CE/CS/EB/EC/EE/EI/ME/IT/SE 301 Engineering Mathematics II

MODULE I

Matrices and Vector spaces : Rank of matrix, Echelon and normal form, Solutions of linear systems of algebraic equations, Eigen values and Eigen vectors, Cayley Hamilton theorem (non proof),

Vector Spaces – Subspaces, - Linear Independence of vectors –Linear span – Dimension and Basis , Linear transformations.

MODULE II

Fourier series and Fourier integrals: Fourier series of Periodic functions – Euler formulac for Fourier coefficients – functions having period 2, arbitrary period – even and odd functions – half range expansions, Fourier integral, Fourier cosine and sine transformations, linearity property, transform of derivatives, convolution theorem(no proof).

MODULE III

Lap[lace transforms : Linearity property, transforms of elementary functions, Laplace transforms of derivatives and integrals, differentiation and integration of transforms, convolution theorem(no proof) use of Laplace transforms in the solution of initial value problems , unit step function, impulse function- transform of step functions, transforms of periodic functions.

MODULE IV

Vector calculus : Scalar and Vector point functions – Gradient and directional derivative of a scalar point function – Divergence and Curl of a vector point functions –their physical meanings.

Evaluation of line integral, surface and volume integrals, Gauss's divergence theorem, Stoke's theorem (No proof of these theorem), conservative force fields, scalar potential.

TEXT BOOKS
1.Advanced engineering mathematics : R.K. Jain , S.R.K.Iyengar, narosa Publishers.
2.Advanced engineering mathematics : C.R. Wilie & L.C. Barrett, Mgh

REFERENCES
1.Mathematics techniques for engineers & scientists Larry C Andrews , Ronald C, Philips, Phi Publishers.
2.Advanced engineering mathematics M.C. Potter, J.L.goldberg Oxford University Press
3.Higher engineering mathematics B.S. Grewal , Khanna Publisers

Type of Questions for University Exam.
Q 1.Eight short answer questions of 5 marks with two questions from each of the four modules.
Q 2. to Q.5 : Two questions A & B of 15 marks from each modules with option to answer either A or B.

CE 302 Surveying I

Module I

Introduction : Classification of surveys, primary division of Surveying-Principle of working from whole to part-conventional signs. Chain Surveying: Instruments - principles of chain surveying-Filed bookplotting- Tie and check line-Chaining and Ranging-obstacles-chaining on sloping ground -Errors in chain Survey- uses of cross staff and optical square. COMPASS SURVEY : Prismatic compass-surveyor's Compass whole circle system and Quadrantel system-True and magnetic bearing-Dip and Declination-Local attraction-Traversing-Plotting a Traverse Survey -Graphical adjustment of closing error in a closed Traverse. Plane Table Survey: Instruments and accessories- Advantages and disadvantages of plane tabling orientation- Different methods of plane Tabling- Two point problem-Three point problem - Errors in plane tabling.

Module II

Levelling: Definitions of Terms used in Leveling-Bench marks- levelling instruments-Temporary and permanent adjustments-principles of leveling-Simple leveling, Differential levelling-Reduction of levels-Classification of leveling-Profile leveling and cross sectioning correction for curvature and refraction-Reciprocal leveling- Errors in leveling. Contour Survey: Definition-characteristics of Contour- uses of contours- Methods of contouring-Interpolation Contours-uses of Contour map.

Module III

Area and volumes: Areas along Boundaries- the Mid-ordinate rule-Average ordinate rule-Trapezoidal rule-Simpson's rule- Area by Meridian distance method- Area by Double meridian method. Departure and total latitude method-Coordinate method-use of Planimeter-Computation of volume by Trapezoidal and Prismoidal formule -Mars haul curve.Minor Instruments: Hand levels-Indian pattern clinometer-Ceylon ghat Tracer-Pantagraph-Eidograph- Box Sextant

Module IV

Theodolite Surveying: Study of Theodolite - Temporary and permanent adjustments-measurement of horizontal angle- method of repetition and reiteration- measurement of vertical angle – Theodolite traversing by direct observation of Angles and by direct observation of Bearings- Adjustment of a closed Traverse (angular error, bearings & closing error) - Bowditch rule-Transit rule-Gale's traverse Table- Omitted measurements.
Tacheometric Surveying : Instruments used-Stadia System-fixed and movable hair methods-Tacheometric constants- Anallatic lens-Tangential System-Direct reading tacheometer-Subtense Bar.

Reference

1) Surveying Vol –I Dr.K.RArora- Standard Book House
2) Surveying Vol I –S.K.Duggal Tata Mc –Graw Hill Publishing Co LTD
3) Surveying - Vol I & II : Punmia B.C- Laxmi Publications Pvt Ltd
4) Surveying – Dr A.M.Chandra – New Age International Publishers

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CE/EE 303 Strength of Materials

Module I

Tension, Compression and Shear : Normal stresses and strains – Mechanical properties of mild steel – Elasticity, plasticity and creep – Liner elasticity, Hooke's law and Poisson' s ratio – Shear stress and shear strain – Allowable stresses and allowable loads – design for axial loads and direct shear

Axially loaded Members : Changes in lengths of axially loaded members – Changes in lengths of nonuniform bars – Thermal effects, misfits and prestrains – stress on inclined sections – strain energy

Module II

Torsion : Torsional deformation of circular bar – Circular bars of linearly elastic materials – nonuniform torsion – stresses and strains in pure shear – relationship between modulus of elasticity, bulk modulus and rigidity modulus – transmission of power by circular shafts – Circular shafts fixed on both ends – strain energy in torsion and pure shear

Shear forces and bending moments: Types of beams, loads and reactions – shear forces and bending moments – relationships between loads, shear forces and bending moments – Shear force and bending moment diagrams

Module III

Stresses in beams : Pure bending and non uniform bending – Curvature of a beam – Longitudinal strains in a beam – Normal stresses in beams (linearly elastic materials) – Design of beams for bending stresses – Nonprismatic beams – Shear stresses in beams of rectangular cross section – Shear stresses in beams of circular cross section – Shear stresses in webs of beams with flanges

Analysis of stress and strain : Plane stress – Principal stresses and maximum shear stresses – Mohr's circle for Plane stress – Hooke's law for plane stress – Maximum stresses in beams – Plane strain

Module IV

Deflection of determinate Beams : Differential equation of deflection profile – Deflection by integration of the bending moment equations – Deflection by integration of the shear-force and load equation – Method of superposition – Moment area method

Columns : Buckling and stability – Columns with pinned ends – Columns with other support conditions – Columns with eccentric axial loads – The secant formula for columns

Reference

1) Gere J M. – Mechanics of Materials, Brooks/Cole Thomson Learning
2) Ramamurtham S " Strength of Materials " Dhanpur Rai & Sons
3) Pytel.A& Kiusalaas J. – Mechanics of Materials-, Brooks/Cole Thomson Learning
4) Popov E.P- Engineering Mechanics of Solids, Printice-Hall of India Limited, New Delhi, India.
5) Timoshenko S.P. and Young D.H - Elements of strength of materials, East-West Press Private Limited New Delhi, India.
6) Nash – Strength of Materials – Shausm's OUTlines, McGraw Hill
7) Subramanian R " Strength of Materials " Oxford University Press.

Type of Questions for University Exam.
Q 1.Eight short answer questions of 5 marks with two questions from each of the four modules.
Q 2. to Q.5 : Two questions A & B of 15 marks from each modules with option to answer either A or B.

CE 304 Concrete Technology

Module I

Cement: Manufacture of Portland cement – basic chemistry of cement – hydration of cement – heat of hydration and strength – Tests on cement: fineness of cement –consistence of standard cement paste – setting time – soundness –strength – Types of Portland cement: Ordinary Portland cement – rapid hardening cement – low heat cement – sulphate resisting cement – blast furnace cement – supersluphated (slag) cement – white and colored cement – Portland pazzalona cement - expansive high alumina cement

Normal aggregate: Size classification – petrographic classification – shape and texture classification – mechanical properties: bond – strength – toughness – hardness – physical properties: specific gravity – bulk density – porosity and absorption – moisture content – bulking of sand – unsoundness due to volume changes – thermal properties –deleterious substances – organic impurities – clay and other fine materials – salt contamination – unsound due to impurities – sieve analysis – grading curves – fineness modulus – grading requirements – maximum size aggregate – practical grading – gap graded aggregate

Module II

Fresh concrete: workability – factors affecting workability – cohesion and segregation – bleeding – workability test – slump test – compacting factor test – Vebe test – flow table test – ball penetration test – density of fresh concrete

Strength of concrete: tensile strength considerations – behavior under compressive stress – practical criteria of strength – Porosity – Gel/space ratio – total voids in concrete – pore size distribution – micro cracking and stress-strain relation – factors affecting strength

Module III

Mixing, handling, placing and compacting concrete: mixers – charging the mixer – uniformity of mixing – mixing time – prolonged mixing – read-mixed concrete – handling – pumped concrete – placing and compacting – vibration of concrete – internal vibrators – external vibrators – vibrating tables – revibration – shortcrete – preplaced aggregate concrete

Admixtures: accelerators – set retarders – water reducers (plasticizers) – superplaticizers – mineral additives – bonding admixture – water repellent admixtures

Concerting in extreme climates: hot weather concreting – cold weather concreting

Module IV

Development of strength: normal curing – method of curing – influence of temperature – maturity rule – steam curing Strength properties of concrete: relation between tensile and compressive strength – fatigue strength – impact strength – resistance to abrasion – bond to reinforcement – modulus of elasticity – factors affecting the modulus of elasticity – Poisson's ratio Testing: precision of testing – analysis of fresh concrete – strength test – compressive strength – tensile strength – test core – accelerated curing – Schmidt hammer – penetration resistance – pullout test – ultrasonic pulse velocity test –Mix design: Bureau of Indian Standard method

References

1) Neville A.M & Brooks J.J – Concrete Technology, Longman.
2) Shetty M.S – Concrete Technology, S.Chand and Company Ltd.
3) A.R. Santhakumar – Concrete Technology, Oxford University Press.
4) Metha & Monteiro – Concrete, Microstructure, Properties of Materials – TataMcGraw Hill.

Type of Questions for University Exam.

Q 1.Eight short answer questions of 5 marks with two questions from each of the four modules.

Q 2. to Q.5 : Two questions A & B of 15 marks from each modules with option to answer either A or B.

CE305 Fluid Mechanics –1

Module I
Fluids: Definition-types and properties. Fluid as a continuum, Control volume concept.
Fluid Statics: Fluid pressure-Measurement of pressure- Hydrostatic forces on immersed surfaces-Application of fluid pressure analysis in engineering problems. Buoyancy and stability of immersed and floating bodies, Pressure in case of accelerated rigid body motion.
Fluid kinematics- Methods of describing fluid motion, - Types of motion, Inviscid flows, Velocity and acceleration- Continuity equation- Potential flows-Velocity potential and Stream function. Cauchy Reimann equation – Flownet - Circulation and vorticity- Source, Sink and Doublet.

Module II
Fluid dynamics: Types of forces, Forces influencing fluid motion- Energy and Head-Energy correction factor, Euler and Bernoulli's equations. Application of Bernoulli's equation. Flow measurement, Linear momentum equations, momentum correction factors, Application of momentum equation.

Module III
Pipe flow: Laminar and turbulent forces- Reynolds' number,
Laminar flow - Head loss. Hagen-Poisseulle Equation-Darcy's law for flow through porous media-Stroke's law -Transition from laminar to turbulent flow-Reynold's experiments.
Turbulent flow in pipes- Classification of turbulence - velocity distribution in turbulent flow - smooth and rough pipes -Nikuradse's experiments
Major loss in pipe flow-Friction loss, Minor losses, Total energy and hydraulic gradient line, Compound pipes, Pipes in series and parallel, Branching pipes, Pipe network.

Module IV
Boundary layer theory - Flow of real fluids-no slip condition Boundary layer growth in flow over a plate, laminar boundary layer and turbulent boundary layer Flow past immersed bodies. drag on a sphere, drag on a flat plate.
Dimensional analysis and similitude - Methods of dimensional analysis, Dimensionless numbers. Principles of similarity- Modeling using Reynolds and Froude laws, Distorted models and Scale effects.

References

1) Shames I.H. – Mechanics of Fluids McGraw Hill, New York
2) Cengel & Cimbala – Fuild Mechanics – McGraw Hill
3) Streeter V.L and Wylie E.B. . – Fluid Mechanics, McGraw Hill , New York
4) Modi P.N. & Seth S.M. . – Hydraulics and Fluid Mechanics including Fluid Machines- Standard Book House. New Delhi.
5) Subramanya K. . – Theory and Applications of Fluid Mechanics, Tata McGraw Hill Publishing Co, New Delhi.
6) S.K. Agrawal. . – Fluid Mechanics and Machinery, Tata McGraw Hill Publishing Co, New Delhi.

Type of Questions for University Exam.
Q 1.Eight short answer questions of 5 marks with two questions from each of the four modules.
Q 2. to Q.5 : Two questions A & B of 15 marks from each modules with option to answer either A or B.

CE 306 ENGINEERING MATERIALS AND BUILDING CONSTRUCTION

Module I
Building stones -Requirement of good building stone- characteristics - testing. Common building stones. Preservation of stones. **Clay products:** Tiles- Manufacture-Properties-Types-Problems of efflorescence and lime bursting in tiles. **Lime:** Properties- Classifications -Manufacture -Testing of lime. **Mortar:** Types –Properties-Tests on mortar, selection and desirable properties of fine aggregate for good mortar. **Gypsum:** Forms of gypsum and gypsum plaster, properties of gypsum plaster, building products of gypsum and their uses. **Pozzolona:** Natural and Artificial fly ash, Surkhi (burnt clay pozzolona), rice husk and ash pozzolona, properties and specifications for use in construction.

Module II
Timber - Defects - Seasoning - Decay - Preservation, Wood based products. **Iron and steel** - Structural sections - Properties and uses of structural steel – Corrosion- forms and preventive measures. **Paints varnishes and distempers**, Common constituents, types and desirable properties, Cement paints. **Glass** - Ingredients, properties types and use in construction. **Plastics -** classification, advantages of plastics, Mechanical properties and their use in construction. **Miscellaneous materials –** Asbestos, Insulating Materials - Thermal and sound insulating material desirable properties and type. Geosynthetics and its applications,

Module III
Cavity walls – Partition walls - Types and features.
Lintels – Classification and loading, Arches – Classification and construction details- Technical terms.
Stairs- Technical terms- Classification and Types of stairs
Doors, Windows and Ventilations- Technical terms-Construction details of different types

Module IV
Floors and flooring - Types of floors - Types of floor coverings; Roof - Types of roofs - Types and uses of roofing materials
Finishing works - Plastering, pointing, painting, white washing, colour washing, distempering ; Damp proofing ant termite treatment.

References
1. Gurucharan Singh, *Building materials,*,1996
2. Rangwala S. C, *Engineering Materials*, Charotar Publishing House, 1992, Anand
3. Punmia B. C, *Building Construction*, Laxmi Publlications, 1999, New Delhi.
4. Rangwala S. C, *Building Construction*, Charotar Publishing House, 1992, Anand
5. Huntington W.C, *Building Construction*, John Wiley, 1959, New York.

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CE 307 Survey Practicals –1

Chain survey :

1. Study of instruments.
2. Travelling and plotting of details-2 exercises.
3. Cross staff survey.

Compass Survey :

4. Study of Prismatic and Surveyor's compass.
5. Traversing with compass and plotting.
6. Open compass traverse- length of closing side by calculation and ploting.

Plane Table survey :

7. Method of Radiation.
8. Method of Intersection.
9. Solving three point problem - Bessel's method.
10. olving three point problem - trial and error method & tracing paper method.
11. Solving two point problem.

Levelling:

12. Study of levelling instruments.
13. Fly levelling.
14. Longitudinal sectioning.
15. Cross sectioning.
16. Contour surveying.
17. Permanent adjustments.

Minor Instruments:

18. Study of planimeter, pantagraph and ediograph.
19. Study of hand levels, clinometer, Ceylon Ghat Tracer and Sextant.

Note : 50 % marks is earmarked for continous evaluation, and 50% marks for end semester examination to be assessed by two examiners. A candidate shall secure a minimum of 50 % marks separately for the two components to be eligible for a pass in that subject.

CE 308 Strength of Materials Lab

1) Tension test   - mild steel bar, mild steel plate, mild steel wire
2) Double shear test   - mild steel bar
3) Torsion test   - mild steel bar
4) Impact test   - IZOD and Charpy test
5) Hardness test   - Brinell, Rockwell
6) Tests of springs   - closed coil spring and open coil spring
7) Fatigue strength
8) Bending test of wooden beam
                          - flexural strength and modulus of elasticity
9) Cement Test   - Standard consistency, Setting time,
                               compressive strength
10) Test on fresh concrete - workability test
11) Compression test   -wood, rock, brick
12) Strength of concrete   - compressive strength, split tensile strength and
                               modulus of rupture
13) Modulus of elasticity of concrete

Note : 50 % marks is earmarked for continous evaluation, and 50% marks for end semester examination to be assessed by two examiners. A candidate shall secure a minimum of 50 % marks separately for the two components to be eligible for a pass in that subject.