

CE/CS/EB/EC/EE/EI/ME/IT/SE 401 A/B Engineering Mathematics –III

MODULE 1

Complex Analytic functions and conformal mapping: curves and regions in the complex plane, complex functions, limit, derivative, analytic function, Cauchy – Riemann equations, Elementary complex functions such as powers, exponential function, logarithmic, trigonometric and hyperbolic functions.

Conformal mapping: Linear fractional transformations, mapping by elementary function like Z^2 , e^z , $\sin z$, $\cos z$, $\sin hz$, and $\cos hz$, $Z + 1/Z$

Module II

Complex integration: Line integral, Cauchy's integral theorem, Cauchy's integral formula, Taylor's series, Laurent's series, residue theorem, evaluation of real integrals using integration around unit circle, around the semi circle, integrating contours having poles, on the real axis.

Module III

Partial differential equations:

Formulation of partial differential equations.

Solutions of equations of the form $F(p,q) = 0$, $F(x,p,q) = 0$, $F(y,p,q) = 0$, $F(z,p,q) = 0$ $F_1(x,p) = F_2(y,q)$, Lagrange's form $Pp+Qq = R$

Linear homogeneous partial differential equations with constant co-efficient

Module IV

Vibrating string: one dimensional wave equation, D'Alembert's solution, solution by the method of separation of variables

One dimensional heat equation, solution of the equation by the method of separation of variables,

Solutions of Laplace's equation over a rectangular region and a circular region by the method of separation of variables.

REFERENCES

Advanced Engineering Mathematics Erwin Kreyszig, Wiley Eastern

Complex Variables & Applications Churchill R.V., Mgh Publishers.

Advanced engineering mathematics M.C.Potter, J.L.Goldberg Oxford University Press

Higher engineering mathematics: B.S.Grewal, Khanna Publishers

Advanced engineering mathematics: R.K.Jain, S.R.K.Iyengar, Narosa Publishers.

Advanced engineering mathematics: C.R.Wilie & L.C.Barrett, Mgh

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 402A/B Surveying- II

Module I

Curves : Types of curves - Basic definitions-Elements of a simple curve - Methods of setting out (Linear methods and Angular methods)-Compound Curves-Elements of a compound curve-Reverse Curve-Transition curves-advantages-super elevation- length of a transition curve - vertical curves-Types of vertical curves- length of the vertical curve.

Module II

Triangulation : Principles of Triangulation-classification triangulation-reconnaissance-Selection of Triangulation Stations-Intervisibility of Triangulation stations-Determination of elevations of stations (No obstruction due to intervening ground and obstruction due to intervening ground) -Signals-Elevated towers-selection of site for base line-Base line measurement-corrections-Satellite station.- introduction to total station .

Adjustments of observations :

Laws of weight-Corrections to field measurements with a closing error-Theory of least squares-Normal equation method-Most probable values of directly observed quantities and indirectly observed quantities-Method of differences - Triangulation adjustments -Station adjustments for 3 different. Cases (when the horizon is closed with angles of equal weight - unequal weight-when several angles are measured at a station individually and also in combinations)- Figure adjustment of a plane triangle adjustment of two connected triangles-adjustment of a braced quadrilateral - adjustment of a level network-adjustment of a closed traverse.

Module III

Field Astronomy:Definitions - solution of astronomical triangle-Co-ordinate systems-Time - Solar-Sidereal and Standard-Equation of time-sun dial-Determination of time, azimuth, latitude and longitude.

Module IV

Hydrographic Survey:Introduction - Shore Line Survey - River survey Soundings Methods of sounding - Method of locating Soundings – plotting soundings-Three Point problem

Photogrammetry: Phototheodolite -Principle of the method of Terrestrial photogrammetry - Field work - Stereo - Photogrammetry -aerial Surveying - Terminology - Scale and distortion of the vertical photograph - principle of Binocular vision & Stereoscopic fusion - Flight planning - plotting from Air Photographs - Heighting – Photo Interpretation Comparison between Air Photograph and Map -Application of Air photograph.

References

- 1) Dr. B.C. Punmia : Surveying vol I & vol II - Laxmi Publications Pvt Ltd.
- 2) T.M. Lillesand & R.W Keifer : Remote Sensing and Image Interpretation.
- 3) Surveying Vol II – Dr K.R Arora Standard Book House
- 4) Surveying _ Dr.A.M.Chandra New Age Indian National Publishers

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CE 403A/B Mechanics of Structures

Module I

Axially loaded members : Impact loading – Repeated loading at fatigue – Stress concentrations – Nonlinear behavior – Elastoplastic analysis

Torsion : Thin walled tubes – Stress concentration in torsion – closed coil helical spring – open coil springs

Module II

Stresses in Beams: Built-up beams and shear flow – beams with axial loads – stress concentration in bending – composite beams – transformed section method for composite beams

Unsymmetrical bending: Doubly symmetric beams with inclined loads – Bending of unsymmetric beams – Shear center concept – shear stresses in beams of thin walled open cross sections – Shear stresses in wide flange beams – Shear centers of thin walled open section

Module III

Application of plane stress : Spherical pressure vessel – Cylindrical pressure vessel – Combined bending and torsion in circular beam

Strains: Measurement of strains – Computation of stresses from strains

Triaxial state of stress – Mohr's circle triaxial state

Module IV

Deflection of determinate beams : Strain energy of Bending – Castigliano's theorem – Deflection produced by Impact – temperature effects - The unit load method of computation of deflection and slopes in beams

Statically indeterminate beams : Types of statically indeterminate beams – Analysis by differential equation of the deflection curve – method of superposition – temperature effects – longitudinal displacements at the ends of the beam

Text Book

- 1) Gere J M. – Mechanics of Materials, Brooks/Cole Thomson Learning.
- 2) Wang C.K – Intermediate Structural Analysis, McGraw Hill International Edition

References

- 1) Pytel.A& Kiusalaas J. – Mechanics of Materials- Brooks/Cole Thomson Learning
- 2) Popov E.P- Engineering Mechanics of Solids, Printice-Hall of India Limited, New Delhi, India.
- 3) Timoshenko S.P. and Young D.H - Elements of strength of materials, East-West Press Private Limited New Delhi, India.
- 4) Nash – Strength of Materials – Shausm's OUTlines, McGraw Hill

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CE 404A/B ENGINEERING GEOLOGY & SEISMOLOGY

Module I

Introduction: Definition - branches of geology -scope of geology – geology in civil engineering.

Physical Geology: Rock weathering and soils - physical weathering - chemical weathering - climate and soil formation - classification of soil - soil erosion and its control. *Wind* - Wind erosion - Wind transportation - Wind deposition

Rivers - erosion - transportation - deposition - river meandering - types of rivers - drainage patterns.

Oceans – sea erosion - transportation - deposition – coastal protection.

Module II

Mineralogy: Definition of minerals - physical properties – Study of physical properties of the following minerals - quartz, Telspar, Muscovite, Biotite, Augite, hornblende, Garnet, Tourmaline, Kyanite, Tale, Kaoline, Serpentine, Calcite, Flourite & Corundum.

Petrology : Classification, texture and structures of Igneous , Sedimentary and Metamorphic rocks- factors & kinds of metamorphism – Engineering properties of rocks- Description, engineering properties and uses of the following rocks – Granite , Syenite, Dioute Gabbro, Basalt, Sandstone, Limestone, Shale, Conglomerate, Breccia, Laterite, Gneiss, Schist, Slate, Quartzite, Marble.

Module III

Structural Geology: Attitude of beds, study of structures –folds, faults, fractures and joints – classification, recognition in the field, relevance to civil engineering – Geological time scale

Geological Investigation : Geological conditions necessary for design and construction of dam & reservoirs , tunnels, buildings & road cuttings.

Module IV

Seismology : Internal structures of the earth – seismic waves- Continental Draift & Plate tectonics –fault movement – other sources of seismic activity –classification of earth quakes –effects of earthquakes –Size of earth quakes – intensity, magnitude, energy –Seismographs - Location of earthquake- Distribution of earth quakes –Seismic History – Seismic Zones of India.

Tsunami – Tsunami velocity – Run up & inundates of Tsunami waves.

References

- 1) Parbin Singh : A text book of Engineering and General Geology (Katson Pub. Ludhiana)
- 2)Waltham .T- Foundations of Engineering Geology, Spon Press . London.
- 3) F.G.H. Blyth & M.H. de Frietis Geology for Engineering
- 4) W.R. Judo : Principles of Engg. Geology and Geotechnics (McGraw Hill)
- 5) P.K. Mukerjee : A text book of geology (World Press Ltd., Calcutta)

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CE 405A/B Fluid Mechanics- II

Module I

Open channel flow in rigid boundary channels- Comparison with pipe flow, Classification of flow, uniform flow – Equations for uniform flow such as Chezy's and Manning's formula, Most efficient channel section – Circular, Rectangular, and Trapezoidal channel sections, Velocity distribution in Open channels, Conveyance, Normal depth, Hydraulic exponents for uniform flow, Determination of normal depth and velocity, Specific energy and Specific force diagrams, Critical flow, Hydraulic exponent for critical flow, Channel transitions, Venturi, Standing wave and Parshall flumes.

Module II

Non-uniform flow: Basic assumptions, Gradually Varied Flow, Dynamic Equation for Gradually Varied flow, Different forms of the Dynamic equation, Flow Profiles in Prismatic Channels, Computation of the Length of the Back Water Curve- Graphical Integration and Direct Step Methods. Rapidly Varied Flow- Hydraulic Jump, Hydraulic jump equations for a Rectangular Channel, Practical Applications, Energy loss and Efficiency of a Jump, Stilling Basins, Selection of Stilling Basins, Rapidly varied Unsteady flow – Surges.

Module III

Hydraulic Machines: Classification of Hydraulic Machines- Dynamic Thrust of a Jet on Fixed and Moving Surfaces- Work Done and Efficiency

Turbines: classification- head, power and efficiencies – Pelton wheel - Work done & Efficiency – Working proportions - Multiple jet pelton wheel- Design. Francis turbine-general description- Work done & Efficiency - Working proportions – Design- Draft tubes- Draft tube theory- Types of draft tubes Kaplan turbine; General description- Working proportions - Design - Governing of turbines- performance Characteristics- Selection of turbines. Runaway speed – Surge tanks

Module IV

Centrifugal pumps: Types-volute and whirlpool chambers-velocity triangle for pumps- least starting speed-efficiency – specific speed-selection and installation of pumps for various purposes-multistage pump.

Positive displacement machines: Reciprocating pumps-types- work cone-effect of acceleration and frictional resistance-slip and coefficient of discharge – separation in such and delivery pipes-air vessels-work save by air vessel-Rate of flow into and from air vessel.

References

- 1) Chow V.T. – Open Channel Hydraulics, McGraw Hill, Inc. New York.
- 2) K.Subramanya. – Flow in Open Channels, Tata McGraw Hill, New Delhi. .
- 3) M. Hanif Chaudhry. –Open Channel Flow, Prentice Hall of India., New Delhi.
- 4) P.N. Modi & S.M. Seth. –Fluid Mechanics & Hydraulic Machines, Standard Book House, New Delhi
- 5) Jagadish lal. – Fluid Mechanics & Hydraulic Machines, Standard Book House, New Delhi
- 6) Streer and Wylie – Fluid Mechanics – McGraw Hill

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CE 406A/B Construction Engineering & Management –I

Module I

Scaffolding/ Falsework, Shoring and Underpinning: Scaffolding – parts of scaffolding – types of scaffolding – points to be kept in view of scaffolding – shoring – types of shoring – underpinning – methods of underpinning

Formwork: Requirements of a good formwork – Loads on form work – guiding points in the design of form work – properties of timbers used in the form work – column form work – spacing of yokes – formwork for beams and floors – form work for deck slabs in bridges

Module II

Engineering Economics : Nature and scope of economics, economics decision and technical decision, wants and utility, demand and supply, elasticity of demand and supply, concept of cost and revenue, concept of equilibrium and margin. Four factors of production and their peculiarities, Money and banking- Functions of money, functions of bank, commercial and central banks, monetary policy of the reserve bank of India.

National income – Macro economics approach , GNP, NNP, NI, DI, PI methods of calculation of national income.

ModuleIII

Organisation and management : Concept of organisation, characteristics of organisation, elements of organisation, organisational structures, organisation charts, Types of organisation - formal line, military or scalar organisation, functional organisation, line and staff organisation, project organisation, matrix organisation, management by objectives
Organisational conflict , group Dynamics, Organisational change, motivation and leadership, Authority and responsibility, span of control, Delegation of authority. – Centralisation and decentralization.

ModuleIV

Materials Management and Inventory Control :

Materials Management – Functions of materials Management, objectives of materials management, Inventory, Inventory control, Inventory classification & Management, Inventory control, its objectives and how to achieves them, Functions of inventories, Economics order Quantity, Inventory models- Simple EOQ model EOQ model with stock out, Inventory model under risk ABC analysis.

References

1. Gurucharan Singh – Building construction engineering – standard book house
2. Arora and bindra – building construction Planing Techniques and methods of construction – Dhanpat rai& Sons
3. R.R. Barthwalk - Industrial economics
4. Paul A Samuelson – Economics – An introductory analysis
5. O.P. Khanna- Industrial Engineering and Management, Dhampat Rai Publications .

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CE 407 A Survey Practical – II

1. Study of Theodolite.
2. Permanent adjustments of Theodolite.
3. Determination of Tacheometric Constants.
4. Heights and distances by stadia tacheometry.
5. Heights and distances by tangential tacheometry.
6. Heights and distances by solution of triangles.
7. Setting out simple curve-angular methods.
8. Demonstration of Total Station.

Note : 50 % marks is earmarked for continuous 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 407 B SURVEY PRACTICALS - II

1. Study and Permanent adjustments of Theodolite.
2. Determination of Tacheometric Constants.
3. Heights and distances by stadia tacheometry.
4. Heights and distances by tangential tacheometry.
5. Heights and distances by solution of triangles.
6. Setting out simple curve-angular methods.
7. Demonstration of Total Station.

Note : 50 % marks is earmarked for continuous 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 408A Fluid Mechanics Lab

- 1) Study of instruments: Pressure gauge, Piezometer, Manometer, Pressure transducers, Pitot
- 2) tubes, Current meter
- 3) Demonstration: Bernoulli's theorem – Phreatic lines – Fluming horizontally and vertically.
- 4) Steady flow through pipes: Determination of friction factor for various types of pipes.
- 5) Orifices and mouthpieces: various types – steady case.
- 6) Notches and weirs: various types – steady case.
- 7) Time of emptying: unsteady flow.
- 8) Discharged measurements: Venturimeter, Venturi flume, orifice meter, water meter.
- 9) Open channel flow: determination of Manning's coefficient.
- 10) Plotting the specific energy curve.
- 11) Determination of hydraulic exponents.
- 12) Tracing back water profiles.
- 13) Tracing draw down profiles.
- 14) Hydraulic jump parameters.
- 15) Study of Pelton wheel, Francis, Kaplan turbines.
- 16) Study of centrifugal pumps, reciprocating pumps, jet pumps, deep well pumps.

Note : 50 % marks is earmarked for continuous 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 408 B FLUID MECHANICS LABORATORY

1. Study of instruments: Pressure gauge, Piezometer, Manometer, Pressure transducers, Pitot tubes,
Current meter
2. Demonstration: Bernoulli's theorem – Phreatic lines – Fluming horizontally and vertically.
3. Steady flow through pipes: Determination of friction factor for various types of pipes.
4. Orifices and mouthpieces: various types – steady case.
5. Notches and weirs: various types – steady case.
6. Time of emptying: unsteady flow.
7. Discharged measurements: Venturimeter, Venturi flume, orifice meter, water meter.
8. Open channel flow: determination of Manning's coefficient.
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