

Bhavnagar University
B.E. Semester III (Civil)
C-301: Mathematics-III

Teaching Scheme			Examination Scheme				Total Marks
Hours per week			Theory		Pract/ Oral /Marks	T.W. Marks	
Theory Lectures Hours	Tut Hours	Practical	Marks	Hrs.			
03	--	--	100	03	--	--	100

1. Ordinary differential equations of higher order definition complete solution, operator D. Complementary function inverse operator, rules for finding particular integral, Cauchy's and Legendre's linear equation, simultaneous linear equations with constant coefficients application to engineering problems such as deflection of beam, electrical circuit, forced damped oscillations.

2. Fourier Series:

Euler's formula, Dirichlet's condition functions having point of discontinuity change of interval, expansion of odd or even periodic function, half range series.

3. Laplace Transforms:

Introduction, Transformation of elementary functions, properties of L.T. Existence conditions, inverse transform, Transform of derivatives transform of integrals, multiplication by t^n , division by t , convolution theorem, Application to solution of differential equations.

4. Series Solution of Differential equations of the type

$$P_0 \frac{d^2 y}{dx^2} + P_1 \frac{dy}{dx} + P_2 y = 0$$

5. Function of Complex Variables:

Introduction, $f(z)$ and its continuity, Derivative of $f(z)$ Cauchy – Riemann equations, analytic functions, harmonic functions orthogonal system application to flow problems geometrical representation of $f(z)$ conformal transformation, Schwarz – Christoffel transformation, some standard transformation, special conformal transformation, complex integration Cauchy integral formula, Cauchy theorem.

6. Statistics:

Poisson and normal distribution, curve fitting and regression.

Books:

- Higher Engineering Mathematics – By Dr. B.S. Grewala.
- Engineering Mathematics I & II- By Shantinayakan.
- Applied Mathematics - By P.N. Wartikar & J.N. Wartikar.
- Mathematics for Engineers- By C.Prasad
- Advanced Mathematics for Engineers- By C.Prasad.

Bhavnagar University
B.E. Semester III (Civil)

C-302: Computer Programming and Numerical Analysis in Civil Engineering

Teaching Scheme			Examination Scheme				Total Marks
Hours per week			Theory		Pract/ Oral /Marks	T.W. Marks	
Theory Lectures Hours	Tut Hours	Practical	Marks	Hrs.			
03	--	02	100	03	25	25	150

(A) Computer programming:

1. Introduction:

Computer Hardware: Input, CPU,

Output, Computer programs: High level and Low level languages.

Terminology, history and introduction to DOS, software and their utility.

2. Introduction to various computer Languages:

3. "C" Programming Language:

Introduction, Input and Output, Constants, Variables, Data Types Operators and Expressions, Control of Programme flow and control structures Through various branching and looping statements, User's defined ructions for defining, declaring, calling as well as the use of arguments and return values. Character strings, and arrays.

(B) Numerical Methods:

1. Linear in dependent algebraic equations and their solutions, by elimination and iterative techniques, Matrix inversion, Gauss elimination Gauss – Jordan, Gauss- sidle iteration,

2. Non linear equations – Roots of polynomial, Newton-Rafhson method.

3. Finite differences method, backward, central and forward differences, Application to ordinary boundary value problems, Interpellation, Newton's and lags ranges formula for interpolation.

4. Numerical differentiation and integration, Newton-cotes equal interval rules, Quadrate rules, Trapezoidal and Simpson's rules.

5. Numerical solution of ordinary differential equations, initial value problems using any one method.

C) Applications:

Engineering problems & Its formulation, numerical method and computer programming with "C" Language.

TERM WORK:-

Term Work, Practical/Oral Shall consist of Tutorials, Problems and other assignments based on the course under "Computer Programming and Numerical Analysis Engineering."

Reference Book:

1. Introductory Methods of Numerical -S.S. Sastry
2. Numerical Mathematical Analysis -Scarborough
3. Programming with Ansi "C" -E.Balaguruswami
4. Programming "C" -Godfried {Schume Series}

Bhavnagar University
B.E. Semester III (Civil)
C-303: Theory of Structures.

Teaching Scheme			Examination Scheme				Total Marks
Hours per week			Theory		Pract/ Oral /Marks	T.W. Marks	
Theory Lectures Hours	Tut Hours	Practical	Marks	Hrs.			
03	--	02	100	03	25	25	150

1. Slope and Deflection of Beams:

Differential equation of the elastic curve, Relation between moment, slope and deflection, Different methods for slope and deflection in statically determinate beams – double integration method, Macaulay's method, moment area method, conjugate beam method . Beams subjected to concentrated, uniformly distributed & varying loads, effect of varying moment of inertia.

2. Consistent deformation method applied to propped cantilever beams, rigid & elastic supports, effects of varying moment of inertia.

3. Fixed Beams:

Analysis of beams under concentrated, uniformly distributed and varying loads and couples, sinking of support and rotation effect. Effect of varying moment of inertia, Advantages & disadvantages of fixed beams.

4. Continuous Beams:

Analysis of continuous beams by moment distribution method.

5. Direct and Bending Stresses:

Short Columns subjected to eccentric loads, middle third rule, and kernel of sections, Chimney subjected to wind pressures, Masonry walls and dams subjected to hydraulic pressures.

6. Columns and Struts:

Buckling of columns, different end condition, effective length , least radius of gyration, product of inertia, principal axes, Mohr's circle of inertia, Theory of long columns, applicability and limitations of Euler's formula, Columns with initial curvature, Rankin's formula for columns, Eccentrically loaded columns, Secant formula used in I.S. specification, Columns with lateral loadings.

7. Strain Energy:

Resilience, strain energy in tension compression, shear, bending and torsion, proof-resilience, modulus of resilience, impact & sudden loads,

8. Arches:

Three hinged segmental, parabolic shape, normal thrust, shear & moment.

9. Riveted and Welded Joints:

Riveted and welded joints, advantages and disadvantages, Strength and efficiency of Riveted and welded joints, Joints subjected to eccentric loading, Stresses in welded joints subjected to bending and torsion.

Term Work:

This will consist of graphical and /or analytical solutions of at least 25 problems based on the syllabus of Theory of Structures.

List of Experiments:

1. Deflection of beams (Cantilever)
2. Experiments on bricks.
3. Slope deflection analysis on continuous beam.
4. Deflection of three – hinged arch.

Reference Books:

1. Mechanics of Materials - By Timoshenko & Gere.
2. Strength of Materials - By G.H. Ryder.
3. Mechanics of Structures Volk.-I- By S.B.Junarkar
4. Mechanics of Materials (Indian edition) - By E.P.Popov.

Bhavnagar University
B.E. Semester III (Civil)
C-304: Engineering Geology

Teaching Scheme			Examination Scheme				Total Marks
Hours per week			Theory		Pract/ Oral /Marks	T.W. Marks	
Theory Lectures Hours	Tut Hours	Practical	Marks	Hrs.			
03	--	02	100	03	25	25	150

1. General:

Object, scope and sub-divisions of geology; Geology and Engineering; Earth Science and earth history- origin and internal structure of earth.

2. Geomorphology:

Definition and scope, weathering of rocks – physical & chemical weathering, factors affecting weathering, resistance to weathering, products, and engineering considerations. Geological work of atmosphere, wind, rivers, seas, Groundwater, Glaciers, Organisms.

3. Mineralogy:

Definition, physical properties of minerals Crystallography crystal systems; Rock forming mineral; Economic mineral deposits and industrial minerals in India. Goal – composition, Classification, formation, Indian occurrences; Petroleum – composition, origin migration, accumulation, Indian occurrences.

4. Petrology:

Igneous rocks – textures and structures, forms – sills and dykes, classification, Sedimentary rocks - formation, texture structures and classification. Metamorphic rocks – factors and kinds of metamorphism, textures, structures and classification. Study of common rock types.

5. Structural Geology:

Primary and secondary structures – intrusion, flows, mass, stratification, lamination, bedding, structural features of rocks – outcrop dip, strike and their relation; structural deformation – fold, faults, joints, schistosity, unconformities, overlaps, outliers, inliers; Intrusive and extrusive structures; Engineering Significance of geological structure.

6. Stratigraphy:

Principles of correlation, standard stratigraphical scale and geological of India; Geological divisions of India; Geology of the region.

7. Miscellaneous Topics:

Elements of rock mechanics; Fundamentals of environmental geology.

Term Work:

Term Work, Practical/Oral Shall is in the form of assignments, tutorials, laboratory experiments, field visits, group discussion, etc. based on the above course. Megascopic study of 35 – 40 minerals specimens and 15 – 20 rock specimens.

Text Book:

1	Engineering and general geology	Parbin Singh	Katson Publishing house, Ludhiana
Reference Books:			
1	A text book of geology	P.K. Mukerjee	The world press Pvt. Ltd, Calcutta
2	Structural geology	Marland P Billings.	Prentice – Hall Inc
3	A text book of geology	K.M.Bangar	Standard Publishers distributors, Delhi
4	Experiments in engineering geology	K.V.G.K. go hale & D.M.Rao	Mc Graw Hill book company inc.
5	Geology of India	D.N.Wadia	Tata McGraw – Hill Co. Ltd. New Delhi
6	Principles of physical Geology	Arthur homes.	“
7	Bis and other standards & Publication		

Bhavnagar University
B.E. Semester III (Civil)
C-305: Building Construction

Teaching Scheme			Examination Scheme				Total Marks
Hours per week			Theory		Pract/ Oral /Marks	T.W. Marks	
Theory Lectures Hours	Tut Hours	Practical	Marks	Hrs.			
03	--	02	100	03	25	25	150

1. Introduction:

Scope, Standards and codes, General concepts of design and construction of building components. Types of Building.

2. Foundation:

Objects and requirements, Site inspection, Bearing capacity and loads, Shallow foundation, Special foundations, Foundations in difficult sites, Foundation for machines, Foundation failures.

3. Masonry Construction:

Stone masonry – materials, terms, joints, classification, dressing and laying, principles of construction, suitability, Brick masonry materials, definitions, types bonds, thickness of walls, general principle of construction, Cavity walls, Reinforced brickwork, partition walls.

4. Cement Concrete Construction:

Materials, admixtures, proportioning, properties, mixing, transporting, curing of concrete, Colored, lightweight, no-fines concrete, Joints in concrete work, Placing concrete in adverse situation, Precast and cast-in-Situ concrete.

5. Arches and Lintels:

Terms, types and construction of arches, lintels and chajjas.

6. Doors and Windows:

Important consideration, terms, types of doors and windows, ventilators, skylights, mosquito proofing, Fixtures and fastenings, Carpentry terms and joints.

7. Stairs and Staircases:

Technical terms, types, requirements of good stair, Materials, Ramps, Ladders, Elevators, Escalators.

8. Floors and Floorings:

Types of floors and flooring and their suitability, Construction details.

9. Roofs and Roof Coverings:

Requirements of good roof, Classification and types of roofs, roof coverings, construction, water proofing and drainage of roofs, ceilings.

10. Building Renderings:

Painting and plastering, whitewashing, colourwashing and distempering, painting and varnishing, plaster boards and wall papers.

11. Building Services:

Plumbing; Sanitation, Drainage, Electrical.

12. Miscellaneous Treatments:

Damp proofing, Termite control Ventilation, Air conditioning, Acoustic treatment, Fire protection, Thermal insulation, Prefabricated construction, Earthquake resistant construction, Building maintenance.

Term Work shall be in the form of Assignment, Sketches, and Field – Visits Based on the above Course.

Text Book:

1	A Text book of Building Construction	Arora and Bindra.	--
Reference Books:			
1	Building Construction	B.C.Punmia	--
2	Building Construction	Shushil Kumar	--
3	Building Construction	S.C. Rangwala	--
4	Time saver standard for MIC Grawhil	BIS, CRBI	--
5	B.C.Vol;-I-4	W.B. Manay	Longmet, New Delhi
6	Const Tech. 1-4	Rechulley	“
7	Encyclopedia & Bldg.	IECH. H.J.Convany	M/Sprenticetiall, New Delhi

Bhavnagar University
B.E. Semester III (Civil)
C-306: Advanced Surveying

Teaching Scheme			Examination Scheme				Total Marks
Hours per week			Theory		Pract/ Oral /Marks	T.W. Marks	
Theory Lectures Hours	Tut Hours	Practical	Marks	Hrs.			
03	--	04	100	03	25	25	150

1. TACHEOMETRY :

Principles; systems and methods; instruments tachometer stands, Rod, Anallactic Lens, sub tense Bar; field work recording computations
tachometric reductions; –tacheometric table; staid; slide rules; direct reading and self reading tachometers; errors and precision; applications.

2. CURVES:

Meaning terms designation classifications simple circular and compound curves- elements; setting out methods and data; transition curves –necessity; characteristics; elements types design criteria; setting out vertical curves-types; elements; assumptions, design, criteria setting out.

3. ENGINEERING AND PROJECT SURVEYS:

Route surveys- reconnaissance; preliminary; final location and construction surveys; site selection and setting out surveys for engineering projects –tunnels, bridges, dams mines etc. General requirements; principles and specifications for project surveys, topographic surveys; city surveys.

4. HYDROGRAPHIC SURVEYING.

Scope tides; sea level shore line surveys; gauges; sounding- equipments methods; location and plotting, three point problem.

5. ELEMENTS OF FIELD ASTRONOMY :

Celestial sphere; astronomical terms ;astronomical coordinate systems and their relation; sidereal; solar; local and standard times; equation of time methods of determination of azimuth; true meridian.

6. ELEMENTS OF PHOTOGRAMMETRY:

Stereo-Photogrammetry binocular vision and stereoscopic fusion; aerial Photogrammetry- basic principles, aerial camera; types.
And geometry of photographs; flight- planning; applications of Photogrammetry- principles of photo - interpretation.

7. ELEMENTS OF REMOTE SENSING :

Terms definition; elements of remote sensing E.M. spectrum; its regions and its applications. Physics of remote sensing; kirthoff's law; sterphon boltzman and plank's law; image and image interpretation.

8. MODERN METHODS IN SURVEYING :

Use of electronics in surveying; telemetry; E.D.M. introduction to modern instruments. .

TERM WORK :

Term work shall be in the form of field base project, mentioned below.

1. Tachometry
2. Setting out simple and transition curve.
3. Exercises on Photogrammetry and remote sensing.
The appropriate drawing sheets will be prepared for above mentioned field base works.

TEXT BOOK :

1. Surveying and leveling part – I & II By T.P.Kanetkar and S.P. Kulkarni.
2. Surveying & Levlling Part- I,II & III By Dr. B.C. Punmia.

REFERENCE BOOKS :

1. Surveying By David Clarke
 2. Principles of surveying by Nagraj & Hussin
 3. Bis & other standards and Publications.
 4. Elements of Photogrammetry By Wolf; Mic Graw Will Pub. Co.
New Delhi.
 5. Route Survey & Design By C.F.Meyer; M/s. Haper & Row Inter
New Delhi.
 6. Remote Sensing & Image Interpretations- Lilisand & Kiffer
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