Content

BLOCK 1 Fundamentals of CAD / CAM

- Unit 1: Computer Aided Design
- Unit 2: Computer Aided Manufacturing
- Unit 3: Computer Integrated Manufacturing
- Unit 4: CIM Architecture

BLOCK 2 Group Technology and Computer Aided Process Planning

- Unit 1: Introduction
- Unit 2: Part Classification and Coding Systems
- Unit 3: Computer Aided Process Planning
- Unit 4: Types of CAPP

BLOCK 3 Computer Integrated Production Management Systems

- Unit 1: Introduction
- Unit 2: MRP I and MRPII
- Unit 3: Shop Floor Control System
- Unit 4: Bar Coding Technology

BLOCK 4 Computer Networks for Manufacturing

- Unit 1: Introduction
- Unit 2: Network Topology
- Unit 3: MAP - TOP
- Unit 4: OSI

BLOCK 5 Flexible Manufacturing Systems

- Unit 1: Introduction
- Unit 2: Computer Control System
- Unit 3: Automated Material Handling System
- Unit 4: Automated Guided Vehicle System

Books:

1. CAD / CAM – P.Groover – Prentice Hall
2. CAD / CAM / CIM – Dr. Radhakrishnan
3. Mikell. P. Groover “Automation, Production Systems and Computer Integrated Manufacturing”, Pearson Education 2001.
4. Mikell. P. Groover and Emory Zimmers Jr., “CAD/CAM”, Prentice hall of India Pvt.Ltd., 1998.
5. James A. Regh and Henry W. Kreabber, “Computer Integrated Manufacturing”, Pearson Education second edition, 2005.
6. Chris McMahon and Jimmie Browne, “CAD CAM Principles, Practice and Manufacturing Management”, Pearson Education second edition, 2005.
7. Ranky, Paul G, “Computer Integrated Manufacturing”, Prentice hall of India Pvt. Ltd., 2005.
8. Yorem Koren, “ Computer Integrated Manufacturing”, McGraw Hill, 2005.
9. P N Rao, “ CAD/CAM Principles and Applications”, TMH Publications, 2007.

Subject Code : MEE 005

Subject Title : Non Conventional Machining Techniques

Structure of the Course Content

BLOCK 1 Electrical Discharge Machining

Unit 1: Introduction

Unit 2: Operating Principle

Unit 3: Process Parameters

Unit 4: Current Developments in EDM

BLOCK 2 Electro Chemical Machining

Unit 1: Introduction

Unit 2: Operating Principle

Unit 3: Process Parameters

Unit 4: Applications of ECM

BLOCK 3 Electron Beam, Laser Beam and Plasma Arc Machining

Unit 1: Electron Beam Machining

Unit 2: Laser Beam Machining

Unit 3: Plasma Arc Machining

Unit 4: Applications

BLOCK 4 Ultrasonic Machining

Unit 1: Introduction

Unit 2: Working Principles

Unit 3: Process Parameters

Unit 4: Applications

BLOCK 5 Abrasive Jet and Water Jet Machining

Unit 1: Abrasive Water Jet Machining

Unit 2: Working Principle and Applications

Unit 3: Water Jet Machining

Unit 4: Working Principles and Applications

Books:

1. Non – Conventional Machining – P.K.Mishra – The Institution of Engineers
2. Text Book of Production Engineering – P.C.Sharma

Subject Code : MEE 006

Subject Title : Composite Materials

Structure of the Course Content

BLOCK 1 Introduction

- Unit 1: Limitations of Conventional Materials
- Unit 2: Definition
- Unit 3: Types and Characteristics
- Unit 4: Applications

BLOCK 2 Materials

- Unit 1: Fibers
- Unit 2: Thermoset Polymers
- Unit 3: Metal Matrix
- Unit 4: Ceramic Composites

BLOCK 3 Manufacturing

- Unit 1: Introduction
- Unit 2: Processes
- Unit 3: Quality Inspection
- Unit 4: Non – Destructive Techniques

BLOCK 4 Mechanics and Performance

- Unit 1: Introduction to Micro Mechanics
- Unit 2: Interlaminar Stresses
- Unit 3: Fatigue Properties
- Unit 4: Impact Properties

BLOCK 5 Design

- Unit 1: Failure Prediction
- Unit 2: Design Considerations
- Unit 3: Optimisation of Laminated Composites
- Unit 4: Applications of FEM for Design

Books:

1. Fiber Reinforced Materials – P.K.Mallick – Monal Deklart Inc.
2. Gibson, R.F., Principles of Composite Material Mechanics, McGraw-Hill, 1994, Second Edition - CRC press in progress.
3. Hyer, M.W., “Stress Analysis of Fiber – Reinforced Composite Materials”, McGraw- Hill, 1998
4. Issac M. Daniel and Ori Ishai, “Engineering Mechanics of Composite Materials”, Oxford University Press-2006, First Indian Edition - 2007
5. Mallick, P.K., Fiber –”Reinforced Composites: Materials, Manufacturing and Design”, Maneel Dekker Inc, 1993.

6. Halpin, J.C., "Primer on Composite Materials, Analysis", Technomic Publishing Co., 1984.
7. Agarwal, B.D., and Broutman L.J., "Analysis and Performance of Fiber Composites", John Wiley and Sons, New York, 1990.
8. Mallick, P.K. and Newman, S., (edition), "Composite Materials Technology: Processes and Properties", Hansen Publisher, Munich, 1990.

Subject Code : MEE 007

Subject Title : Reverse Engineering

Structure of the Course Content

BLOCK 1 Introduction

- Unit 1: Scope of RE
- Unit 2: Tasks of RE
- Unit 3: Domain Analysis
- Unit 4: Process of Duplicating

BLOCK 2 Tools for RE

- Unit 1: Functionality
- Unit 2: Digitising Techniques
- Unit 3: Material Characteristics Evaluation
- Unit 4: Application Prototyping

BLOCK 3 Concepts in RE

- Unit 1: History of RE
- Unit 2: Stage Process of RE
- Unit 3: Technical Data Generation
- Unit 4: Data Verification

BLOCK 4 Data Management

- Unit 1: Introduction
- Unit 2: Software Applications
- Unit 3: Design Experiments to Evaluate RE Tools
- Unit 4: RE of Assembly Programs

BLOCK 5 Integration

- Unit 1: Introduction
- Unit 2: RE Integration
- Unit 3: RE Coordinate Measurement
- Unit 4: Surface and Solid Member

Books:

1. Reverse Engineering – Kethryn, Anglyn – McGrawhill
2. Reverse Engineering – Linda Wills – Kluiver Academy Publishers
3. Data Reverse Engineering – Aiken Peter – MacGraw Hill
4. Coordinate Measurement and Reverse Engineering – Donald R. Honsa – American Gear Manufacturers Association
5. Design Recovery and Maintenance and Reuse – T.J. Biggerstaff – IEEE Corporations

Subject Code : MEE 008

Subject Title : Environmental Science and Engineering

Structure of the Course Content

BLOCK 1 Environment, Ecosystem and Bio diversity

- Unit 1: Environmental
- Unit 2: Ecosystem
- Unit 3: Ecological Pyramid
- Unit 4: Biodiversity

BLOCK 2 Environmental Pollution

- Unit 1: Air Pollution and Water Pollution
- Unit 2: Soil Pollution and marine Pollution
- Unit 3: Noise and Thermal Pollution
- Unit 4: Nuclear Hazards

BLOCK 3 Natural Resources

- Unit 1: Forest Resources
- Unit 2: Food resources
- Unit 3: Energy Resources
- Unit 4: Land resources

BLOCK 4 Social Issue and the Environment

- Unit 1: Introduction
- Unit 2: Urban Problems related to Energy
- Unit 3: Role of Non Government Organisation
- Unit 4: Wild Life Protection Act

BLOCK 5 Human Pollution and Environment

- Unit 1: Population Growth among various Nations
- Unit 2: Environment and Human Health
- Unit 3: Human Rights
- Unit 4: Value Education

Books:

1. Environmental Engineering and Science – Gilbert M.Masters – Person Education
2. Gilbert M.Masters, ‘Introduction to Environmental Engineering and Science’, 2nd edition, Pearson Education (2004).
3. Benny Joseph, ‘Environmental Science and Engineering’, Tata McGraw-Hill, New Delhi, (2006).
4. R.K. Trivedi, ‘Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards’, Vol. I and II, Enviro Media.

5. Cunningham, W.P. Cooper, T.H. Gorhani, 'Environmental Encyclopedia', Jaico Publ., House, Mumbai, 2001.
6. Dharmendra S. Sengar, 'Environmental law', Prentice hall of India PVT LTD, New Delhi, 2007.
7. Rajagopalan, R, 'Environmental Studies-From Crisis to Cure', Oxford University Press (2005)