ANNA UNIVERSITY
Chennai-25.
Syllabus for
B.E.(Full Time) Civil Engineering

CM125 Chemistry I   **3   0   0   100**

1.   CHEMICAL THERMODYNAMICS   9

Definition of free energy and spontaneity - Maxwell relations - Gibbs-Helmholtz equation - Van't hoff equations - Stoichiometry and energy balances in Chemical reactions.

2.   DYNAMICS OF CHEMICAL PROCESSES   10

Basic concepts - composite reactions (opposing, parallel and consecutive reactions) - Collision theory - Thermodynamic formulation of reaction rates - unimolecular reactions - Chain reactions (Stationary and non-stationary) - Enzyme Kinetics - Michaelis - Menten Equation.

3.   ELECTRODICS   8

Types of electrodes and cells - Nernst Equation - emf measurement and its applications - Principles of chemical and electrochemical corrosion - corrosion control (Sacrificial anode and impressed current methods).

4.   WATER   8

Water quality parameters - Definition and expression - Estimation of hardness (EDTA method) - Alkalinity (Titrimetry) - Water softening (zeolite) - Demineralisation (Ion- exchangers) and desalination (RO) - Domestic water treatment.

5.   POLYMERS   10

Monomer - Functionality - Degree of polymerisation - Classification based on source and applications - Addition, Condensation and copolymerisation - Mechanism of free -radical polymerisation - Thermoplastics and thermosetting plastics - Processing of plastics - Injection moulding, blow moulding and extrusion processes.

Total No of periods: 45

CM125 Chemistry I   **3   0   0   100**

Text Books:

1. Alkins P.W., " Physical Chemistry ", ELBS, IV Edition, 1998, London.

References:

1. Balasubramanian M.R., Krishnamoorthy S. and Murugesan V., " Engineering Chemistry ",
    Allied Publisher Limited., Chennai, 1993.
2. Karunanidhi M., Ayyaswamy N., Ramachandran T and Venkatraman H., " Applied Chemistry ",
    Anuradha Agencies, Kumbakonam , 1994.
3. Sadasivam V., " Modern Engineering Chemistry - A Simplified Approach ", Kamakya Publications,
    Chennai , 1999.
4. Kuriakose, J.C. and Rajaram J., " Chemistry in Engineering and Technology ", Vol. I and II,
    Tata McGraw-Hill Publications Co.Ltd, New Delhi ,1996.
5. Jain P.C. and Monica J., " Engineering Chemistry ", Dhanpat Rai Publications Co.,(P) Ltd.,
    New Delhi, 1998.

GE131 Engineering Mechanics   3   1   0   100

1.   BASICS   5

Introduction - Units and Dimensions - Laws of Mechanics - Vectors - Vectorial representation of forces and moments - Vector operations.

2.   STATICS OF PARTICLES   8

Coplanar Forces - Resolution and Composition of forces - Equilibrium of a particle - Forces in space - Equilibrium of a particle in space - Equivalent systems of forces - Principle of transmissibility - single equivalent force.

3.   EQUILIBRIUM OF RIGID BODIES   7

Free body diagram - Types of supports and their reactions - requirements of stable equilibrium - Equilibrium of Rigid bodies in two dimensions - Equilibrium of rigid bodies in three dimensions.

4.   PROPERTIES OF SURFACES AND SOLIDS   12

Determination of Areas and Volumes - First moment of area and the centroid - second and product moments of plane area - Parallel axis theorems and perpendicular axis theorems - Polar moment of inertia - Principal moments of inertia of plane areas - Principal axes of inertia - Mass moment of inertia - relation to area moments of inertia.

5.   FRICTION   4

Frictional Force - Laws of Coloumb friction - Simple Contact friction - Rolling Resistance - Belt Friction.

6.   DYNAMICS OF PARTICLES   16

Displacement, Velocity and acceleration their relationship - Relative motion - Curvilinear motion - Newton's Law - Work Energy Equation of particles - Impulse and Momentum - Impact of elastic bodies.

7.   ELEMENTS OF RIGID BODY DYNAMICS   8

Translation and Rotation of Rigid Bodies - Velocity and acceleration - General Plane motion - Moment of Momentum Equations - Rotation of rigid Body - Work energy equation.

Total No of periods: 60

GE131 Engineering Mechanics   3   1   0   100

Text Books:

1. Beer and Johnson, " Vector Mechanics for Engineers ", Vol. 1 " Statics " and
   Vol. 2 " Dynamics ", McGraw Hill International Edition, 1995.
2. Merriam, " Engineering Mechanics ", Vol.1 " Statics " and Vol.2 " Dynamics 2/e ",
   Wiley International, 1988.

References:

1. Rajasekaran S. and Sankara Subramanian, G., " Engineering Mechanics - Statics and
   Dynamics ".
2. Irving, H., Shames, " Engineering Mechanics - Statics and Dynamics ", Thrid Edition,
   Prentice-Hall of India Pvt.Ltd., 1993.
3. Mokoshi, V.S., " Engineering Mechanics ", Vol.1 " Statics " and Vol.2 " Dynamics ",
   Tata McGraw Hill Books, 1996.
4. Timoshenko and Young, " Engineering Mechanics ", 4/e, McGraw Hill, 1995.
5. McLean, " Engineering Mechancis ", 3/e, SCHAUM Series, 1995.

MA131 Mathematics I   **3   1   0   100**

.   **(Revised Syllabus For B.E. / B.Tech. Programmes - Effective From June 2002)**

1.   MATRICES   9

Characteristic equation - Eigen values and eigen vectors of a real matrix. Some properties of eigen values, Cayley-Hamilton theorem, Orthogonal reduction of a symmetric matrix to diagonal form - Orthogonal matrices - Reduction of quadratic form to canonical form by orthogonal transformation.

2.   THREE DIMENSIONAL ANALYTICAL GEOMETRY   9

Direction cosines and ratios - Angle between two lines - Equation of a plane - Equation of a straight line - Co-planer lines - Shortest distance between skew lines - Sphere - Tangent plane - Plane section of a sphere - orthogonal spheres.

3.   GEOMETRICAL APPLICATIONS OF DIFFERENTIAL CALCULUS   9

Curvature - cartesian and polar coordinates - Circle of curvature - Involutes and Evolutes - Envelopes - properties of envelopes - Evolute as envelope of normals.

4.   FUNCTIONS OF SEVERAL VARIABLES   9

Functions of two variables - Partial derivatives - Total differential - Differentiation of implicit functions - Taylor's expansion - Maxima and Minima - Constrained Maxima and Minima by Lagrangean Multiplier method - Jacobians - differentian under integral sign.

5.   ORDINARY DIFFERENTIAL EQUATIONS   9

Simultaneous first order linear equations with constant coefficients - Linear equations of second order with constant and variable coefficients - Homogeneous equation of Euler type - equations reducible to homogeneous form - Method of reduction of order - Method of variation of parameters.

6.   TUTORIAL   15

Total No of periods: 60

MA131 Mathematics I   **3   1   0   100**

Text Books:

1. *Kreyszig, E., " Advanced Engineering Mathematics " (8th Edition), John Wiley and Sons (Asia) Pte Ltd., Singapore, 2001*
2. *Veerarajan, T., " Engineering Mathematics ", Tata McGraw Hill Publishing Co., NewDelhi, 1999.*

References:

1. *Grewal, B.S., " Higher Engineering Mathematics " (35th Edition), Khanna Publishers, Delhi , 2000.*
2. *Kandasamy, P., Thilagavathy, K., and Gunavathy, K., " Engineering Mathematics ", Volume I (4th Revised Edition), S. Chand & Co., New Delhi, 2000.*
3. *Narayanan, S., Manicavachagom Pillay, T.K., Ramanaiah, G., " Advanced Mathematics for Engineering Students ", VolumeI (2nd Edition), S. Viswanathan (Printers & Publishers), 1992.*
4. *Venkataraman, M.K. " Engineering Mathematics - First year " National Publishing Company, Chennai (2nd Edition), 2000.*

| PH125 Physics I | 3 | 0 | 0 | 100 |

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1. PROPERTIES OF MATTER 9

Elasticity - stress-strain diagram-factors affecting elasticity - Twisting couple on a wire-Shafts-Torsion pendulum-Depression of a cantilever- Young's modulus by cantilever-Uniform and Non Uniform bending-I shape girders-Production and measurement of high vacuum-Rotary pump-Diffusion pump-Pirani Gauge-Penning gauge-Viscosity-Oswald Viscometer-Comparision of viscosities.

2. ACOUSTICS 9

Acoustics of buildings-Absorption coefficient-Intensity-Loudness-Reverberation time-Sabine's formula-Noise pollution-Noise control in a machine-Ultrasonics-production-Magnetostriction and Piezoelectric methods-Applications of ultrasonics in Engineering and Medicine.

3. HEAT AND THERMODYNAMICS 9

Thermal conductivity-Forbe's and Lee's Disc methods-Radial flow of heat-Thermal conductivity of rubber and glass-Thermal insulation in buildings-Laws of thermodynamics-Carnot's cycle as heat engine and refrigerator-Carnot's theorem-Ideal Otto and Diesel engines-Concept of entropy-Entropy Temperature diagram of carnot's cycle.

4. OPTICS 9

Photometry-Lummer Brodhum photometer-Flicker Photometer-Antireflection coating-Air wedge-Testing of flat surfaces-Michelson's Interferometer and its applications-Photoelasticity and its applications-Sextant-Metallurgical microscope-Scanning electron microscope.

5. LASER AND FIBRE OPTICS 9

Principle of lasers-laser characteristics-Ruby-NdYAG, He-Ne, CO_2 and semiconductor lasers-propagation of light through optical fibers-types of optical fibre-Applications of optical fibres as optical waveguides and sensors.

Total No of periods: 45

PH125 Physics I   3   0   0   100

Text Books:

1. Arumugam.M., " Engineering Physics ", Anuradha Publications, 1998.

References:

1. Resnik R. and Halliday D., " Physics ", Wiley Eastern, 1986.
2. Nelkon M. and Parker.P., " Advanced Level Physics ", Arnald-Heinemann, 1986.
3. Vasudeva A.S., " Modern Engineering Physics ", S. Chand and Co., 1998..
4. Gaur, R.K., and Gupta, S.L., " Engineering Physics ", Dhanpat Rai and Sons, 1988.
5. Mathur, D.S, " Elements of properties of Matter ", S.Chand & Co., 1989.

CM126 Chemistry Lab   0   0   2   100

.   **30**

1. Preparation of standard solutions.
2. Estimation of hardness of water by EDTA method
3. Estimation of different types and amounts of alkalinity in water - Indicator method
4. Determination of dissolved oxygen - Winkler's method.
5. Estimation of iron in water - Spectrophotometric method.
6. Estimation of sodium in water - Flame Photometric method
7. Determination of molecular weight of polymers-Viscometric method.
8. Determination of total dissolved solids in water.
9. Corrosion experiments:
   * Corrosion rate measurements
   * Inhibition efficiency.
10. Electrochemistry experiments:
   * Determination of emf.
   * Single electrode potential
   * Potentiometric and conductometric titration

Total No of periods: 30

GE132 Computer Practice I   1   0   3   100

1.   **FUNDAMENTALS OF COMPUTERS AND OPERATING SYSTEMS**   **4**

Evolution of Computers - Organization of Modern Digital Computers-Single user Operating System-Multitasking OS-GUI

2.   **OFFICE AUTOMATION**   **11**
a) Word Processing
b) Data Base Management System
c) Spread Sheet Package
d) Presentation Software

3.   **PRACTICALS**   **45**

Total No of periods: 60

Text Books:

1. Ghosh Dastidar, Chattopadhyay and Sarkar, " Computers and Computation - A Beginner's Guide ", Prentice Hall of India, 1999.

References:

1. Nelson, Microsoft Office 97, Tata McGraw Hill, 1999.
2. Taxali, " PC Software for Windows Made Simple ", Tata McGraw Hill, 1999.

GE133 Workshop Practice   0   0   4   100

1.   **SHEET METAL**   **10**

Tools and Equipments - Fabrication of tray, cone, etc., with sheet metal

2.   **WELDING**   **10**

Tools and Equipemts - Arc Welding of butt joint, Tap Joint, Tee fillet etc., Demonstration of gas welding.

3.   **FITTING**   **10**

Tools and Equipments- Practice in Chipping, Filling, Drilling - making Vee joints, square and dove tail joints.

4.   **CARPENTRY**   **10**

Tools and Equipments-Planning Practice-making halving joint and dove tail joint models.

5.   **FOUNDRY**   **10**

Tools and Equipments Preparation of moulds of simple objects like flange, gear V- grooved pulley etc.

6.   **SMITHY**   **10**

Tools and Equipments - Demonstration for making simple parts like keys, bolts etc.

                                                        Total No of periods: 60

GE133 Workshop Practice   0   0   4   100

References:

1. *Venkatachalapathy V.S., " First Year Engineering Workshop Practice ",*
    Raamalinga Publications, Madurai, 1999.
2. *Kanaiah P.and Narayana K.C., " Manual on Workshop Practice Scitech Publications ",*
    Chennai, 1999.

PH126 Physics Lab   0   0   2   100

1.   **PRACTICALS**   **30**

1. Young's modulus by non uniform bending.
2. Rigidity modulus and moment of inertia using Torsion Pendulum
3. Viscosity of a liquid by Poiseuille's method.
4. Wavelength determination using grating by Spectrometer.
5. Particle size determination by Laser
6. Thermal conductivity by Lees' disc.
7. Thickness of wire by Air wedge.
8. Thermo emf measurement by potentiometer.

Total No of periods: 30

AG151 Engineering Geology   **3   0   0   100**

1.   GENERAL GEOLOGY   9

Geology in Civil Engineering - Branches of geology - Earth Structure and composition - Elementary knowledge on continental drift and plate techtonics. Earth processes - Weathering - Work of rivers, wind and sea and their engineering importance - Earthquake belts in India. Groundwater - Mode of occurence - prospecting - importance in civil engineering.

2.   MINERALOGY   9

Elementary knowledge on symmetry elements of important crystallographic systems - physical properties of minerals - study of the following rock forming minerals - Quartz family. Feldpar family, Augite, Hornblende, Biotite, Muscovite, Calcite, Garnet - properties, behaviour and engineering significance of clay minerals - Fundamentals of process of formation of ore minerals - Coal and Petroleum - Their origin and occurence in India.

3.   PETROLOGY   9

Classification of rocks - Distinction between Igneous, Sedimentatary and Metamorphic rocks. Decription occurence, engineering properties and distribution of following rocks. Igneous rocks - Granite, Syenite, Diorite, Gabbro, Pegmatite, Dolerite and Basalt Sedimentary rocks sandstone, Limestone, Shale Conglo, Conglomerate and breccia. Metamorphic rocks, Quartzite, Marble, Slate, Thyllite, Gniess and Schist.

4.   STRUCTURAL GEOLOGY AND GEOPHYSICAL METHOD   9

Attitude of beds - Outcrops - Geological maps - study of structures - Folds, Faults and points - Their bearing on engineering Construction. Seismic and Electrical methods for Civil Engineering investigations.

5.   GEOLOGICAL INVESTIGATIONS IN CIVIL ENGINEERING   9

Remote sensing techniques - study of air photos and satellite images - Interpretation for Civil Engineering Projects - Geological conditions necessary for construction of Dams, Tunnels, Buildings, Road cuttings, Lad slides - causes and preventions. Sea erosion and coastal Protection.

Total No of periods: 45

AG151 Engineering Geology   3   0   0   100

Text Books:

1. Parbin Singh, " Engineering and General Geology ", Katson Publication House, 1987.
2. Krynine and Judd, " Engineering Geology and Geotechniques ",
   McGraw Hill Book Company, 1990.

References:

1. Legeet, " Geology and Engineering ", McGraw Hill Book Company, 1998.
2. Blyth, " Geology for Engineers ", ELBS, 1995.

CE131 Building Science I   3   0   0   100

1.   STONES   5

Classification - Selection - Application of stone in buildings - Requirement and testing of stones - Deterioration and preservation of stone work - Artificial stones.

2.   BRICKS AND BUILDING BLOCKS   10

Manufacture of bricks - classification - Qualities - Test on Bricks - Fire bricks - building blocks types and uses - joist and filter blocks - Curved shell units - Light weight concrete blocks.

3.   MORTAR - CEMENT - CONCRETE   10

Classification of mortar - Preparation - Selection of mortar - Tests for mortars - Manufacture of cement - Types of cement - Characteristics - Aggregates - Basic Characteristics - Types of aggregates - Admixtures - Properties of fresh concrete - Properties of hardened concrete - Slump Test - Vebe test - Flow test - Compacting factor test - Types of Concrete.

4.   MATERIALS FOR BUILDINGS SERVICES   10

Timber - Market forms - Industrial timber - Plywood Veneer - Thermocole - Panels of laminates - Steel - Composition - uses - Market forms - Mechanical treatment - Paints - Vanishes - Distempers.

5.   SPECIAL MATERIALS   10

Glass - Ceramics - Sealants for joints - Sheets for pitched roof coverings - Fibre glass reinforced plastic - Clay products - Refractories - Composite materials - Types - Applications of laminar composites - Fibre textiles - mats and pads for earth reinforcement - Recycling of Industrial waste as building material - Polymers in Civil Engineering.

                                                    Total No of periods: 45

CE131 Building Science I   3   0   0   100

Text Books :

1. Rangwala, S.C., " Engineering Materials ", Charotar Publishing House, Anand, 1997.
2. Surendra Singh, " Building Materials ", Vikas Publishing Company, New Delhi, 1996.

References:

1. Neil Jackson and Ravindrakumar Dhir, " Civil Engineering Materials ".
2. National Building Code of India, " Building Materials ", Part V, 1983.

EC151 Electronics Engineering   2   0   0   100

1.   **SEMICONDUCTORS**   6

Classification of solids as conductors and semiconductors - Intrinsic, Extrinsic semiconductors - P type and N type semiconductors - Junction diode - Zener effect - Zener diode - VI characteristics of junction and Zener diodes.

2.   **TRANSISTORS**   6

Bipolar Junction Transistor - CB, CE, CC-Configurations - Simple treatment of characteristics and biasing. Elementary treatment of FET, MOSFET, UJT, DIAC and TRIAC.

3.   **BASIC ELECTRONIC CIRCUITS**   6

Rectifiers - Votage Regulators - CB, CE, CC amplifer circuits - SCR circuit and one application - Principle of feedback and sinusoidal oscillators.

4.   **LINEAR INTEGRATED CIRCUITS**   5

Multivibrators - Operational Amplifier - Adder, Multiplier, Integrator, Differentiator and Filters.

5.   **DIGITAL ELECTRONICS**   7

Binary number system - AND, OR, NOT, NAND, NOR circuits - half and Full Address - Principal of register and counter - Qualitive treatment of A/D and D/A conversion - Principle of Digital Computer.

Total No of periods: 30

EC151 Electronics Engineering   **2   0   0   100**

Text Books :

1. Mehta V.K., " Principle of Electronics ", S.Chand and Company Limited, 1994.

References:

1. Malvino & Leach, " Digital Principal and Applications ", McGraw Hill, 1986.
2. Milman & Halkias, " Integrated Electronics ", McGraw Hill, 1979.

EE151 Electrical Engineering   2   0   0   100

1.   **ELECTRICAL CIRCUITS**   9

Ohms Law - Kirchoff's Laws - steady state solution of DC circuits - Introduction to AC circuits - Waveforms and RMS value - power and power factor, single phase and 3 phase balanced circuits.

2.   **ELECTRICAL MACHINES**   15

Principles of operation and characteristics of DC machines, Transformers (single phase and three phase) - Synchronous Machines - 3 Phase and single phase Induction motors - (op. principles).

3.   **ELECTRICAL MEASUREMENTS**   6

Moving coil and moving iron instruments (Ammeter and Voltmeter) Dynamometer type watt meters and energy meters (op. principles).

4.   **PRACTICAL**   30

                                              Total No of periods: 60

Text Books:

1. *Mittle, V.N., " Basic Electrical Engineering ", TMH Edition, New Delhi, 1990.*
2. *Del Toro, " Electrical Engineering Fundamentals ", Prentice Hall of India Pvt.Ltd.,*
   New Delhi, Second Edition.

References:

1. *Jimmie J.Cathey and Nasar, S.A., " Basic Electrical Engineering ", Schaurn outline series in*
   Engineering, McGraw Hill Book Co.1987.
2. *Deshpande, N.V., " Electrical Machines " A.A.Wheeler and Co. Ltd., New Delhi, 1994.*

MA132 Mathematics II   **3   1   0   100**

.   **(Revised Syllabus For B.E. / B.Tech. Programmes - Effective From June 2002)**

1.   MULTIPLE INTEGRALS   9

Double integration in Cartesian and polar coordinates - Change of order of integration - Area as a double integral - Triple integration in Cartesian coordinates - Change of variables - Gamma and Beta functions.

2.   VECTOR CALCULUS   9

Curvilinear coordinates - Gradient, Divergence, Curl - Line, surface & volume integrals - Statements of Green's, Gauss divergence and Stokes' theorems - Verification and applications.

3.   ANALYTIC FUNCTIONS   9

Cauchy Riemann equations - Properties of analytic functions - Determination of harmonic conjugate - Milne-Thomson's method - Conformal mappings : Mappings
$w = z + a$, az, $1/z$, $z2$ and bilinear transformation.

4.   COMPLEX INTEGRATION   9

Cauchy's theorem - Statement and application of Cauchy's integral formulae - Taylor's and Laurent's expansions - Singularities - Classification - Residues - Cauchy's residue theorem - Contour integration - Circular and semi Circular contours (excluding poles on real axis).

5.   STATISTICS   9

Moments - Coefficient of correlation - Lines of regression -   Tests based on Normal and t distributions, for means and difference of means - Chi Square test for goodness of fit.

Total No of periods: 45

MA132 Mathematics II   3   1   0   100

Text Books:

1. *Kreyszig, E., " Advanced Engineering Mathematics " (8th Edition), John Wiley and Sons, (Asia)*
   Pte Ltd.,Singapore, 2000.
2. *Grewal, B.S., " Higher Engineering Mathematics " (36th Edition), Khanna Publishers, Delhi 2001*

References:

1. *Kandasamy, P., Thilagavathy, K., and Gunavathy, K., " Engineering Mathematics ", Volumes I & II*
   (4th Revised Edition), S. Chand   & Co., New Delhi, 2001.
2. *Narayanan, S., Manicavachagom Pillay, T.K., Ramanaiah, G., " Advanced Mathematics for*
   Engineering Students ", Volumes I & II   (2ndEdition), S.Viswanathan (Printers & Publishers,
   Pvt, Ltd.), 1992.
3. *Venkataraman, M.K. " Engineering Mathematics III - A ", National Publishing Company,*
   Chennai, (13th Edition), 1998.

ME151 Mechanical Engineering   2   0   0   100

1.   **SIMPLE MACHINES**   5

Lifting machines - Cranes - Principle of operation - different types - law of a machine - automatic forklifts. Drilling machines - rock drilling - submerged drilling - oil drilling. Trouble shooting and maintenance procedures.

2.   **ENERGY SYSTEMS**   10

Principle of Internal and external combustion engines - auto engine - diesel engine. Electricity generation - hydro - thermal - nuclear- solar power plants layout and principle of operation. Environment friendly systems - energy efficiency.

3.   **ENERGY RESOURCES**   5

Conventional and non-conventional energy resources - availability - principle of taping. Envirnomental concerns - global warming - ozone depletion - environment labeling - criteria for sustainable development.

4.   **FOUNDRY TECHNOLOGY**   5

Moulding process - properties of moulding sand - methods of moulding - tools and equipments used. Study of typical sand mould. Casting - different methods - melting furnaces - Cupola - defects in casting - inspection of casting.

5.   **METAL FORMING**   5

Hot and cold forming. Welding processes - arc & gas welding - AC & DC welding equipments -TIG - MIG - Submerged arc - Thermal welding, Brazing and soldering.

Total No of periods: 30

ME151 Mechanical Engineering   2   0   0   100

Text Books:

1. Rao P.N., " Manufacturing Technology " , 2nd Edition, Tata McGraw Hill Inc., New Delhi.
2. Khurmi R.S.& Gupta J.K., " A Text Book of Thermal Engineering (Mechanical Technology) " ,
   S.Chand &Co., New Delhi, 1999.

References:

1. Campbell J.S., " Principles of Manufacturing Materials and Processes " , 14th Edition,
   Tata McGraw Hill.Inc., New Delhi, 1995.
2. Rai G.D., " Energy Sources " , Khanna Publishers, New Delhi, 1996.

GE134 Engineering Graphics   1   0   3   100

1.   PRINCIPLES OF GRAPHICS   16

Two dimensional geometrical construction - Conic sections, involutes and cycloids - Representation of three dimensional objects - Principles of projections - standard codes of principles.

2.   ORTHOGRAPHIC PROJECTIONS   28

Projections of points, straight line and planes - ' Auxiliary projections '- Projection and sectioning of solids - Intersection of surfaces - Development of surfaces.

3.   PICTORIAL PROJECTIONS   8

Isometric projections - ' Perspectives '- Free hand sketching.

4.   COMPUTER GRAPHICS   8

Hardware - Display technology - Software - Introduction to drafting software.

Total No of periods: 60

Text Books:

1. Narayanan, K.L., and Kannaiah, P., " Engineering Graphics ", Tata McGraw-Hill Publishers Co., Ltd., 1992.

References:

1. William M. Neumann and Robert F.Sproul, " Principles of Computer Graphics ", McGraw Hill, 1989.
2. Warren J. Luzzadder and John M. Duff, " Fundamentals of Engineering Drawing ", Prentice-Hall of India Private Ltd., Eastern Economy Edition, 1995.
3. Natarajan K.V., " A Text Book of Engineering Drawing ", Private Publication, Madras, 1990.
4. Mathur, M.L. and Vaishwanar, R.S., " Engineering Drawing and Graphics ", Jain Brothers, New Delhi, 1993.

GE135 Computer Practice II   1   0   3   100

1.   MULTIUSER OPERATING SYSTEM   4

Unix: Introduction - Basic Commands - Vi editor - filters - Input/output redirection - piping - transfer of data between devices - shell scripts.

2.   FUNDAMENTALS OF NETWORKING   3

Working on a networked environment - Accessing different machines from one node - concept of E-mail - Uses of Internet.

3.   HIGH LEVEL LANGUAGE PROGRAMMING   8

C Language: Introduction - Operator - Expressions - Variables - Input/output statements - control statements - function arrays - pointer - structures - unions - file handling - case studies.

4.   TUTORIAL   45

Total No of periods: 60

Text Books and References:

1. Stephan J. Kochen & Patrick H. Wood, " Exploring the UNIX System ", Techmedia, 1999.
2. Maurice J. Bach, " The design of UNIX Operating Systems ", Prentice Hall of India, 1999.
3. Ramos, " Computer Networking Concepts ", Prentice Hall International, 1999.
4. Balagurusamy, " Programming in ANSI C ", Tata McGraw Hill, 1999.
5. Kernighan and Ritchie, " The C Programming Language ", Prentice Hall of India, 1999.
6. Gottfried, " Programming with C ", Tata McGraw Hill, 1999.
7. Kutti, " C and UNIX Programming: A Conceptual Perspective ", Tata McGraw Hill, 1999.
8. Eric Nagler, " Learning C++ ", M/s. Jaico Publishing Co., 1998-99.

CE231 Mechanics of Solids   3   1   0   100

1.   STRESS, STRAIN AND DEFORMATION OF SOLIDS   6

Rigid bodies and deformable solids - Stability, strength and stiffness - tension, compression and shear stresses - Deformation of simple and compund bars - Thermal Stresses - Elastic Constants.

2.   ANALYSIS OF PLANE TRUSSES   6

Stability and equilibrium of plane frames - perfect frames - types of trusses - analysis of forces in truss members - Method of joints - Method of tension coefficients - Method of sections.

3.   TRANSVERSE LOADING ON BEAMS   6

Beams - Types and transverse loading on beams - Shear force and bending moment in beams - Cantilevers - Simply supported beams and over-hanging beams.

4.   STRESSES IN BEAMS   6

Theory of simple bending - analysis of stresses - Load carrying capacity - Proportioning sections - Leaf springs - Flitched bearms - Shear stress distribution - shear flow.

5.   TORSION   7

Stresses and deformation in circular and hollow shafts - Stepped shafts - shafts fixed at the both ends - Stresses in helical springs - Deflection of springs - Design of buffer springs.

6.   ANALYSIS OF STATES OF STRESS (TWO DIMENSIONAL)   7

Biaxial state of stress - Thin cylinders and shells - Deformation of thin Cylinders and shells - Stresses at a point - Stress as tensor - Stresses on inclined planes - Principal stresses and principal planes - Mohr's circle of stress.

7.   DEFLECTION OF BEAMS   7

Double integration method - Macaulay's method - Area moment theorems for computation of slopes and deflections in beams - Conjugate beam method.

8.   TUTORIAL   15

Total No of periods: **60**

CE231 Mechanics of Solids   **3   1   0   100**

Text Books:

1. Egor P. popov, " Engineering Mechanics of Solids ", Prentice Hall of India,
   New Delhi, 1997.
2. Srinath L.N., " Advanced Mechanics of Solids ", Tata McGraw Hill Publishing
   Company Ltd., New Delhi.

References:

1. Junarkar S.B., " Mechanics of Structures ", Vol. 1, 21st Edition,
   Charotar Publishing House, Anand, India, 1995.
2. Kazimi S.M.A., " Solid Mechanics ", Tata McGrawHill Publishing Company,
   New Delhi, 1991.
3. Laudner T.J. and Archer R.R., " Mechanics of Solids in Introduction",
   McGrawHill International Editions, 1994.
4. William A. Nash, " Theory and Problems of Strength of Materials", Schaum's
   Outline Series, McGraw Hill International Editions, Third Edition, 1994.
5. Elangovan A., " Thinmavisaiyiyal (Mechanics of solids in Tamil) ",
   Anna University, Chennai, 1995.

CE232 Building Science II   3   0   0   100

1. PRELIMINARY INVESTIGATION   9

Principles of Planning - Planning regulations and bye-laws - Site works and setting out - Excavations and Timbering - Sub soil drainage - Electrictiy Lighting on Building sites - Winter building - Preparation of layout - Site Plan - Orientation of buildings.

2. FOUNDATION   6

Bearing capacity of soils - Soil investigations - Plate load Test - Methods of Improving bearing capacity - Shallow Foundation - Deep Foundations - Machine Foundations.

3. SUPER STRUCTURE   5

Stone and Brick masonry - Composite masonry Load bearing walls - Cavity Walls - Partition walls - Reinforced Brick masonry.

4. FLOORING   5

Ground floors - Components - Types - suspended flooring - Upper floors - Types - Methods of laying.

5. ROOFS   5

Types of roofs -Types of Pitched roof - Shell roofs - Folded Plate roofs - Constructional Practices - Roof covering details.

6. STAIRCASES   5

Requirement of a good staircase - Types of staircase calculation for geometry - Ramps, Escalators, Lifts, Types - Handling Capacity.

7. BUILDING SERVICES   5

Water Supply - Drainage - Ventilation - Damp proofing - Acoustiv Treatment - Thermal Insulation Termite Proofing - Fire Protection.

8. PREFABRICATION   5

Principles - Advantages and disadvantages - Types of prefabricates - Standardization - Basic, nominal and actual dimensions - Tolerances - Joints Production - Transportation - Erection - Cranes merits and demerits.

                                                              Total No of periods: 45

CE232 Building Science II   **3   0   0   100**

Text Books:

1. Arora S.P. and Bindra S.P., " Building Construction Planning Techniques and method of Construction " , Dhanpat Rai and Sons, New Delhi, 1997.
2. Punmia B.C., Ashok Kumar Jain, Arun Kumar Jain, " Building Construction ", Laxmi Publications Pvt.Ltd., New Delhi, 1997.

References:

1. Chudley.R., " Construction Technology ", Vol.1,2,3,4. ELBS Publisher, 1997.
2. " National Building Code of India ", Parts III,IV,VII and IX, 1983.

CE233 Fluid Mechanics   3   1   0   100

1.   DEFINITIONS AND FLUID PROPERTIES   5

Definitions - Fluid and Fluid Mechanics - Dimensions and units - Fluid properties - Continum - Concept of system and control volume.

2.   FLUID STATISTICS   8

Pascal's law and Hydrostatic equation - Forces on plane and curved surfaces - Buoyancy - Pressure measurement.

3.   FLUID KINEMATICS   6

Stream, streak and path lines - Classification of flows - Continuity equation - Stream and potential functions - Flow nets - Velocity measurement.

4.   FLUID DYNAMICS   10

Euler and Bernoulli's equations - Application of Bernoulli's equation - Discharge measurement - Laminar flows through pipes and between plates - Hagen Poiseuille equation - Turbulent flow - Darcy Weisbach formula - Moody diagram - Momentum Principle - Impact of jets on plane and curved plates.

5.   BOUNDARY LAYER AND FLOW THROUGH PIPES   10

Definition of boundary layer - Thickness and classification - Displacement and momentum thicknesses - Development of Laminar and Turbulent flows in circular pipes - Major and minor losses of flow in pipes - Pipes in series and in parellel - Pipe network.

6.   SIMILITUDE AND MODEL STUDY   6

Dimensional analysis - Rayleigh's method - Buckingham P -Theorem - similitude and models - Scale effect and distorted models.

7.   TUTORIAL   15

                                                    Total No of periods: 60

CE233 Fluid Mechanics   **3   1   0   100**

Text Books:

1. Kumar K.L., " Engineering Fluid Mechanics ", Eurasia Publishing House (P) Ltd.,
   New Delhi, 1995.
2. Fox, Robert W. and McDonald, Alan T., " Introduction to Fluid Mechanics ",
   John Willey & Sons, 1995.

References:

1. Streeter, Victor L. and Wylie, Benjamin E., " Fluid Mechanics ", McGraw-Hill Ltd., 1998.
2. Natarajan M.K., " Principles of Fluids Mechanics ", Anuradha Agencies, Vidayal Karuppur,
   Kumbakonam, 1995.

CE234 Surveying I   3   0   0   100

1. INTRODUCTION AND CHAIN SURVEYING   8

Definition - Principles - Classification - Fields and office work - Scales - Conventional signs - Survey instruments, their care and adjustment - Ranging and chaining - Reciprocal ranging - Setting perpendiculars - well-conditioned trainagles - Traversing - Plotting - Enlarging and Reducing figures.

2. COMPASS SURVEYING AND PLANE TABLE SURVEYING   7

Prismatic compass - Surveyor's compass - Bearing - Systems and conversions - Local attraction - Magnetic declination - Dip - Traversing - Plotting - adjustment of error - Plane table instruments and accessories - Merits and demerits - Methods - Radiation - Intersection - Resection - Traversing.

3. LEVELLING AND APPLICATIONS   12

Level line - Horizontal line - Levels and Staves - Sprit level - Sensitiveness - Bench marks - Temporary and permanent adjustments - Fly and Check levelling - Booking - reduction - Curvature and Refraction - reciprocal levelling - Longitudinal and cross sections - Plotting - Calculation of areas and volumes - Contouring - Methods - Characteristics and uses of contours - Plotting - Earth work volume - Capacity of reservoirs.

4. THEODOLITE SURVEYING   8

Theodolite - Vernier and microptic - Description and uses - temporary and permanent adjustments of vernier transit - Horizontal angles - Vertical angles - Heights and Distances - Traversing - Closing error and distribution - Gales's tables - Omitted measurements.

5. ENGINEERING SURVEYS   10

Reconnaissance, Preliminary and location surveys for engineering projects - Layout - Setting out works - Route Surveys for highways, railways and waterways - Curve ranging - Horizontal and vertical curves - Simple Curves - setting with chain and tapes, tangential angles by theodolite, double theodolite - Compound and reverse curves - Transistion curves - Functions and requirements - Setting out by offsets and angles - Vertical curves - Sight distances - Mine Surveying - Instruments - Tunnels - Correlation of underground and surface surveys - Shafts - Adits.

Total No of periods: 45

CE234 Surveying I   3   0   0   100

Text Books:

1. Bannister A. and Raymond S., " Surveying ", ELBS, Sixth Edition, 1992.
2. Heribert Kahmen and Wolfgang Faig, " Surveying ", Walter de Gruyter, 1995.
3. Kanetkar T.P., " Surveying and Levelling ", Vols. I and II, United Book
   Corporation, Pune, 1994.
4. Punmia B.C., " Surveying ", Vols. I , II and III, Laxmi Publications, 1999.

References:

1. Clark D., " Plane and Geodetic Surveying ", Vols. I and II, C.B.S. Publishers
   and Distributors, New Delhi, Sixth Edition, 1991.
2. James M. Anderson and Edward M. Mikhail, " Introduction to Surveying ",
   McGraw Hill Book Company, 1995.

CE235 Architecture   3   0   0   100

1.   ARCHITECTURAL DESIGN   6

Architectural design - an analysis - Integration of function and aesthetics - Introduction to basic elements and principles of design.

2.   CLIMATE RESPONSIVE DESIGN   7

Factors that determine climate - Characterestics of climate types - Design for various climate types - Passive and active energy controls.

3.   BUILDING TYPES   12

Residential, institutional, commercial and Industrial - Planning concepts - Application of anthropometry and space standards - Interelationships of functions - Safety standards - Building rules and regulations - Integration of building services.

4.   SITE PLANNING   10

Surveys - Site analysis - Development control - Zoning regulations - Layout regulations - Urban planning standards - Layout design concepts.

5.   ENVIRONMENTAL DESIGN   10

Urban reneual - Conservation - Principles of Landscape design - Case studies.

Total No of periods: 45

CE235 Architecture   **3   0   0   100**

References:

1. Francis D.K. Ching, " Architecture: Form, Space and Order ", VNR, N.Y., 1999.
2. Givoni B., " Man Climate and Architecture ", Applied Science, Barking ESSEX, 1982.
3. Edward D. Mills, " Planning the Architects Handbook ", Butterworth London, 1995.
4. Gallian B. Arthur and Simon Eisner, " The Urban Pattern - City Planning and Design ",
*   Affiliated Press Pvt. Ltd., New Delhi, 1995.*
5. Margaret Roberts, " An Introduction to Town Planning Planning Techniques ", Hutchinson, London,
1990.

MA231 Mathematics III   3   1   0   100

.   **(Revised Syllabus For B.E. / B.Tech. Programmes - Effective From June 2002)**

1.   PARTIAL DIFFERENTIAL EQUATIONS   **9**

Formation - Solutions of standard types of first order equations - Lagrange's Linear equation - Linear partial differential equations of second and higher order with constant coefficients.

2.   FOURIER SERIES   **8**

Dirichlet's conditions - General Fourier series - Half-range Sine and Cosine series - Parseval's identity - Harmonic Analysis.

3.   BOUNDARY VALUE PROBLEMS   **9**

Classification of second order linear partial differential equations - Solutions of one - dimensional wave equation, one-dimensional heat equation - Steady state solution of two-dimensional heat equation - Fourier series solutions in Cartesian coordinates.

4.   LAPLACE TRANSFORMS   **9**

Transforms of simple functions - Basic operational properties - Transforms of derivatives and integrals - Initial and final value theorems - Inverse transforms - Convolution theorem - Periodic functions - Applications of Laplace transforms for solving linear ordinary differential equations upto second order with constant coefficients and simultaneous equations of first order with constant coefficients.

5.   FOURIER TRANSFORMS   **10**

Statement of Fourier integral theorem - Fourier transform pairs - Fourier Sine and Cosine transforms - Properties - Transforms of simple functions - Convolution theorem - Parseval's identity.

                                    Total No of periods: 45

MA231 Mathematics III   3   1   0   100

Text Books:

1. Kreyszig, E., " Advanced Engineering Mathematics " (8th Edition),
   John Wiley and Sons, (Asia) Pte Ltd.,Singapore, 2000.
2. Grewal, B.S., " Higher Engineering Mathematics " (35th Edition),
   Khanna Publishers, Delhi 2000.

References:

1. Kandasamy, P., Thilagavathy, K., and Gunavathy, K., " Engineering Mathematics ",
   Volumes II & III (4th Revised Edition), S. Chand   & Co., New Delhi, 2001.
2. Narayanan, S., Manicavachagom Pillay, T.K., Ramanaiah, G.,
   " Advanced Mathematics for Engineering Students ", Volumes II & III
   (2ndEdition), S.Viswanathan (Printers & Publishers, Pvt, Ltd.) 1992.
3. Venkataraman, M.K. " Engineering Mathematics " Volumes III - A & B,
   13th Edition National Publishing Company, Chennai, 1998.
4. Shanmugam, T.N. : http://www.annauniv.edu/shan/trans.htm

CE236 Strength of Materials   3   0   0   100

1.   **ENERGY PRINCIPLES**   10

Strain energy and strain energy density - Strain energy in traction, shear, flexure and torsion - Castigliano's and Engessor's energy theorems - Principle of virtual work - application of energy theorems for computing deflections in beams and trusses - Maxwell's reciprocal theorem - Williot Mohr diagrams.

2.   **INDETERMINATE BEAMS**   9

Propped Cantilever and Fixed Beams - Fixed end moments and Reactions for standard cases of loading - slopes and deflections in fixed beams - Continuous beams - Theorem of three moments - Analysis of continuous beams - S.F. and B.M. diagrams for continuous beams.

3.   **COLUMNS**   6

Eccentrically loaded short columns middle third rule - core of section - Columns of unsymmetrical sections - euler's theory of long columns - Critical loads for prismatic columns with different end conditions Rankine - Gordon Formula eccentrically loaded long columns.

4.   **STATE OF STRESS IN THREE DIMENSIONS**   8

Spherical and deviatric components of stress tensor - Determination of Principal stresses and principle planes - Volumetric strains - Dilatation and distortion - theories of failure - Principal stress, principal strain, shear stress, strain energy and distortion energy theories - application in analysis of stress, load carrying capacity and design of members - Interaction problems and interaction curves.

5.   **ADVANCED TOPICS IN BENDING OF BEAMS**   6

Unsymmetrical bending of beams of symmetrical and unsymmetrical sections - curved beams - Winkler Bach Formula -Shear centre.

6.   **SPECIAL TOPICS**   6

Residual Stresses - Stress Concentration - Fatigue and Fracture - Thick Cylinders - Compound Cylinders.

                                                    Total No of periods: 45

Text Books:

1. Egor P. Popov, " Engineering Mechancis of Solids ", Prentice Hall of India, New Delhi, 1997.
2. Srinath N., " Advanced Mechanics of Solid ", Tata McGraw Hill Publishing Company, New Delhi, 1994.
3. Prakash Rao B.S., " Strength of Materials, a Practical Approach ", University Press (India) Ltd., 1999.

References:

1. Junarkar S.B., " Mechanics of Structures ", Vol.1, 21st Edition, Charotar Publishing House,
   Anand, India, 1995.
2. Kazimi S.M.A. " Solid Mechanics ", Tata McGraw Hill Publishing Company, New Delhi, 1991.
3. Laudner T.J. and Archer R.R., " Mechanical of Solids in Introduction ",
   McGraw Hill International Editions, 1994.
4. William A.Nash, " Theory and Problems of Strength of Materials ", Schaum's Outline Series,
   McGraw Hill International Editions, Third Edition, 1994.
5. Elangovan A, " Thinmavisaiyiyal (Mechanics of solids in Tamil) ", Anna University, Madras, 1995.

CE237 Concrete and Construction Technology   2   0   2   100

1.   CONCRETE AND CONSTRUCTION TECHNOLOGY   6

High grade cements - High strength Concrete - Advances in manufacture of cements - testing of fresh and hardened Concrete - Non destructive testing - Concrete chemicals and application.

2.   CONCRETE MIX DESIGN   4

Concepts of mix design - Statistical quality control of concerte - Mix design as per IS and other methods of mix design.

3.   SITE PREPARATION AND TEMPORARY STRUCTURES   6

Specifications, details and sequence of activity and construction co-ordination - site clearance - Marking - Earthwork - shoring - Dewatering - pipe lines - Building foundations - Basements - Temporary shed - centering and shuttering sheet piles - slip and moving forms - scaffoldings - Deshuttering forms - Launching girders bridge decks, offshore platforms etc. - special forms for shells.

4.   SUPER STRUCTURE   6

Fabrication and erection of steel trusses - Frames - Braced domes - Laying brick - Masonry - stone masonry - Concrete - Concrete hollow block masonry - flooring- Damp proof courses construction joints - Movement and expansion joints - Precast Pavements - weather and water proof roof finishing. Air conditioning, Accosting and fire protection.

5.   REPAIR AND REHABILITATION WORKS   4

Study on causes for building damage and deterioration - assessment of materials and methods of repair and restoration.

6.   CONSTRUCTION EQUIPMENT   4

Selection of equipment for earth work, concreting, Material handling and erection of structures - Dewatering and Pumping equipment.

7.   PRACTICAL   30

Total No of periods: 60

CE237 Concrete and Construction Technology   2   0   2   100

Text Books:

1. Shetty M.S., " Concrete Technology ", S.Chand and Company, 1992.
2. Arora S.P. and Bindra S.P., " Building Construction, Planning Techniques
   and Methods of construction ", Dhanpat Rai and sons, 1997.
3. Pewifoy R.L., " Formwork for Concrete Structures ", McGraw Hill Book Co., 1999.
4. Jha J and Sinha S.K., " Construction and Foundation Engineering ", Khanna
   Publishers, 1993.

CE238 Applied Hydraulic Engineering   **3   1   0   100**

1.   OPEN CHANNEL FLOW   8

Open channel flow - types and regime of flow - Velocity distribution in open channel - wide open channel - specific energy - critical flow and its computation.

2.   UNIFORM FLOW   8

Uniform flow - Velocity measurement - Manning's and Chezy's formula - determination of roughness coefficients - determination of normal depth and velocity - most economical sections - minimum permissible velocity determination - non-erodible channels.

3.   VARIED FLOW   8

Dynamic equation of gradually varied flow - assumptions - characteristics of flow profiles - drawdown and backwater curves - profile determination - graphical integration, direct step, standard step method.

4.   HYDRAULIC JUMPS   6

Hydraulic jump - types - energy dissipation - surges - surge through channel transitions.

5.   TURBO MACHINES   8

Turbomachines - turbines - classification - radial flow turbines - draft tube and cavitation - axial flow turbines - performance of turbines - similarity laws - centrifugal pump - minimum speed to start the pump - multistage pumps.

6.   POSTIVE DISPLACEMENT PUMPS   7

Positive displacement pumps - reciprocating pump - negative slip - flow seperation conditions - air vessels - indicator diagram and its variation - savings in work done - rotary pumps.

7.   TUTORIAL   15

                                                      Total No of periods: 60

CE238 Applied Hydraulic Engineering   3   1   0   100

Text Books:

1. Subramanya K., " Flow in Open channels ", Tata McGraw Hill Publishing Company, 1994.
2. Kumar K.L., " Engineering Fluid Mechanics ", Eurasia Publishing House (P) Ltd.,
   New Delhi, (7th Edition), 1995.
3. Jain A.K., " Fluid Mechanics (including Hydraulic Machines) ", Khanna Publishers, 8th edition, 1995.

References:

1. Ven Te Chow, " Open-Channel Hydraulics ", McGraw - H:Q Book company, 1996.
2. Ramamirtham S., " Fluid Mechanics, Hydraulics and Fluid Mechines ", Dhanpat Rai & Sons, Delhi, 1998.
3. John A. Roberson, " Hydraulic Engineering ", Jaico Publishing House, 1998.

CE239 Surveying II   3   0   0   100

1.   TACHEOMETRIC SURVEYING   6

Tacheometric systems - Tangential, stadia and subtense methods - Stadia systems - Horizontal and inclined sights - Vertical and normal staffing - Fixed and movable hairs - Stadia constants - Anallactic lens - Subtense bar.

2.   CONTROL SURVEYING   8

Working from whole to part - Horizontal and vertical control methods - Triangulation - Signals - Base line - Instruments and accessores - Corrections - Satellite station - Reduction to centre - Trignometric levelling - Single and reciprocal observations - Modern trends.

3.   SURVEY ADJUSTMENTS   8

Errors - Sources, precautions and corrections - Classification of errors - True and most probable values - weighted observations - Method of Equal shifts - Principle of least squares - Normal equation - Correlates - Level nets - Adjustment of simple triangulation networks.

4.   ASTRONOMICAL SURVEYING   11

Celestial sphere - Astronomical terms and definitions - Motion of sun and stars - Apparent altitude and corrections - Celestial co-ordinate systems - Different time systems - Nautical almanac - Star constellations - Practical astronomy - Field observations and calculations for azimuth.

5.   MISCELLANY   12

Photogrammetry - Introduction - Terrestial and aerial Photographs - Stereoscopy -Parallax - Electromagnetic distance measurement - Carrier waves - Principles - Instruments - Trilateration - Hydrographic Surveying - Tides - MSL - Sounding and methods - Location of soundings and methods - Three point problem - Strength of fix - Sextants and station pointer - River surveys - Measurement of current and discharge - Cartography - Cartographic concepts and techniques - Cadastral surveying - Definition - Uses - Legal values -Scales and accuracies.

Total No of periods: 45

CE239 Surveying II   3   0   0   100

Text Books:

1. Bannister A. and Raymond S., " Surveying " , ELBS, Sixth Edition, 1992.
2. Heribert Kahmen and Wolfgang Faig, " Surverying " , Walter de Gruyter, 1995.
3. Kanetkar T.P., " Surveying and Levelling " , Vols. I and II, United Book
   Corporation, Pune, 1994.
4. Punmia B.C., " Surveying ", Vols. I, II and III, Laxmi Publications, 1999.

References:

1. Clark D., " Plane and Geodetic Surveying " , Vols. I and II, C.B.S. Publishers and
   Distributors, Delhi, sixth Edition, 1971.
2. James M. Anderson and Edward M. Mikhail, " Introduction to Surveying ", McGraw
   Hill Book Company, 1985.
3. Wolf P.R. " Elements of Photogrammetry", McGraw Hill Book Company, Second Edition, 1986.
4. Robinson A.H., Sale R.D. Morrison J.L.and Muehrche P.C., " Elements of Cartography ",
   John Wiley and Sons, New York, Fifth Edition, 1984.

CE240 Soil Mechanics   3   0   0   100

1.   INTRODUCTION   10

Nature of soil - Soil description and classification for engineering purposes - IS Classification system - Phase relationships - Soil compaction - Theory, comparison of laboratory and field compaction methods - Ground improvement by compaction.

2.   SOIL WATER AND WATER FLOW   7

Soil water - static pressure in water - Permeability measurement in the laboratory and field - Seepage - Introduction to flow nets - Simple problems.

3.   STRESS DISTRIBUTION AND SETTLEMENT   10

Effective stress concepts in solids - Stress distribution in soil media - Use of influence charts - Components of settlement - Immediate and consolidation settlement - Terzaghi's one dimensional consolidation theory.

4.   SHEAR STRENGTH   9

Shear strength of cohesive and cohesionless soils - Mohr - Coulomb failure theory - saturated soil mass - Measurement of shear strength, direct shear - Triaxial compression, UCC and Vane shear tests - Pore pressure parameters.

5.   SLOPE STABILITY   9

Slope failure mechanisms - Types - Infinte slopes - Finite slopes - Total stress analysis for saturated clay - Method of slicese - friction circle method - Use of stablity number - Slope protection measures.

Total No of periods: 45

CE240 Soil Mechanics 3 0 0 100

Text Books:

1. Punmia P.C., " Soil Mechanics and Foundations ", Laximi Publications
   Pvt. Ltd., New Delhi, 1995.
2. Gopal Ranjan and Rao A.S.R., " Basic and applied soil mechanics ",
   Wiley Eastern Ltd., New Delhi (India), 1997.
3. Khan I.H., " A text book of Geotechnical Engineering ", Prentice Hall of India,
   New Delhi, 1999.
4. Arora K.R., " Soil Mechanics and Foundation Engineering ", Standard Publishers
   and Distributors, New Delhi, 1997.

References:

1. Holtz R.D. and Kovacs W.D., " Introduction to Geotechnical Engineering ",
   Prentice-Hall, 1995.
2. McCarthy D.F., " Essentials of Soil Mechanics and Foundations ", Prentice-Hall, 1997.
3. Sutten B.H.C., " Solving Problems in Soil Mechanics", Longman Group Scientific
   and Technical, U.K. England, 1994.

MA038 Numerical Methods   **3   1   0   100**

1.   **SOLUTION OF EQUATIONS AND EIGEN VALUE PROBLEMS**   **10**

Method of false position, Iterative method, Newton-Raphson method for single variable and for simultaneous equations with two variables, Solutions of a linear system by Gaussian, Gauss-Jordan, Jacobian and Gauss-Seidel methods. Inverse of a matrix by Gauss-Jordan method. Eigen value of a matrix by Power and Jacobi Methods.

2.   **INTERPOLATION AND APPROXIMATION**   **8**

Interpolation with Newton's divided differences, Lagrange's polynomial, Newton forward and backward differences, central difference, Least square polynomial approximations.

3.   **NUMERICAL DIFFERENTIATION AND INTEGRATION**   **9**

Numerical differentiation with interpolation polynomials, Numerical integration by Trapezoidal and Simpson's (both 1/3 rd and 3/8 th) rules. Rombergs rule Two and Three point Gaussian quadrature formula. Double integrals using Trapezoidal and Simpson's rule.

4.   **INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS**   **8**

Single Step Methods - Taylor Series, Euler and Modified Euler, Runge-Kutta method of fourth order first and second order differential equations. Multistep Methods - Milne and Adam's-Bashforth predictor and corrector methods.

5.   **BOUNDARY VALUE PROBLEMS FOR ORDINARY AND PARTIAL**   **10**
         DIFFERENTIAL EQUATIONS

Finite difference solution for the second order ordinary differential equations, Finite difference solution for one dimensional heat equation (both implicit and explicit). One dimensional wave equation and two dimensional Laplace and Poisson equations.

6.   **TUTORIAL**   **15**

                                                          Total No of periods: 60

MA038 Numerical Methods   **3   1   0   100**

Text Books:

1. Sastry, S.S., " Introductory Methods of Numerical Analysis (Third Edition) ", Printice Hall of India, New Delhi, 1998.

References:

1. Kandasamy, P., Thilakavathy, K. and Gunavathy, K., " Numerical Methods ", S. Chand & Co., New Delhi, 1998.
2. Grewal, B.S. and Grewal, J.S., " Numerical Methods in Engineering and Science ", Khanna Publishers, New Delhi, 1999.
3. Jain M.K., Iyengar, S.R.K. and Jain, R.K., " Numerical Methods for Engineering Scientific and computations (Third Edition) ", Wiley Eastern Ltd, New Delhi, 1987.
4. Gerald, C.F., and Wheatley, P.O., " Applied Numerical Analysis (Fifth Edition) ", Addison Wesley, Singapore, 1998.
5. Narayanan, S., Manicavachagam Pillai,T.K. and Ramanaiah, G., " Advanced Mathematics for Engineering Students - Volume-III ", S.Viswanathan Pvt., Ltd., 1987.

CE243 Soil Engineering Laboratory   0   0   2   100

.   **30**

1. Grainsize distribution - Sieve analysis
2. Grainsize distribution - Hydrometer analysis
3. Atterberg limits test
4. Determination of moisture - Density relationship using standard proctor.
5. Permeability determination (constant head and falling head methods)
6. Determination of shear strength parameters.
a) Direct shear test on cohesionless soil
b) Unconfined compression test in cohesive soil
c) Triaxial compression test on cohesionless soil
7. One dimensional consolidation test (Determination of co-efficient of consolidation only)

Total No of periods: 30

References:

1 " Soil Engineering Laboratory Instruction Manual ", Published by the Engineering College
   Co-operatiave Society, Chennai, 1996.
2 Lambe T.W., " Soil Testing for Engineers ", John Wiley and Sons, New York, 1990.
3 " I.S.Code of Practice (2720) Relevant Parts ", as amended from time to time.