SEMESTER III

MA203 PROBABILITY, STATISTICS AND LINEAR PROGRAMMING

Total, Compound, Marginal and conditional probability, Bayes' theorem - Binomial, Poisson and Normal distributions, Moment generating function, Characteristic function
Central Limit Theorem, Law of large numbers, Tests of significance, large and small samples, t- test, F-test and chi-square test for goodness of fit.
Estimation theory, ANOVA table and analysis, Multiple and partial correlation - Regression
Convex spaces, LPP statement, basic feasible solution, Graphical solution - Slack and surplus variables - Artificial variable technique - Charne's penalty method - Two phase method - Dual simplex method - Primal dual problems, Transportation and Assignment problems.
Integer programming - Gomory's cutting plane method - Branch and bound method

References

1. Gupta. S.C. and Kapoor. V.K., Fundamentals of Mathematical Statistics, 7th Edition, Sultan Chand and Sons, 1980.
2. Kantiswarup, Gupta P.K. and Man Mohan, Operations Research, 11th Edition, Sultan Chand and Sons, 2003.

CE201 MECHANICS OF SOLIDS – I

Tension, compression and shear stresses - Hooke's law - elastic constants - compound stresses - composite bars - thermal stresses.
Strain Energy due to axial force - Resilience - stresses due to impact and suddenly applied load - Principal stress and principal planes - Mohr's circle
Beams and support conditions -Types of supports and loads - shear force and bending moment - their diagrams for simply supported beams, cantilevers and overhanging beams.
Theory of simple bending - Stress distribution at a cross section due to Bending Moment and Shear - strain energy.
Analysis of plane truss - Method of joints - Method of sections - Thin cylinders and shells.
Theory of torsion - Torsion of circular and hollow circular shafts and shear stresses due to torsion - closed and open coiled helical springs - leaf spring.

References

1. Vazirani, V.N. and Ratwani, N.M., Strength of Materials, Vol I, Khanna Publishers, 1996.
2. Kazimi, Mechanics of Solids, Tata McGraw - Hill, 2004.
3. Timoshenko, S.P. and Gere, J.M., Mechanics of Materials, Tata McGraw Hill, 1992.

CE203 MECHANICS OF FLUIDS – I

Continuum concept - CGS, MKS and SI systems - Properties of Fluids - Ideal and real fluid - Pressure at a point - pressure variation - pressure measurement

Hydrostatic forces on plane and curved surfaces - Buoyancy and equilibrium - Metacentric height and its determination-Types of flow - continuity equation for one, two and three dimensional flows - stream function and velocity potential - flow net and its properties
Convective and local acceleration - Pressure, Kinetic and Datum energy - Bernoulli's theorem and proof - Euler's equations of motion for a three dimensional flow and along a streamline - Deduction of Bernoulli's theorem - Momentum equation - applications.
Reynold's experiment - Laminar and turbulent flow - Reynold's number - critical flow - Navier-Stoke equations of motion - shear stress and pressure gradient - Laminar flow between parallel plates - Couette flow - Hagen Poiseuille equation for flow through circular pipes.
Turbulence - semi empirical theories –Major losses - Darcy-Weisbach equation for flow through circular pipe - Friction factor - Smooth and rough pipes - Moody diagram - flow through noncircular pipe - Minor losses - pipes in series and parallel - Equivalent length - Introduction to water hammer phenomena.

References

1. Nagaratnam, S., Fluid Mechanics, Khanna Publishers, 1995.
1. Natarajan, M.K. Principles of Fluid Mechanics, Oxford & IBH Publishing Co, 1994.
2. Jagdish Lal, Hydraulics and Fluid Mechanics, Tata McGraw Hill, 2001.
3. Streeter V.L., Fluid mechanics, Tata McGraw Hill, 1998.

CE205 SURVEYING - I

Principles of Surveying - Types of surveying - Conventional signs - Equipment - chains - tapes - Arrows - Ranging rods - ranging and chaining - reciprocal ranging - Overcoming obstacles in chaining - chaining on sloping ground, Hypotenuse allowance.
Prismatic compass - Surveyor's compass - Bearings – W.C.B. and reduced bearing - errors in compass surveying - Local attraction - Traverse adjustment
Omitted measurements - Area and volume computation - Simpson's rule and Trapezoidal rule.
Plane Table Surveying - instruments and accessories - merits and demerits - methods - radiation - intersection - traverse - resection - three point and two point problems.
Levels and staff - temporary and permanent adjustments - Differential levelling - fly levelling - profile Levelling - block levelling - booking - reduction of levels - checks - curvature and refraction - Reciprocal levelling - longitudinal and cross sectioning - contours - Automatic levels .
Vernier Theodolite - Description - temporary and permanent adjustments - two face observation - necessity - measurements of horizontal angles and vertical angles - errors - compensating and cumulative errors - elimination of errors.

References

1. Duggal, S.K. Surveying Vol. I and II, Tata McGraw Hill, 2004.
2. Punmia, B.C. Surveying Vol.I and II, Standard Publishers, 1994.
3. Arora, K. R. Surveying Vol. I and II, Standard Book House, 1996.

CE207 GEOTECHNICAL ENGINEERING - I

Historical development of Soil Engineering - Origin and general types of soils - soil structure, clay minerals-Three phase system- Identification and Classification of soils
Soil water - capillary phenomena - concept of effective and neutral stresses - Permeability - determination of coefficient of permeability in the laboratory - Seepage flow - Head, gradient, pressure - steady state flow - two dimensional - flow net.
Vertical stress distribution in soil - Boussinesq and Westergaard's equation - Newmark's influence chart - principle, construction and use - Equivalent point load and other approximate methods - pressure bulb. Compaction
Shear strength - Mohr-Coulomb failure criterion - shear strength tests - Different drainage conditions - Shear properties of cohesionless and cohesive soils - Use of Mohr's circle - relationship between principal stresses and shear parameters.
Compressibility and consolidation - Terzaghi's one dimensional consolidation theory - pressure void ratio relationship - preconsolidation pressure - Total settlement and time rate of settlement - coefficient of consolidation - curve fitting methods - Correction for construction time.

References

1. Gopal Ranjan and Rao, P. Basic and Applied Soil Mechanics, New Age International Pvt. Limited, New Delhi, 2002.
2. Murthy, V.N.S., A text book of Soil Mechanics and Foundation Engineering, UBS Publishers Distributors Ltd., New Delhi, 1999
3. Punmia, B.C. Soil Mechanics and Foundation Engineering, Laxmi Publications Pvt. Ltd., New Delhi, 1995.
4. Braja M. Das, Fundamentals of Geotechnical Engineering, Thomson Asia Pvt. Ltd., Singapore, 2005.

CE209 CONCRETE TECHNOLOGY

Introduction - Concrete materials - Cement: Physical tests on cement - Concrete materials - Tests on aggregates - Quality of Water for mixing and curing - use of sea water for mixing concrete
Mix Design - factors influencing mix proportion - Mix design by ACI method and I.S. code method - Design of high strength concrete.
Admixtures - accelerating admixtures - Retarding admixtures - water reducing admixtures - Air entraining admixtures - coloring agent - Plasticizers. Batching - Mixing -Transportation - Placing of concrete - curing of Concrete
Strength of Concrete - Shrinkage and temperature effects - creep of concrete - permeability of concrete - durability of concrete - Corrosion - Causes and effects - remedial measures- Thermal properties of concrete - Micro cracking of concrete.
Special Concrete - light weight concrete - Fibre reinforced concrete - Polymer-polymer modified concrete - Ferrocement - Mass concrete - Ready mix concrete- Self compacting concrete- Quality control - Sampling and testing-Acceptance criteria

References

1. Shetty, M.S., Concrete Technology, Theory & Practice, S.Chand and Co, 2004.
2. Gambhir, M.L., Concrete Technology, Tata McGraw Hill, 2004.
3. Nevile, Properties of Concrete, Longman Publishers, 2004.
4. Santakumar A.R., Concrete Technology, Oxford University Press, New Delhi, 2007.

CE211 BUILDING PLANNING AND DRAWING

Classification of buildings - Principles of planning - Dimensions of buildings - Building bye-laws for floor area ratio, open spaces - Orientation of buildings - Lighting and Ventilation- Planning and preparing sketches and working drawings of Residential buildings (Flat and sloping roof), Schools, Hostels, Hospitals, Single-storey factory buildings with trusses. Detailed working drawings of the component parts - Doors and Windows - Roof Trusses - Staircases-Toilets

References

1. Shah M.G. Kalec. M. & Patki SY Building Drawing, Tata Mcgraw Hill, New Delhi, 2000

CE213 SURVEY LAB – I

1. Chain surveying
2. Chain traverse
3. Compass surveying
4. Compass traverse-open and close traverse
5. Plane table surveying:
6. Leveling: Fly leveling and contouring
7. Radiation, intersection-Traverse- Resection

CE215 GEOTECHNICAL LAB

1. Grain Size analysis
2. Consistency limits
3. Specific gravity
4. Permeability tests
5. Unconfined compression test
6. Direct shear test
7. Core cutter and sand replacement
8. Compaction test
9. California bearing ratio test
10. Vane shear test
11. Triaxial test
12. Consolidation test