VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT.

B.E. Civil Engineering

Semester - III

B.E./B.Tech II (Civil) :: 3rd Semester		Teaching Scheme (Hours)			Examination Scheme					
					Theory			Practical/ Drawing		
Course	Course No.	L	T	P	Duration (hours)	Marks	Tuto. Mark.	Cont. Int. Eval. Marks	End Sem. Marks	Total Marks
Surveying -I	C301C	3	-	4	3	100	-	40	60	200
Fluid Mechanics -I	C302C	3	-	2	3	100	-	20	30	150
Transportation Engg - I	C303C	3	-	-	3	100	-	-	-	150
Mechanics of Solids	AM 304C	3	1	2	3	100	25	20	30	175
Engg. Maths & Statistical Methods	ASH 305C	3	1	-	3	100	25	-	-	125
Electronics & Instrumentation	EC 306C	3	-	2	3	100	-	20	30	150

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CE 301 C SURVEYING - I

(A) THEORY:

1. PLANE TABLE SURVEY:

Plane table and accessories, plane table techniques, two point and three point problems, error in plane tabling, advantages and disadvantages of plane tabling.

2. LEVELLING:

Methods of levelling, setting out levels, permanent adjustments of level, applications of levelling in sewer line, road alignment, precise levelling, levelling errors.

3. COMPUTATION OF AREAS AND VOLUMES:

Areas from field measurements and plans, different methods, Trapezoidal and Simpson's rule, Plannimeter.

Volume by trapezoidal and prismoidal formula, calculation of earthwork in cutting and embankment for civil engineering works, mass haul diagram, volume by spot levels, capacity of reservoir.

4. THEODOLITE SURVEY:

Introduction, types of theodolite, temporary and permanent adjustment of theodolite, field operations with theodolite, theodolite traversing, latitude and departure, Gale's traverse table, omitted measurements in theodolite traversing, errors in theodolite traversing.

5. CURVE SURVEYING:

Introduction, classification of curves, simple, compound and transition curves, methods of setting the curves, vertical curves.

6. CONSTRUCTION SURVEYS:

Introduction, setting out buildings, pipe lines and sewers, roads.

7. HYDROGRAPHIC SURVEYS:

Introduction, controls in hydrographic surveying, shore line survey, soundings, reduction in soundings, methods of locating and plotting of soundings.

(B) PRACTICALS / DRAWINGS :

Based on the theory course as prescribed above.

REFERENCES:

1. Dr. K. R. Arora, " Surveying and Levelling, Vol. I & II ", Standard Publications.
2. Kanitkar & Kulkarni, " Surveying and Levelling, Vol. I & II ", Vidyarthi Gruh Prakashan.
3. K. S. Duggal," Surveying and Levelling, Vol. I & II", TMH Edition.

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CE 302 C FLUID MECHANICS - I

(A) THEORY:

1. FLUID PROPERTIES:

Scope of fluid mechanics, fluid properties and classification of fluids.

2. FLUID STATISTICS:

Fluid pressure and its measurements, Hydrostatic forces on plane and curved surfaces, Buoyancy and Floatation.

3. FLUID KINEMATICS:

Types of fluid flows, stocam lines and path lines, streak lines, stream lines, Tutes-Euleriam and Lagrawgiam Approach, Continuity Equation, Velocity potential and stream fumetian velocity and Acceleration of fluid particles.

4. FLUID FLOW DYNAMICS:

Eulers and Bernouli's equations and applications, Momentum equations, Energy and Momentum correction factors.

5. LAMINAR FLOW:

Reynold's experiment and Reynold's Number, Shear and pressure relationship, Laminar flow through pipes and porous media, Instability of laminar flow, Measurement of viscosity.

6. FLUID FLOW MEASUREMT:

Flow measuring devices for pipe and open channel: Orifice, Nozzle, Venturi and Bend meters, Notches, Weirs and pitot tubes, Orifices and Mouthpieces.

(B) PRACTICALS / DRAWINGS :

1. Study of relationship between hydrostatic pressure and Depth of Immersion.
2. Determination of metacentric height of a floating body.
3. Determination of coefficients for a circular orifice.
4. Caliberation of Triangular Notch.
5. Caliberation of Venturimeter.
6. Caliberation of Nozzlemeter.
7. Caliberation of Orifice meter.
8. Caliberation of Centrifugal Headmeter.
9. Verification of Bernouli’s Theorem.
10. Determination of Viscosity and Friction Factor for laminar flow.

REFERENCES:

1. Gerde R. J. & A. G. Mirajgaonkar, " Engineering Fluid Mechanics ", Nanchand Bros., Roorkee.

2. K. Subramanya, " Theory and Applications of Fluid Mechanics ", TMH Publishing Company Limited., New Delhi.

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CE 303 C TRANSPORTATION ENGINEERING - I

(A) THEORY:

1. TRANSPORTATION SYSTEM:

Role of transportation engineering , Major transport systems, Impact on social, cultural and economical processes, factors in transport development, History of Transportation System Growth, transport System in India.

2. BASIC TRANSPORTATION SYSTEM:

Components of each system, Carrier classification.

3. TECHNOLOGICAL FACTORS:

Basic Supporting Systems for Roads, Railways, Airports, Waterways, Belt Conveyors.

4. TECHNOLOGICAL CHARECTERISTICS:

Guidance, Buoyancy, Stability and Resistance considerations for the different transportation systems.

5. OPERATING CHARECTERISTICS:

Flexibility, Speed safety land-use, capacity for different transport systems.

6. TRANSPORTATION INFRASTRUCTURE:

For Airports, Railways, docks and Harbors.

REFERENCES:

1. Hay W. W., " Transportation Engineering ", John Wiley & Sons.

2. Hennis R. G. & M. I. Ekse, " Fundamentals of Transportation Engineering", McGraw Hill Book Co.

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AM 304C MECHANICS OF SOLIDS

(A) THEORY:

1. SIMPLE STRESSES AND STRAINS:

Concept of stress and strain-types of stresses and strains. Elastic bodies, Elasticity, Hooke's Law, Stress - Strain Diagram for ductile and brittle materials, Yield and Working Stress, Factor of Safety, Linear Lateral Strain, Poisson's ratio, Volumetric Strain, Relation between Modulus of Elasticity - Modulus of Rigidity - Bulk Modulus, Elongation due to self weight, Bars of varying section, Uniformly Tapering Section, Thermal Stresses and Strains Composite Section.

2. FLEXURAL MEMBERS:

Shear Force and Bending moment diagrams for Statically determinate beams such as Cantilever, Simply supported and overhang beams with concentrated uniformly distributed and varying loads, moments, inclined loads, and sinusoidal loads.

3. STRESSES IN FLEXURAL MEMBERS:

Theory of simple bending, assumptions, moment of resistance modulus of section, shear stresses due to bending, beams of uniform strength, beams of two materials, arranged spring.

4. DIRECT AND BENDING STRESSES:

Combined bending and direct stresses, eccentric loading, limit of eccentricity, distribution of stress at the base, chimney subjected to wind pressure, walls subjected to water pressure, stress analysis of dam section, middle third rule.

5. TORSION:

Torsional stresses in circular (solid and hollow) section, shaft strength, shaft angle of twist theory of pure torsion, power transmitted by shaft, shaft of varying section, combined bending and torsion, close coiled helical spring.

6. BUCKLING OF COLUMNS:

Different end conditions, effective length, least radius of gyration, theory of long column, application and limitations of euler's formula, rankine's formula, secant formula used in I.S. code.

7. PRINCIPAL STRESSES AND STRAINS:

Tangential and normal stresses, principal planes and stresses, analytical methods for stresses on an oblique section subjected to direct and shear stresses, mohr's circle method.

8. THIN AND THICK CYLINDERS:

Cylindrical shells, thin and thick cylinders, hoop, longitudinal and radial stresses, thin cylinders subjected to lam's theory for thick cylinders.

9. STRAIN ENERGY:

Strain energy, resilience proof, modulus of resilience, Strain Energy due to gradually impact loads, Strain Energy due to shear torsion and bending.

10. MECHANICAL PROPERTIES OF MATERIALS:

Ductile material, brittle material, elasticity hardness, toughness and endurance limit.

(B) PRACTICALS:

Eight practicals are based on above theory. (1) Tension test (2) Compression test (3) Torsion test (4) Transverse test (5) Charpy impact test (6) Shear test (7) Springs in parallel (8) Hardness test.

(C) TUTORIALS:

At least 30 problems based on above course work.

REFERENCES:

1. S. B. Junarkar & H. J. Shah, " Mechanics of Structures ", Charotar Publishing House, Anand.

2. S. Timoshanko & D. H. Young, " Elements of Strength of Materials ",Affiliated East-West Press Pvt. Ltd.

3. E. P. Popov & I. P. Kapia, " Introduction to Mechanics of Soilds ",Prentice Hall of India, New Delhi.

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Semester - III

ASH 305 C ENGG. MATHEMATICS & STATISTICAL METHODS

(A) THEORY:

PART-I : ENGG. MATHEMATICS :

1. IMPROPER AND MULTIPLE INTEGRALS:

Reorientation of Integration, Concepts of improper Integrals, Beta and Gamma functions with properties, double and triple integration, Evaluation, change of order of double integration, change of variables, application for finding area, volume and surfaces.

2. VECTOR CALCULAS:

Reorientation & Mathematical Preliminaries of vector calculus, line integrals and applications, point functions, directional derivatives and its geometrical meaning, grad., divergenal curl and laplacian with their physical interpretations; vector identities , integral theorems (without proofs) with applications.

3. SECOND ORDER PARTIAL DIFF. EQUATIONS:

Reorientation and mathematical preliminaries, introduction to heat, wave and laplace equations and their solution by method of separation of variables in case of standard and initial conditions.

4. INTRODUCTION TO MATHEMATICAL MODELLING:

Concepts, approaches.

PART - II STATISTICAL METHODS:

5. PROBABILITY DISTRIBUTIONS:

Binomial, Poisson and normal distribution, properties, applications, measures of central tendency and dispersion.

6. SAMPLING:

Concepts, methods and distribution of means and variance known and unknown.

7. INTERFERENCE TESTS:

Test of Hypothesis, Chi-square test for goodness of fit, quality control.

8. REGRESSION:

Linear regression, method of least square, coefficient of correlation, significance of correlation coefficient - regression applications.

(B) TUTORIALS:

Tutorials are based on above theory.

REFERENCES:

1. Mulholland H. & C. R. Jones, " Fundamentals of Statistics ", The English Language Book Society and Butter worths.
2. E. Kreyszig, "Advanced Engineering Mathematics ", International Student Edition, 1995 (Wiley).
3. C. R. Wylie, "Advanced Engineering Mathematics ", McGraw Hill International Student Edition (1993).

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EC 306C ELECTRONICS AND INSTRUMENTATION

(A) THEORY:

PART - I ELECTRONICS:

1. INTRODUCTION:

Introduction to electronic engineering, areas of application in Civil Engineering .

2. SOLID STATE DEVICES:

Physical concept of semiconductor materials - PN Junction diode and its characteristic equivalent circuit of a diode small signal and large signal. Different types of diodes and its applications.

3. SMALL SIGNAL AMPLIFIERS:

CE, CB, CC Configurations, the AC load line, maximum load power for class A, B and C amplifier introduction, Distortion, principles of feedback in amplifiers. Coupling methods in amplifiers, D.C. amplifier, difference amplifier, Basic properties of operational amplifier and its applications.

4. RECTIFIERS AND OSCILLATIONS:

Single phase type half wave , full wave rectifiers with resistive load. Bridge rectifiers, the ripple measurement, Introduction to filter circuits, SCR characteristics, phase controlled rectifier. Principle of an oscillator when bridge oscillator, Astable multi-vibrators, UJT and its application as saw-tooth generator.

PART - II INSTRUMENTATION:

1. MEASUREMENT AND ERROR:

Definitions , accuracy and precision, general idea about electronic instrumentation and its merits and demerits. Precautions in using sophisticated electronic instruments. Digital and analogue instruments.

2. MEASURING INSTRUMENTS:

Cathode ray oscilloscope and its use in frequency and phase measurement, multi-meter, strain gauge bridge. Measurement of displacement velocity and acceleration. Temperature controllers ON / OFF type, BOD incubator, Temperature controlled furnace / oven, electronic timers and pulse counters using ICs.

3. ELECTRONIC INSTRUMENTS:

Instruments used in Environmental analysis and measurements - pH meter, Flame photometer, Spectra-photometer, Conductivity bridge, Stress analyzer, polarograph, gas chromatograph , noise meter, oxygen analyzer. Instruments used in Transportation and water

resources engineering. Electronic traffic control system using microprocessor . Electronic radar for speed measurement. Block diagrams of instruments used in telecommunication and wireless communication.

4. TRANSDUCERS:

As input elements to instrumentation systems classification, selection, strain gauges, displacement
transducers, temperature measurements, photosensitive device instrumentation systems, interfacing transducers to electronic control and measuring systems, multiplexing.

(B) PRACTICALS :

Practicals are based on above theory.

REFERENCES:

1. " Electronic Principles ", A Malvino Edition, 1996.
2. " Modern Electronic Instrumentation and Measurement Techniques " by A. D. Helfrick and W. D. Cooper, PHI Edition 1995.
3. " Foundation Instrumentation ", Hanna.
4. " Experimental Stress Analysis ", Dally and Rielery.
5. " Experimental Stress Analysis and motion measurement ", Dover and Adams.
6. " Experimental Stress Analysis ", Havd. Book by Hetenyt