

Course Title : NUMERICAL METHODS AND COMPUTATION**Course Code: MA131401****L-T:: C 3-2 =4**

ClassHours/week	4
Expected weeks	12
Total hrs. of classes	36+12 =48

MODULE	TOPIC	COURSE CONTENT	HOURS
1	Approximation in numerical computation	Truncation and rounding errors, fixed and floating point arithmetic, Propagation of errors.	4
2	Interpolation	Newton forward/backward interpolation, Lagrange's and Newton's divided difference Interpolation	12
3	Numerical Integration	Trapezoidal rule, Simpson's 1/3 rule, Simpson's 3/8 rule. Expression for corresponding error terms.	8
4	Numerical solution of linear equations	Gauss elimination method, matrix inversion, LU factorization method, Gauss-Seidel iterative method.	7
5	Numerical solution of Algebraic and transcendental equation	Bisection method, Regula-Falsi method, Newton-Raphson method.	7
6	Numerical solution of Ordinary differential equation	Euler's method, Runge-Kutta methods, Predictor-Corrector methods and Finite Difference method.	10
TOTAL			48

REFERENCE BOOKS:

1. Numerical Methods, Sukhendu Dey, Shishir Gupta, McGraw Hill Education (India) private Limited.
2. Numerical Algorithms. E. V. Krishnamurthy, S. K. Sen. Affiliated East-West Press.
3. Computer Programming & Numerical Analysis by N Dutta, University Press.
4. Numerical Methods. E. Balagurusamy, Tata McGraw - Hill Education (1999).
5. Numerical & Statistical Methods With Programming in c by Sujatha Sinha.
6. Numerical Methods In Eng. & Science, Dr. B. S. Grewal, Khpub publication.
7. Numerical Methods for Scientific and Engineering Computation by R. K. Iyengar, New Age International.
8. Numerical Mathematical Analysis by J. B. Scarborough, Oxford.

Course Title : STRUCTURAL ANALYSIS-I

Course Code: CE131402

L-T:: C 3-2 = 4

ClassHours/week	4
Expected weeks	12
Total hrs. of classes	36+12 =48

MODULE	TOPIC	COURSE CONTENT	HOURS
1	Introduction	Classification of Structures, Stress resultants, Degrees of freedom per node, Static and Kinematic Indeterminacy.	3
2	Strain Energy	Strain energy due to axial load, bending and shear, theorem of minimum potential energy, principle of virtual work, law of conservation of energy, 1st and 2nd Castiglione's Theorem, Betti's & Maxwell's reciprocal theorem, Deflection of Beams using Strain Energy Method and Unit load method	10
3	Analysis of Arches and Cables	Analysis of Arches, Linear Arch, Eddy's theorem, three hinged parabolic arch, Spandrel braced arch, Analysis of Cables under point loads and UDL	10
4	Suspension Bridges	Suspension cable with three hinged stiffening girder, Shear force and bending moment.	7
5	Indeterminate Structure-Compatibility Methods	Analysis of Fixed beam (moment area method), Continuous beam and simple frames with and without translation of joints by Method of Consistent Deformation and Three moments Theorem. Analysis of Propped Cantilever, Two-hinged Arches.	10
6	Curved Beams	Introduction, Bending of Curved bars in plane of bending, stresses in bars of small and large initial curvatures.	8
TOTAL			48

REFERENCES:

1. Basic Structural Analysis Reddy, C. S. Tata McGraw Hill
2. Elementary Structural Analysis Norris and Wilbur Tata McGraw Hill

3. Theory & Analysis of Structures Jain, O. P. Nem Chand & Bors., Roorkee, Vol. I&II and Jain B. K India
4. Structural Analysis Coates, R. C., English Language & Coutie, M. G. & Book Society & Nelson Kong, F.K
5. Structural Analysis Ghali, A & Neville, M. Chapman & Hall Publications
6. Advanced Structural Analysis Jain, A.K Nem Chand & Bors., Roorkee, India
7. Theory of Structures, Vol. II Jain, O.P. & Arya A. S Nem Chand & Bors., Roorkee, India
8. Indeterminate Structural Analysis Kinney, J.S. McGraw Hill Book Company
9. Indeterminate Structural Analysis Wang, C. K McGraw Hill Book Company
10. Structural Analysis, Thandavamoorthy.T.S. Oxford Higher Education

Course Title : HYDRAULICS AND HYDRAULIC MACHINES**Course Code: CE131403****L-T:: C 3-0 = 3**

ClassHours/week	3
Expected weeks	12
Total hrs. of classes	36

MODULE	TOPIC	COURSE CONTENT	HOURS
1	Open Channel flow	Channel section- Wetted perimeter, hydraulic radius, slope; Chezy's and Manning's formula, Economic section. Normal depth, specific energy, critical depth and critical velocity, types of bed slope. Gradually varied flow-surface profile, equation of gradually varied flow-direct step method, backwater curve, rapidly varied flow-hydraulic jump in horizontal rectangular channel, depth and length of jump, loss of energy.	8
2	Viscous flow	Viscosity- dynamic and kinematic; Equation of motion- Navier- Stokes equation; Laminar flow in circular pipes- Hagen Poiseuille equation, flow between parallel plates- Couette flow, plane Poiseuille flow.	5
3	Turbulent flow	Eddy viscosity, Prandtl mixing length theory, velocity distribution over smooth and rough surfaces.	2
4	Boundary Layer Theory	Boundary layer thickness- displacement, momentum and energy thickness, Laminar and turbulent boundary layer along a flat plate- momentum integral equation; Laminar sub-layer.	4
5	Flow around Submerged Bodies	Drag and lift, pressure and friction drag on sphere, cylinder and disc. Separation of flow -Kármán vortex street, lift-cylinder with circulation, Magnus effect, Drag and Lift coefficients.	4
6	Advanced Pipe Flow	Smooth and rough pipes, variation of friction factor, Moody's diagram, pipe network analysis-Hardy Cross method, water hammer in pipes- rigid and elastic water column theories, gradually and instantaneous closure of valves, surge tank.	4
7	Impact of Jet	Impulse momentum principle, momentum of momentum, force of jet on fixed, hinged and moving plate, including curved plate,	3

		water wheel and radically rotating curved vanes.	
8	Turbines	Classification, Impulse and reaction turbines, work done, power and efficiencies, Pelton wheel, Francis turbine, Kaplan and Propeller turbine, draft tube, unit quantities, specific speed.	3
9	Pumps	Centrifugal pump- velocity triangle, work done, manometric head, efficiency, minimum starting speed, multi stage pump. Reciprocating pump-discharge, indicator diagram, effects of acceleration and friction, Air vessels.	3
TOTAL			36

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TEXTBOOKS:

1. A textbook of Fluid Mechanics and Hydraulic Machines-. Dr. R. K. Bansal, Laxmi Publication.
2. A textbook of Fluid Mechanics and Hydraulic Machines- Sukumar Pati, Tata MaxGraw Hill.
3. A textbook of Fluid Mechanics – R K Rajput, S Chand & Company Pvt.
4. Fluid Mechanics through Problems – R. J. Garde- New Age Publications.

Course Title : ENGINEERING SURVEYING-II

Course Code: CE131404

L-T:: C 3-0 = 3

ClassHours/week	3
Expected weeks	12
Total hrs. of classes	36

MODULE	TOPIC	COURSE CONTENT	HOURS
1	Curves	Introduction, Types of Horizontal Curves, Properties of Simple Circular Curves, Horizontal Curve Setting by Chain and Tape Method, Horizontal Curve Setting by Deflection Angle Method or Rankine's Method, Compound Curve, Reverse Curve, Transition Curve, Vertical Curves.	5
2	Trigonometrical levelling	To determine the height of object when the base is accessible, To determine the height of object when the base is inaccessible.	3
3	Triangulation and trilateration	Classification of Triangulation System, Triangulation Figures or Systems, The Strength of Figure, Reconnaissance, Signals and Towers, Base Line Measurement, Tape Corrections, Satellite Station, Triangulation v/s Trilateration, Uses and Advantages of Trilateration, Reduction of slope distance from vertical angle and elevations.	8
4	Survey adjustments and theory of errors	Kinds of Errors, Laws of Accidental Errors, Laws of weights, Laws of Probable Error, Distribution of Error in the Field Measurements, Normal Equations, Determination of Most Probable Values, Method of Difference, Method Of Correlates.	8
5	Aerial survey	Aerial Camera, Scale of Vertical Photograph, Computation of Length of Line Between Points of Different Elevations, Relief Displacement, Flight Planning for Aerial Photography, Stereoscopic Vision, Parallax in Aerial Stereoscopic Views.	6
6	Remote sensing	Introduction, Idealized Remote Sensing, Basic Principles of Remote Sensing, Remote Sensing Observation Platforms, Indian Remote Sensing Satellites, Sensors, Application of Remote Sensing.	3

7	Special instruments	Telemeter, Altimeter, Electronic Theodolites, The Geodimeter, The Tellurometer, Total Station.	3
TOTAL			36

TEXTBOOKS:

1. Surveying Vol II and Vol III. K.R. Arora, Standard Publishers Distributors.
2. Surveying Vol II. B.C. Punmia, Ashok K. Jain, Arun K. Jain, Laxmi Publication.
3. Surveying Vol II. S.K. Duggal, McGraw Hill Education.

Course Title : ENGINEERING GEOLOGY AND ROCK MECHANICS**Course Code: CE131405****L-T:: C 2-2 = 3**

ClassHours/week	3
Expected weeks	12
Total hrs. of classes	36

MODULE	TOPIC	COURSE CONTENT	HOURS
1	Introduction	Introduction to Earth Science, Earth’s interior.	2
2	Geological work	Geological function of wind, running water and glacier.	7
3	Mineralogy	Rock forming minerals, their physical properties & uses – Feldspar group, Pyroxene group, Amphibole group, mica group.	4
4	Petrology	Igneous, Sedimentary and Metamorphic rocks – Their Formation, Classification, Structures, Textures and Engineering Importance.	3
		Geological and Engineering properties of granite, pegmatite, basalt, sandstone, limestone, shale, schist, gneiss, quartzite and marble.	3
5	Structural geology	Primary and Secondary structures of rocks: folds, faults, joints, unconformities - causes of formation, classification, Engineering considerations.	4
6	Geophysical prospecting	Electrical resistivity method	1
		Seismic Refraction Method	1
7	Rock mechanics	Engineering Classification of rocks- Intact & Insitu.	2
		Geological investigation for dams, tunnels & reservoirs.	2
		Rock quarrying-rock drilling, rock boring, core recovery, modified core recovery ,RQD	4
		Rock blasting and few related problems.	3
TOTAL			36

REFERENCES:

1. Engineering Geology-Subinoy Gangopadhyay, Oxford University Press.
2. A Textbook of Engineering Geology – Parbin Singh.
3. Engineering Geology – D Venkat Reddy, Vikash Publishing House Pvt. Ltd.
4. Rock Mechanics – V.P Verma.

Course Title : ECONOMICS AND ACCOUNTANCY

Course Code: HS131406

L-T ::C 4-0 = 4

ClassHours/week	4
Expected weeks	12
Total hrs. of classes	48

MODULE	TOPIC	COURSE CONTENT	HOURS
1	Introduction to Economics	i) Nature and Scope of Economics ii) Concepts of micro and macro economics, economic good and free good.	4
2	Demand and Supply Analysis	i) Law of Demand and determinants of demand. ii) Categories and Types of Elasticity of Demand- price elasticity, income elasticity, cross elasticity. iii) The determinants of elasticity, Demand elasticity and Revenue. iv) Law of Supply and Elasticity of Supply.	8
3	The Theory of Production and Cost	i) Iso-quant and Iso-cost line. ii) Law of Return to Scale and Law of Variable Proportion iii) Types of Cost – total, average and marginal cost, fixed cost & variable cost, long run and short run cost, private & social cost, economist's cost & accountant's cost, opportunity cost.	8
4	Market	i) Features of perfect competition and monopoly. ii) Price-Output determination under-- perfect competition, simple problems of perfect competition	5
5	Concepts of Accountancy	Various concepts like Journal, ledger and preparation of trial balance.	8
6	Preparation of Final Account	Trading Account, Profit and Loss account, Balance Sheet.	8
7	Depreciation	Depreciation Policy, Causes of Depreciation, straight line method.	4
8	Cash Book	Single, Double and Triple Column.	3
TOTAL			48

REFERENCE BOOKS:

1. Managerial Economics by Yogesh Maheswary, PHI Learning.
2. Mankiw Gregory N.(2002), *Principles of Economics*, Thompson Asia.
3. Misra, S.K. and Puri (2009), *Indian Economy*, Himalaya.
4. Engineering Economics by Dr. Afajuddin Ahmed, G Begum, Chandra Prakash.
5. Book Keeping and Accountancy, K.R. Das, Lawyer's Books Stall.

PRACTICALS

NUMERICAL METHODS AND COMPUTATION LAB

SUBJECT CODE L-T-P-C CLASS HOUR TOTAL NO. OF CLASS EXPECTED NO. OF WEEKS	NUMERICAL METHODS AND COMPUTATION LAB MA131411 0-0-2-1 3hrs/week 5 (APPROX) 5 (APPROX)
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EXPERIMENT NO.	TITLE OF THE EXPERIMENT	HOURS
1	Write a C program to solve algebraic equations by using Method of Bisection.	3
2	Write a C program to solve algebraic equations by using Method of False position.	3
3	Write a C program to solve algebraic equations by using Newton Raphson Method.	3
4	Write a C program to solve linear system of equations by using Gauss Jordan Method.	3
5	Write a C program to solve linear system of equations by using Gauss Seidal Method.	3
TOTAL		15

Course Title : **HYDRAULICS AND HYDRAULIC MACHINES LAB**
Course Code: **CE131413**
L-T-P:: C **0-0-2:: 1**

EXPERIMENT NO.	TITLE OF THE EXPERIMENT	HOURS
1	Determination of the sequent depths in Hydraulic Jumps.	3
2	Experiment on the impact of Jets.	3
3	Determination of friction factor in pipe flow cases.	3
4	Determination of critical velocity in pipe flow cases.	3
TOTAL		12

Course Title : ENGINEERING SURVEYING-II LAB
Course Code: CE131414
L-T-P:: C 0-0-2:: 1

EXPERIMENT NO.	TITLE OF THE EXPERIMENT	HOURS
1	To set out a simple circular curve by the method of offsets from long chord.	3
2	To carry out an open traverse with the help of prismatic compass.	3
3	Three-point problem by using plane table.	3
4	Direct contouring by using tangent clinometer.	3
5	To measure the height of building when the base is accessible.	3
6	To measure the height of building when the base is inaccessible.	3
7	Demonstration of Total Station.	3
TOTAL		21

Course Title : ENGINEERING GEOLOGY AND ROCK MECHANICS LAB
Course Code: CE131415
L-T-P:: C 0-0-2:: 1

- Megascopic studies of some important minerals and rocks.
- Problems of dip and strike and completion of outcrops.
- Geological maps and geological sections.
