CIVIL ENGINEERING YEAR: II SEMISTER: III

Sl. No.	Course No.	Subject	Periods			Evaluation Scheme					Credit
Theory			L	T	P	SESSIONAL EXAM				SUB TOTAL	
						TA	CT	TOT	ESE		
1	CS1312	NUMERICAL ANALYSIS & COMPUTER PROGRAMMING(C,C++)	2	1	-	15	10	25	50	75	3
2	ME1312	MATERIAL SCIENCE	2	1	-	15	10	25	50	75	3
3	ME1303	STRENGTH OF MATERIALS	3	1	-	30	20	50	100	150	4
4	CE1301	FLUID MECHANICS	3	1	-	30	20	50	100	150	4
5	CE1302	SUREYING - I	3	1	-	30	20	50	100	150	4
6	MH1305	MATHEMATICS III	3	1	-	30	20	50	100	150	4
PRACTICAL/DRAWING/DESIGN											
7	CS1303-P	FLUID MECHANICS LAB	-	-	3	25	-	25	25	50	2
8	ME1307-P ME1308-P	MATERIAL SCIENCE/ STRENGTH OF MATERIALS LAB (To be taken Alternately)	-	-	3	25	-	25	25	50	2
9	CS1301-P	NUMERICAL ANALYSIS & COMPUTER PROGRAMMING(C,C++)	-	-	3	25	-	25	25	50	2
10	CE1304P	SUREVEY FIELD WORK	-	-	3	25	-	25	25	50	2
11	HS1303-P	GENERAL PROFICIENCY III	-	-	-	-	-	50	-	50	2
		TOTAL	16	6	12	-	-	-	-	1000	32

TA-TEACHERS ASSESSMENT CT-CLASS TEST ESE- END SEMESTER EXAMINATION

TOTAL MARKS: 1000 TOTAL PERIODS : 34 TOTAL CREDITS : 32

CIVIL ENGINEERING YEAR: II SEMISTER: IV

Sl. No.	Course No.	Subject	Periods			Evaluation Scheme					Credit
Theory			L	T	P	SESSIONAL EXAM				SUB TOTAL	
						TA	CT	TOT	ESE		
1	CS1412	COMPUTER GRAPHICS	2	1	-	15	10	25	50	75	3
2	CE1401	ENGINEERING GEOLOGY	2	1	-	15	10	25	50	75	3
3	CE1402	FLUID MECHANICS – II	3	1	-	30	20	50	100	150	4
4	CE1403	STRUCTURAL ANALYSIS - I	3	1	-	30	20	50	100	150	4
5	CE1404	SUREYING - II	3	1	-	30	20	50	100	150	4
6	CE1405	BUILDING MATERIAL & CONSTRUCTION	3	1	-	30	20	50	100	150	4
PRACTICAL/DRAWING/DESIGN											
7	CE1406-P	FLUID MECHANICS LAB	-	-	3	25	-	25	25	50	2
8	CS1413-P	COMPUTER GRAPHICS LAB	-	-	3	25	-	25	25	50	2
9	CE1407-P	ELECTRICAL MACHINES LAB I	-	-	3	25	-	25	25	50	2
10	EE143-P	SUREVEY FIELD WORK	-	-	3	25	-	25	25	50	2
11	HS1404-P	GENERAL PROFICIENCY IV	-	-	-	-	-	50	-	50	2
		TOTAL	16	6	12	-	-	-	-	1000	32

TA-TEACHERS ASSESSMENT CT-CLASS TEST ESE- END SEMESTER EXAMINATION

TOTAL MARKS: 1000 TOTAL PERIODS: 34 TOTAL CREDITS: 32

CIVIL ENGINEERING YEAR: III SEMISTER: V

Sl. No.	Course No.	Subject	Periods			Evaluation Scheme					Credit
Theory			L	T	P	SESSIONAL EXAM				SUB TOTAL	
						TA	CT	TOT	ESE		
1	HS1511	MANAGEMENT SCIENCE	2	1	-	15	10	25	50	75	
2	CE1501	TRANSPORTATION ENGINEERING	2	1	-	15	10	25	50	75	
3	CE1502	STRUCTURAL ANALYSIS - II	3	1	-	30	20	50	100	150	
4	CE1503	CONCRETE STRUCTURE - I	3	1	-	30	20	50	100	150	
5	CE1504	GEO-TECH ENGINEERING	3	1	-	30	20	50	100	150	
6	CE1505	ENVIRONMENT ENGINEERING	3	1	-	30	20	50	100	150	
PRACTICAL/DRAWING/DESIGN											
7	CE1506-P	STRUCTURAL ANALYSIS LAB	-	-	3	25	-	25	25	50	
8	CE1507-P	TRANSPORTATION ENGINEERING LAB - I	-	-	3	25	-	25	25	50	
9	CE1508-P	GEO-TECH ENGINEERING LAB- I	-	-	3	25	-	25	25	50	
10	CE1509-P	ENVIRONMENT ENGINEERING LAB -I	-	-	3	25	-	25	25	50	
11	HS1521-P	GENERAL PROFICIENCY	-	-	-	-	-	50	-	50	
		TOTAL	16	6	12	-	-	-	-	1000	

TA-TEACHERS ASSESSMENT CT-CLASS TEST ESE- END SEMESTER EXAMINATION

TOTAL MARKS: 1000 TOTAL PERIODS: 34 TOTAL CREDITS: 32

CIVIL ENGINEERING YEAR: III SEMISTER: VI

Sl. No.	Course No.	Subject	Periods			Evaluation Scheme					Credit
Theory			L	T	P	SESSIONAL EXAM				SUB TOTAL	
						TA	CT	TOT	ESE		
1	CE1601	OPEN CHANNEL FLOW	2	1	-	15	10	25	50	75	
2	CE1602	CONSTRUCTION MANAGEMENT	2	1	-	15	10	25	50	75	
3	CE1603	TRANSPORTATION ENGINEERING	3	1	-	30	20	50	100	150	
4	CE1604	CONCRETE STRUCTURE - II	3	1	-	30	20	50	100	150	
5	CE1605	GEO-TECH ENGINEERING – II	3	1	-	30	20	50	100	150	
6	CE1606	ENVIRONMENT ENGINEERING II	3	1	-	30	20	50	100	150	
PRACTICAL/DRAWING/DESIGN											
7	CE1607-P	CONCRETE TECHNICAL LAB	-	-	3	25	-	25	25	50	
8	CE1608-P	OPEN CHANNEL FLOW LAB	-	-	3	25	-	25	25	50	
9	CE1609-P	GEO-TECH ENGINEERING LAB-II	-	-	3	25	-	25	25	50	
10	CE1610-P	ENVIRONMENT ENGINEERING LAB -II	-	-	3	25	-	25	25	50	
11	HS1606-P	GENERAL PROFICIENCY VI	-	-	-	-	-	50	-	50	
		TOTAL	16	6	12	-	-	-	-	1000	

TA-TEACHERS ASSESSMENT CT-CLASS TEST ESE- END SEMESTER EXAMINATION

TOTAL MARKS: 1000 TOTAL PERIODS: 34 TOTAL CREDITS: 32

CIVIL ENGINEERING YEAR: IV SEMISTER: VI

Sl.No	Course No.	Subject	Periods			Evaluation Scheme					Credit
THEORY			L	T	P	SESSIONAL EXAM				SUB TOTAL	
						TA	CT	TOT	ESE		
1		OPEN ELECTIVE – I	3	1	-	15	10	25	50	75	4
2	EC1712	PHOTOGRAMMETRIC & REMOTE SENSING	3	1	-	15	10	25	50	75	4
3	CE1701	WATER RESOURCE ENGINEERING I	3	1	-	30	20	50	100	150	4
4		ELECTIVE I (PROFESSIONAL ELECTIVE)I	3	1	-	30	20	50	100	150	4
5	CE1702	STEEL STRUCTURE I	3	1	-	30	20	50	100	150	4
PRACTICAL/DRAWING/DESIGN											
7	CE1703-P	STRUCTURAL DETAILING	-	-	3	30	20	50	100	150	2
8	CE1704-P	ESTIMATION & EVALUATION	-	-	3	25	-	25	25	50	2
9	CE1705-P	WATER RESOURCE ENGINEERING LAB	-	-	3	25	-	25	25	50	2
10	CE1706-P	PROJECT I	-	-	3	25	-	25	25	50	2
11	HS1707-P	GENERAL PROFICIENCY VII	-	-	-	-	-	50	-	50	2
		TOTAL	15	5	12	-	-	-	-	1000	30

TA-TEACHERS ASSESSMENT **CT-CLASS TEST** **ESE- END SEMESTER EXAMINATION**
TOTAL MARKS: 1000 **TOTAL PERIODS: 34** **TOTAL CREDITS: 32**

	Sl.No.	Code	PAPER
OPEN ELECTIVE I	01	HS2751	Operation Research Technique
	02	CE2751	Reliability Engg.
	03	CE2752	Statistical method in Engg.
	04	HS2752	Science & Religion
PROFESSIONAL ELECTIVE II	01	CE2753	Construction Equipments & Project management.
	02	CE2754	Computer aided Structural Analysis
	03	CE2755	Building Design
	04	CE2756	Bridge Engineering
	05	CE2757	Quality control Management
	06	CE2758	Earthquake Engineering
	07	CE2759	Pre stress Concrete Structure
	08	CE2760	Modern Surveying Technique
	09	EC2751	Remote Sensing & its Applications

CIVIL ENGINEERING YEAR : IV SEMISTER : VIII

Sl. No.	Course No.	Subject	Periods			Evaluation Scheme					Credit
THEORY			L	T	P	SESSIONAL EXAM				SUB TOTAL	
						TA	CT	TOT	ESE		
1	CE1801	STEEL STRUCTURE - II	3	1	-	30	20	50	100	150	4
2	CE1802	WATER RESOURCE ENGINEERING II	3	1	-	30	20	50	100	150	4
3		OPEN ELECTIVE – II	3	1	-	30	20	50	100	150	4
4		PROFESSIONAL ELECTIVE II	3	1	-	30	20	50	100	150	4
5		PROFESSIONAL ELECTIVE III	3	1	-	30	20	50	100	150	4
PRACTICAL/DRAWING/DESIGN											
6	CE1803-P	PROJECT II	-	-	12	100	-	100	100	200	6
7	CE1808-P	COLLOQUIUM	-	-	2	-	-	50	-	50	2
		TOTAL	15	5	14	-	-	-	-	1000	28

TA-TEACHERS ASSESSMENT CT-CLASS TEST ESE- END SEMESTER EXAMINATION
TOTAL MARKS: 1000 TOTAL PERIODS: 32 TOTAL CREDITS: 28
Total Credit of All the Four Years

	Sl.No.	Code	Paper
OPEN ELECTIVE I	1	HS2821	Optimization Methods
	2	CE2851	Advance Engineering systems
	3	HS2852	Industrial Psychology
	4	HS2853	Energy Management
PROFESSIONAL ELECTIVE II	1	CE2852	Computational Hydraulics
	2	CE2853	Microprocessor based System Design
	3	EC2851	Instrumentation in Fluid Mechanics
	4	CE2854	Water Resource Planning & Management
	5	CE2855	Fundamentals of Environmental Geo-technology
	6	CE2856	Geotechnical Processes
	7	CE2857	Rock Mechanics
	8	CE2858	Environmental Pollution & Management
	9	CE2859	Industrial Waste Treatment
	10	CE2860	Air Pollution & Control Measures
PROFESSIONAL ELECTIVE III	1	CE2861	Rural Water Supply & Sanitation
	2	CE2862	Environmental Impact Assessment & Auditing
	3	CE2863	Traffic Engineering
	4	CE2864	Advance Highway Engineering
	5	CE2865	Transport Planning & Management
	6	ME2851	Advance Strength of Material
	7	ME2852	Theory of Plates and Shells
	8	ME2853	Experimental Stress Analysis
	9	ME2854	Composite materials

Semester III

C51312 NUMERICAL ANALYSIS AND COMPUTER PROGRAMMING (2-1-0)

1. Numerical analysis

Approximations and round of errors. Truncation errors and Taylor Series. Determination of roots of polynomials and transcendental equations by Newton-Rap son. secant and Bairstow's method. Solutions of linear simultaneous linear algebraic equations by Gauss Elimination and Gauss-Siedel iteration methods_

Carve fining -linear and nonlinear regression analysis.

Backward Forward and Central difference .relations and their uses in Numerical differentiation and integration. Application of difference relations in the solution of partial differential equations. Numerical solution of ordinary differential by Euler. Modified Euler. Runge -kutta and Predictor-Corrector method.

2. Computer Programming

Introduction to Computer programming in C and C++ language. Arithmetic expressions. simple programs. The emphasis should be more on programming techniques rather than the language itself. The C programming language is being chosen mainly because of the availability of the compilers_ books and other reference materials.

Example of some simple C program. Dissection of the program line by line. Concepts of variables. program statements and function calls from the library (print for example)

C data types. int, char, float etc.

C expressions, arithmetic operation; relational and logic operations.

C assignment statements. execution of assignment to the operations. C primitive input output usinu getchar and putchar, exposure to the scant' and printf functions.

C statements. conditional execution using if else. Optionally switch and break statements may be mentioned.

Concept of loops, example of loops in C using for. while and do-while. Optionally continue may be mentioned.

One dimensional arrays and example of iterative programs using, alTays. 2 d arrays. Use in matrix computations.

Concept of Sub-programming. functions. Example of functions. Argument passing mainly for the simple variables.

Pointers, relationship between arrays and pointers. Argument passing using pointers.

Array of pointers, passing arrays as arguments. Strings and C string library.

Structure and unions. Defining C structures. passing structures as arguments. Program examples.

File HO. Use of fopen. [scant and [printY routines.

CS1301- P NACP LAB (0-0-3)

Development of computer program for

- Numerical integration by Trapezoidal and Simpson's rule
- Gauss-Siedel iteration method
- Various matrix operation and their use as sub-routines
- Uses of pointers, data structure, loops, arrays.

References

1 Shastry S. S., "Numerical Methods", Prentice Hall Inc .. India,1998.

2. Noble Ben, "Numerical Methods", New York International Publications. New York, 1964.

3. Stanton Ralph G "Numerical Methods for engineering". Englewood Cliff's. N.J., Prentice Hall Inc., 1961.

4 Buckingham R.A. "Numerical methods", Sir Isaac Pitman sons. Ltd.. London, 1957.

5 Bakhvalov N.S. "Numerical methods", Mir. Pub Moscow. 1977.

6 Grewal B.S "Numerical Methods ' , Khanna pub., New Delhi. 1998.

7 Sudhit kaicker, " The Complete ANSIC", BPB publications. New Delhi, 1996.

8 B.W.Kernighan and D.M.Richie. "The C Programming language "Prentice Hall of India, 1998

9 Bvron S G-ottfreid. " Programming with C ". Tata McGraw Hill 2nd edition 1998.

ME 1312 Materials Science (2-1-0)

History of materials: Source of engineering materials; categorization of engineering materials [2 or 3 materials, their properties and hence their application just to make an illustrative point]; Periodic table approach to engineering materials 2 hours

Atomic bonding vis-à-vis properties of materials: Crystal structure and non-crystalline structure; Miller indices, X-ray diffraction, 2 hours

Defects, their origin, Frenkel and Schottky defects; Order-disorder transformations, association Of defects, non-stoichiometric solids; role of defects in defining electronic properties of materials Si, GaAs, Dislocations 3 hours

Diffusion in solids, atom mobilities. temperature and impurity dependence of diffusion, various diffusion processes 2 hours

Binary phase diagrams (Pb-Sr, AI-Si, Ge-Si, Au-Si etc) , microstructure and its effect on properties. 2hours

Materials for use in electronic devices: Polymers, ceramics. semiconductors and metals their structure and properties', insulators; superconductors. dielectric, ferroelectric, memory and magnetic materials. Case studies, 7 hours

Quantum mechanical approach to structure of materials 4 Energy bands in solids; electrical conductivity;

extrinsic and intrinsic semiconductors: carrier concentration: work function, 6 hours

Carrier transport mechanism: Scattering and drift of electrons and holes: diffusion and drift of carriers; Hall effect 3 hours

'Technology of fabrication of semiconductor devices-. Unit operations: Thin film deposition, oxidation: diffusion: implantation lithography; etching; metallization, bonding; encapsulation and packaging; Description of a discrete device fabncation; IC fabrication technology. 6 hours

Sensors and actuators: classification and terminology: acoustic sensor,. mechanical sensors, magnetic sensors, radiation sensors, thermal sensors, biosensors, chemical sensors and meChanical sensors Examples of integrated sensors. 4 hours

Opto-electronic 'materials and devices: Modulation of light: birefringence; Kerr effect, magneto-optic effects. acousto-optic effects. Display devices' CRTs. LE0s, LCDs, photoconductors, a detectors, Photon devices, Lasers. Optical switching devices. 4 hours

Structural, chemical characterization of materials - introduction to X-ray Analysis, optical microscopy, ESCA, SEM-EDAX, STM,,AFM: case studies of Si, GaAs, ferrites, lithium niobate. 3 hours

Environmental assessment of semiconductor device production' retrospect and prospect l hour

ME 1307-P MATERIAL SCIENCE LAB (0-0-3)

1. To study the lattice structure of various types of unit Cells. Observe the Miller Indices for Planes and directions in a unit Cell.
2. To study the micro-structure of Cast Iron
   Mild Steel
   Brass
   Solder
   Under Annealed. Cold Worked. Forged/rolled conditions.
3. To verify the Hall effect.
4. To determine the fracture characteristics of ductile and brittle materials.
5. To determine the chemical composition of a few common alloys.
6. To determine % age of C and S content in an alloy with Fe as main constituent.

References

1. V. Raghava.n, "Material Science and Engineering", Prentice Hall. I. Canister," Material Science Engineering", astem Wiley.

ME1303 STRENGTH OF MATERIALS (3-1-0)

Stress: axial toad-safety concept, general concepts-, stress analysis of axially loaded bars., member strength of design criteria. (4 lectures)

Strain: Axial strain and deformation-, strains and deformation in axially loaded bars, stress-strain relationship, Poisonssaratio, thermal strain and deformation, strain concentration. (4 lectures)

Generalized Hooke's law, Pressure vessels, constitutive relationship-generalized concepts, relationship between elastic constant; thin wall pressure vessel. (6 lectures)

Torsion: Torsional stress and deformation in circular members, design of circular members in torsion. closed coil helical spring. (5 lectures)

SFD & BMD: Axial force, shear and bending moment diagram, introduction-direct approach for axial Force, shear and bending, bending ofbean-is with symmetrical cross-section. (4 lectures)

Stresses in Beath: Shear stress in beams; introduction-shear flow-shear stress in beams. (4 lectures)

Combine stresses: Transformation of stress and strain: analysis for combined loading-, transformation of
stress and strain-Mohr's rule for Stress transformation (6 lectures)

Deflection of beams: Introduction-deflection by integration-deflection by moment—area method. (6 lectures)

Stability of column: Introduction-Eulers buckling load formula. Rankin's formula-introduction to beam column (2 lectures)

ME1308-P STRENGTH OF MATERIALS LAB (0-0-3)

List of Experiments

1. Tensile Test: To prepare the tensile test upon the given specimen (Mild Steel).
2. Compression Test To determine the compressive strength of the given specimen.
3. Torsion Test: To perform the Torsion test on given specimen.
4. Impact Test: To determine the impact toughness of. The given material.
5. Brinell hardness Test: To determine the hardness of the given specimen. -
6. Vickers's Hardness Test: To determine, the hardness of the given specimen.
7. Rockwell Hardness Test: To determine the hardness of the given specimen.

References

1. Feodosyev, V.,,. Strength of matenals". Mir publishers. Moscow, 1968.
2. Benham. P.P 8c. Warnock, F.V., "Mechanics Sz. solids Sz Structures", pitman publishing, London
   1973.
3. Seely, F. B. S.c. smith, 1. "Sdvanced Mechanics of materials". Tokyo, Toppan, 1952.
4. Shaneloy, Strength of Materials", McGraw Hill Book Company, 1957.
5. Timoshenko, S.. " Strength of Materials". VoL 1. McGraw Hilt BooR Company, 1965.
6. S H. Crandall, NC Dahal & T.I. Lardener." An introduction to the mechanics ofsolids", McGra Hill Book Co. 1985
7. I.H. Shames, "Introduction a solid mechanics", Prentice Hall of India Ltd, I 990

CE1301 FLUID MECHANICS I (3-1-0)

. **Introduction**

Fluids and continuum, Physical properties of fluids, ideal and real fluids, Newtonian and non Newtonian fluids, measurement of surface tension.

II. Kinematics of Fluid Flow

Steady and unsteady, uniform and non-uniform, laminar and turbulent flows, one, two and her dimensional flows, streamlines, streak lines and path lines, continuity equation, rotation and circulation elementary explanation of stream function and velocity potential, graphical and experimental method of drawing of pressure.

III. Fluid Statics

Pressure- density-height relationship, manometers, pressure on plane and curved surfaces, Centre c pressure, buoyancy. stability of immersed and floating. bodies, fluid masses subjected uniform accelerations, measurement of pressure.

IV. Dynamics of Fluid Flow

Ruler's equation of motion along a streamline and its integration, Bernoulli's equation and its applications Pitot like, flow through orifices. mouthpieces. nozzles, weirs, sluice gates under free and submerged flow conditions, Aeration of nappe capitation. free and forced vortex, momentum equation and its application to stationary and moving vanes, pipe bends. problems related to combined application of energy and momentum equations,

V. Dimensional Analysis and Hydraulic Similitude

Dimensional analysis. Buckingham's theorem. important dimensionless numbers and their significance geometric, kinematic and dynamic similarity. model studies.

CE 1303-P FLUID MECHANICS I LAB. (0-0-3)

List of Experiments: -

1. To determine experimentally the metacentric height of a ship model
2. To verify the momentum equation experimentally.
3. To determine the coefficient of discharge of an orifice (or a month piece) of a given shape. Also to
4. Determine the coefficient of velocity and the coefficient and the contraction of the orifice (or the mouth piece).
5. To plot the flow net for a given model using the concept of electrical analogy.
6. To measure surface tension of a liquid
7. To obtain the surface profile and the total head distribution of a forced vortex.
8. To calibrate an orifice meter and study the variation of the coefficient of discharge with the Reynolds
9. number.

References:

1. Garde, R. J. and A.G. Miraigaoker. "-Engineering Fluid Mechanics (including Hydraulic Machines)"Second Ed., Nem Cliand & Bros, Roorkee, 1983.
2. Garde, RI, "Fluid mechanics through Problems". Woley Easterm. Limited, New Delhi. 1989.
3. Hunter Rouse, "Elementary Mechanics of Fluids". John Wiley & sons, Inc., 1946.
4. L. H. Shames," Mechanirs of Fluids", McGraw Hill, Int. Student. Education.
5. Vijay Gupta and S. K. Gupta, "Fluid Mechanics and its applications", Wiley Eastern Ltd.

CE1302 SURVEYING 1 (3-4-0)

I. Introduction

Importance of surveying to Engineers- ,Examples from different branches; plane and Geodetic surveying Control points, Classification of surveys, Methods of location a point. sources and Types, principle of working from whole to part, Organisation of field and office work, Conventional signs, surveying instruments, their care and adjustment. Principle of reversal.

II. Measurement of distances

Principles of different methods and their accuracies, Measurement by chain and tape. Source of auxiliary instruments, Modern trends E DM and Total Station.

I I. Measurement of Angles and Directions

Reference meridians, Bearing and azimuths declination and its variations. Use and adjustment compass, Vernier and microptic theodolites, Temporary and permanent adjustments. Requirements non-adjustable parts. measurement of horizontal and vertical angles by different methods.

IV. Traversing

Principles at traversing by compass and theodolite, Field work and checks, Computation of coordinate Sources of errors. Precision of traversing, Checking and adjusting of traverses. Omitted measurement.

V. Measurement of Elevations

Different methods of determining elevations: Spirit. Trigonometric, Barometric and Photogrammetric method, spirit leveling- Definitions of terms. Principle, Construction, Temporary and permanent adjustment of levels. Sensitivity of bubble tube. Automatic levels. Leveling staves, Methods of spot levelling booking and reduction of fields notes. Curvature and refraction. Reciprocal leveling. Plotting of profiles Barometric leveling, Construction and filed use of altimeter, Trigonometric leveling simple

and reciprocal observations, sources of errors and precision of leveling procedures.

VI. Tachometry

Definitions. Principles of stadia systems, Instrument constants, Substance and Tangential Systems, Construction and use of Reduction Tachometers_ Range finders, Error and Precision,

VII. Contouring

Methods of relief representations. Definition and characteristics of contours, Use of contour maps. direct. and Indirect methods of contouring.

VIII. Sheet numbering systems

IM and L And A C. series. Scales and Numbering of Indian Topographic maps.

CE 1304-P SURVEY FIELD WORK (0-0-3)

List of Experiments: -

1. Study of different Levels and Leveling staff. Practice for temporary adjustment. To find out the reduced levels of given points using Dumpy level. (Reduction by Height of Collimation method)
2. Study of a Tilting (LOP.) Level and to find out the levels of given points (Reduction of data by Rise and Fall method).
3. Visit to Lab, For the study of:-
   (a) Map in the making p Survey of India publication
   (b) Conventional Symbol charts and different types of maps
4. To establish a Benchmark by Check Leveling with a LOP. level and 'closing the work at the staring Bench mark.
5. To perform Fly Leveling with a LO.P. level.
6. To draw the longitudinal rid cross- sections profiles along a given route.
7. Practice for Temporary adjustments of a Vernier Theodolite and taking Horizontal the work at the starting measurements. by Reiteration method.
8. (i) Measurements of a 'horizontal angles by Repetition method at three zeros and four repetitions.
   (ii) To Determination of elevation and horizontal distance of a given point using Substance Bar and a Vernier Theodolite.
9. (i) Determination of the Tachometric constants of a given Theodolite.
   (ii)To determine the gradient between two given points using Tachometric method.
10. To determine the bearing of a given traverse using Prismatic Compass, and plotting of the traverse.
11. Establishment of a given traverse using Tachometric method.
12. Determination of elevations of a given point by Trigonometrically Leveling

13. Study and use of different types of Micro-optic Theodolites and Total Station

Reference.

1. Agor, R, "Surveying ", Vol. I 84 H, Khanna publications, delhi,19951
2. Arora, K.R., ., Surveying", Vol. I & II, Standard Book House, Delhi,1993.
3. Bannister, A. and Baker. R., "solving problems in Surveying". Longman scientific Technical, U.K.. 1994.
4. Kenniel TJ.M and petrie, G., "Engineering surveying Technology" Blackie & Sons Ltd. London. 1990
5. Punmia_ B.C. "surveying". Vol. I & H Laxmi Publications, New delhi, 1996.

MH 1305 MATHEMATICS- III (3-1-0)

I. COMPLEX VARIABLE

Complex number, Complex functions, limit, Continuity and differentiability, Cauchy- Reima equations, harmonic functions, construction of analytic functions by Mile- Thomson method, Conform mapping, transformations W=Zn, 1/z. ez, (az+b)/(cz-d).

II. Fourier series

Periodic functions trigonometric series. Fourier series. Elder's formula. even and odd functions. have arbitrary period. half range sine and cosine series... Determination of Fourier coefficients within integration

III. Lap lace Transform

Unit step function, Dirac delta function - their lap lace transforms. second shifting theorem, Laplace transform of the periodic functions, applications.

IV. Series Solution of Differential Equation

Series solution. Frobenious method, Legendre and Bessel equations

V. Partial Differential Equation

Linear and non-linear partial differential equations of first order. four standard forms.

References

1. E Kreyszig. "Advanced Engineering mathematics". 5th ed. Wiley Eastern. 1985.
2. Sehume series.

CS1412 COMPUTER GRAPHICS (2-1-0)

Use of Basic, C and FORTRAN in Computer Graphics Screen, World and Normalised Coordinates

Generation of Points, Line and two dimensional geometric figures

Scaling, rotation and translations and their representation in ti-om of matrix operations

Clipping, windowing and shading

Introduction to Graphic packages in Basic, C FORTRAN

CS1413-P COMPUTER GRAPHICS LAB (0-0-3)

Introduction to DOS system, Different graphics Modes and Graphics Drivers available Development of Computer programs to

- High light pixel
- Produce a line. triangle, square and other polygons
- Shading patterns and styles, filling the given polygon with the given colour
- Text generation in Graphics and its orientation
- Preparation of plan and elevation of simple building and detailing of building components

References

1. Newman and Sproull "Pnncipais ofInteractive Computer Graphics " Tata Mc Graw
2. karnighan and Ritchie" C Programming language" PIHI
3. Hearn and Baker "Computer Graphics" PHI

CE 1401 ENGINEERING GEOLOGY (2-1-0)

I. Minerals

Their physical properties and detailed study of certain rock forming minerals

II. Rocks

Their origin, structure, texture and classification of igneous, sedimentary and metamorphic rocks and the suitability as Engineerins2, materials, Building stones, Engineering properties of rooks

III. Stratifications, lamination. bedding, and dip strike of bed, overlap.

IV. Rock deformation

Folds. Faults, joints unconformity and their classification, causes and relation to engineering behaviour of

rock masses.

V. Earthquake, its causes, classification, seismic zones of India and Geological consideration for construction of building.

VI. Landslides, its causes, classification and preventive measures.

VII. Underground water, Origin, Aquifer, Aquicludes, Artesian Wells, Underground provinces of India and its role as geological hazard.

VIII. Geological investigations for site selection of Dams and Reservoirs ttunnels, Bridges and highways.

IX. Principles of Geophysical explorations, methods for subsurface structure.

CE 1408-P GEOLOGY LAB. (0-0-3)

LAB

1. Study of rock forming and Economic minerals, study of different rocks
2. Methods of completing the outrop of rocks on a map
3. Drawing the geological sections of geological maps
4. Inter-relation of geological maps rind sections with respect to subsurface Structure.
5. Problems of locating sites of projects like Dams, Tunnels Highways et. In the geological sections_

Suggested Text Books & References

1. Prabin Singh,, Engineering and General Geology". Katson Publishing house.

2. Leggot, R. F "Geology and Engineering", McGraw Hill, New York.
3. Blyth, F. G. M., " A Geology for Engineering", Arnold, London.
4. P. K. Mokerjee, " A Text Book of Geology" Clatima, Word publisher.

CE 1402 FLUID MECHANICS II (3-1-0)

I. Laminar and Turbulent Flow

Equation of motion for laminar flow through pipes, Stoke's law, flow between parallel plates, flow through porous media, fluidisation" measurement of viscosity. transition from laminar to turbulent flow. turbulent flow, equation for turbulent flow, eddy viscosity. mixing length concept and velocity distribution in turbulent flow. Hot .— wire anemometer and L D A.

II. Boundary Layer Analysis

Boundary layer: thicknesses, boundary layer over a flat plate, laminar boundary layer, application of momentum equation, turbulent boundary layer, laminar sub-layer, smooth ad rough boundaries, atmospheric boundary layer, local and average friction coefficient, separation and its control, measurement of shear.

III. Pipe Flow

Nature of turbulent flow in pipes, equation for velocity distribution over smooth and rough surfaces, resistance coefficient and its variation, flow in sudden expansion, contraction, diffusers, bends, valves and siphons. concept of equivalent length. branched Pipes. pipes in series and parallel simple networks, pumps and turbines, transmission of power.

IV. Flow Past submerged Bodies

Drag and lift, drag on a sphere, cylinder and disc. lift Magnus effect and circulation.

V. Compressibility Effects in Pipe Flow

Transmission of pressure waves in rigid and elastic pipes. water hammer, analysis of simple surge tank excluding function.

CE 1406-P FLUID MECHANICS II LAB. (0-0-3)

List of Experiments: -

1. To verify Darcy's law and to find out the coefficient of permeability of the given medium
2. To study the transition from laminar to turbulent flow and to determine the lower critical Reynolds number,
3. To study the velocity distribution in a pipe and also compute the discharge by integrating the velocity profile.
4. To study the variation of friction factor. “F” for turbulent flow in smooth and rough commercial pipes
5. To determine the loss coefficients for the pipetltting

6. To study the flow behaviour in a bend and to calibrate the pipe bend for discharge measurement.
7. To study the boundary layer velocity profile and to determine boundary layer thickness and displacement thickness. Also to determine the exponent in the power law of velocity distribution.
8. To measure the pressure distribution around a cylinder placed in a cylinder placed in a wind stress and to calculate the coefficient of drag.
8. To calibrate a venturiemeter and to study the variation of coefficient of discharge with the Reynolds number.

References

1. Grade.R.J. and A.G. Mirajsaoker, " engineering Fluid Mechanics (including Hydraulic Mechanics}" 2nd Ed., Nem Chand & Bros Roorkere, 1983.
2. Grade, RI., "Fluid Mechanics through problems" wiley Eastern Limited. New Delhi 1989.
3. Streeter, V.L and Wylie. E.B " Fluid Mechanics",McGraw Hill, New York. 8th Ed 1985.
4. Asawa G.L . "experimental Fluid Mechanics". Vol. I Nem Chand and Bros . Roorkee. 1992.

CE 1403 STRUCTURAL ANALYSIS I (3-1-0)

I. Classification of Structures, stress resultants. decrees of freedom per node Static and Kinematic Indeterminacy.

II. Classification of Pin Jointed determinate trusses. Analysis of determinate plane and space trusses (compound and complex). Method of substitution and Method of tension coefficient

III. Analysis of determinate beams & plane frames. bending moment. shear force diagrams and axial trust diagrams. Elastic curve (sketch).

IV. Rolling loads influence lines for beams and trusses. Absolute maximum ending moment.

V. Analysis of Arches. Linear arch, Eddy's theorem. and three hinged parabolic arch. spandrel braced arch. moving load &r.. influence lines.

VI. Strain Energy of deformable systems. maxwell's reciprocal & Betti's theorem. Castigliano's first theorem. unit load & Conjugate beam methods.

VII. Unsymmetrical bending, location of neutral axis. computation of stresses and deflection . shear center its location for common structural section.

VIII. Bending of curved bars in plane of bending. stresses in bars of small & large initial curvatures.

References

1. Wilbur and Norris." elementary structural analysis", Tata McGraw Hill.
2. Reddy, C.S., "Basic Structural Analysis", Tata McGraw Hill.
3. jain, A.P. and jain. B.K.," Theory & Analysis of structures:* Vol. I & II, Nem chand.
4. Coastes, R.C., Coutie. M.G. & King. F.K " Structural Analysis", English language Book society & Nelson. 1980.
5. Ghali, A. & Neville. M., " structural Aaalysis", Chapman & hall Publications, 1974.
6. Jain, AK:, " Advanced Structural Analysis". Nem Chand & Bros. Roorkee. India. 1Q96.
7. Jain, 0. P. & Arya A .S., "Theory of Structures", Vol. 11, Newt Chand Bros., Roorkee, 1976.
8. Kinney, I. S., Indeterminate Structural Analysis", McGray\: Hill Book Company, 1957.
9. Wang, C. K., Intermediate Structural Analysis", McGraw Hill Book Company, 1983.

CE 1404 SURVEYING II (3-1-0)

I. Plane Table Surveys

Principles, Advantages and disadvantages. Plane Table equipment Use of Telescopic Alidade and Indian Pattern Tangent Clinometers, Different methods of Plane Surveying, Resection Two and three point: problems. Fields works in Plane Table surveying and contouring.

II. Trilateration and Triangulation

Principle of Trilateration, EDM instrument and their uses, Reduction of observation, Principle an classification of -Triangulation system, Triangulation chains, Strength of Figures. Station marks and Signals, satellite station, Intersected points, fields work Reconnaissance, Intervisibility of station. Angular Measurement, Base Line measurement and extension, Adjustment of fields observation an Computation of Coordinates.

III. Adjustment Computations

Weighting of observations, Treatment of random errors. probability equation, Normal law of errors Mos: Probable Value & measures of precision, Propagation of errors and variances, Most probable .value principle of' Least square, Observations and correlative Normal Equations. Adjustment of triangulation figures and level nets

IV. Curves

Classification of Curves., Elements of Circular.. Transition and Vertical. curves, Theory and methods 0: setting out Simple. Transition and Vertical curves, speial fields problems.

V. Project surveys

General requirements and specifications for Engineering project: surveys, Reconnaissance, Preliminary and Locations surveys for highways. roadways and canals. Correlation of surface and underground surveys

in case of culvers. Bridges and Tunnels: Principles and practice of hydrographic surveys, Layout culverts. bridges and buildings.

CE 1407-P SURVEY FIELD WORK (0-0-3)

List of Experiments

1. To carry out Triangulation and Trilateration of a given area (2-3 turns are needed).
1. To adjust the angular observations taken in exercise 1.

2. To compute the adjusted coordinates of Triangulation stations.

3. To plot the coordinates at a given scale on Plane Table and their field checking.

4. To plot the details as well contours (topographic mapping) of area. using Radiation and intersection methods (6-7 turns are needed).

5. To solve two Point and Three Point Problems in Plane Tabling.

6. Layout at simple circular curve on the ground using two Theodolite method.

7. Layout a building and a culvert on the ground.

References

1. Agor, R,"surveying". Vol. II & III . Khanna Publications, delhi, 1995.
2. Arora, KR., " Surveying ", Vol. II & III. Standard Book House, delhi, 1993.
3. .Bannister, A. and Baker, R., "' solving problems in surveying," Longman Scientific Technical. U.K. 1990..
4. Kennie, T.J.M. and Petrie, G "Engineering Survying Technology", Blackie & Sons Ltd, London. 1990
5. Punmia BC .Surveying , Vol. II Sz, Ill. Laxrni Publications, New delhi. 1996.

CE 140•S BUILDING MATERIALS AND CONSTRUCTION (3-1-0)

I. Building Materials

Bricks, stone, lime, timber. plywood, glass, plastics, steel aluminum: classification, properties and selection criteria. Cement, aggregate, admixtures: types properties, selection criteria, and tests. Preparation and properties of concrete. concrete mix design.
Introduction to destructive and non- destructive tests. Motor Types, classification and strength. LS. specifications.

II. Building Construction

Building byelaws, modular co-ordination.
Loads on buildings. Types of foundations and selection criteria. Brick masonry, stone madonry, bonds.
Types of walls, partition and cavity walls, design criteria. Prefabricated construction.
Treatment for water proofing.
Doors and windows: sizes and location, materials.
Stair and staircases: types, materials, proportions.
Lifts and escalators. White washing, colour washing, painting, distempering.
Shuttering. Scaffolding and centering. Expansion and construction joints.
Sound and fire proof construction, I.S. Specifications.

References

1. Arora. S.P. & Bindra S.P. "A text book of Building Construction"— Dharipat Rai Sz S Delhi. 1977
2. Jha J. & Sinha. S.K., "Building Construction". Khanna Publishers. Delhi, 1977.
3. Kulkanii. C.J. "A text book of Engineering Materials". Ahmedabad Book Depot, Ahmedabad 1968.
4. kulkani. " A text book of Engineering Construction", Ahmedabad Book Depot

Ahmedabad. 1968.
5. Kumar Sushi!, "Engineering Materials", Standard Publishers Distributors, Delhi, 1994
6. Kumar Sushil, "Building Construction", Standard Publishers Distributors, Delhi, 1994
7. McKay W.8., "Building Construction. "Vol. 1 to 4, Orient Longman Ltd., Hyderabad, Bombay,Madras, Delhi Vol. 1 & 2 - 1995. Vol. 3 -1996, Vol. 4 -1998.
8. Punrnia, B.C., "A text" book of Building Construction", Laxmi Publications, Delhi, Mad 1987.
9. Singh Surendra. "Engineering --1.atcrials", Konark Publishers Pvt. Ltd .,1994.

V SEMESTER

HS 1501 MANAGEMENT SCIENCE (2-1-0)

I. Basic Concepts and Functions of Management: Planning: Nature, Purpose and Objectives, Planning:

Organizing: nature and Purpose. Authority and Responsibility, Staffing, Supply of Human Resource Performance Appraisal, Contain: System and Process of Controlling, Controlling Techniques_

II. Human Resources Management: Nature and Scope of Human Resource planning, training and Development, recruitment and selection, career growth, grievances, motivation and its types, need for motivation, reward and punishment, models for motivation, leaders: kind of leaders, leadership styles. Roles and function of leaders, conflict management, kinds and cause of conflict, settlement of conflict, group and team working, organization design and Development.

III. Marketing Management: Marketing Environment: Consumer Markets and Buyer Behavior Marketing Mix. Advertising and Sales Promotion. Channels of Distribution.

IV. Financial Management and Accounting Concepts: Book Keeping, Financial Statement Analysis, Financial Ratios, Capital Budgeting, Break-Even Analysis.

V. Production/Operation Management: Planning and Design of Production and Operation Systems, Facilities Planning, Location, Layout and Movement of Materials, Materials Management and inventory Control, Maintenance management. PERT & CPM.

VI. Management Information system: Role of information in decision making, information system planning, Design and Implementation Evaluation and Effectiveness of Information System.

VII. StatisticaI Quality Control, TQM and ISO Certification...

VIII. Social and Ethical Issues in Management: Ethics in management, Social Factors, Unfair and Restrictive Trade Practices.

IX. Strategic and Technology Management: Need, Nature, Scope and Strategy. SWOT analysis, value and concepts.

References

1. Philip Kotler," Marketing Management", Prentice Hall of India 1997.
2. Fred Luthans," I luman Resource Management", MdGraw Hill Inc. 1997.
3. Stephen P. Robbins," Organizational Behaviour Concepts, Controversies and Applications", Prentice Hall, Englewood, Cliffs, New Jersey, 1989.

10 MN. Khan sand P.K. Jain," financial Management", Tata McGraw Hill, 1997.

11 Michael Porter," Competitive Advantage", The Free Press, 1985

12 Niicliacl Porter." Competitive Strategy", The Free Press. 1985

13 Y K.Bhusan," Fundamentals of Business Organisation and Management", S.Chand and sons,1998.

14 K.K.Ahuja " Industrial Management", Khanna Publishers, 1998.

CE 1501 TRANSPORTATION ENGINEERING I (2-1-0)

I. Introduction .

Modes of Transportation, their importance and limitations. the importance of highway transportation.

III. Highway Planning

Principles of Highway Planning, Road development and Financing, Privatisation of
High Highway Alignment-Requirements, Engineering surveys for Highway location.

IV. Geometric Design

cross section elements. width, camber, .Design speed, Sight distances, Requirements and design. horizontal and vertical alignments.

V. Highway Materials

Properties of sub grade and pavement component materials, Material characterization, Tests on sub grade
soil, aggregates and bituminous materials, Bituminous mix design.

VI. Pavement Design and Construction

Factors in the design of flexible and rigid pavement, Group index and C.B.R. Methods, Westergaards analysis of wheel load stresses in rigid pavement, I.R.C. design method for Concrete pavements Pavement
constriction Techniques and Quality control, Types of Bituminous pavements.

VII. Highway Drainage

Surface drainage and subsoil drainage, Pavement failures, Maintenance and Strengthening.

VIII. Traffic Engineering

Fundamentals of Traffic. Flow; Traffic field studies and their uses, Traffic control devices, Trafric management, Prevention of Road accidents.

IX. Functional design aspects of bridges and 1RC loading.

CE 1507-P TRANSPORTATION ENGINEERENG I LAB (0-0-3)

List of Experiments

1. CBR test on soil
2. Impact test on aggregates
3. Crushing test on aggregates
4. Hardness test on aggregates
5. Soundness test on aggregates
6. Shape test on aggregates
7. Specific gravity on aggregates
8. Penetration test on bitumen
9. Ductility test on bitumen
10. .Softening point test on bitumen
11. Viscosity test on Tar
12. .Flash and fire point on bitumen
13. Specific gravity test on bitumen
14. Traffic speed study (Endoscope• method)
15. Traffic volume study (manual as yell as mechanical method)

References

1. Khanna. S.1C and Justo, CEG, "Highway Engineering". Nem Chand it. Bros., 1997
2. K.aciivali. L.R. "Highway Engineering", Khanna Publishers, Delhi, 1996.

CE 1502 STRUCTURAL ANALYSIS II (3-1-0)

I. Analysis of Fixed beams, Continuous beam and Simple frames with and without translation of joints. Method of Consistent Deformation, Slope-Deflection method Moment Distribution. 7.-fethed., Strain Energy method.

II. Muller-Brelau's principle and its application for drawing influence lines for interminate beams

III. Analysis of two hinged arches, influence line diagrams for maximum bending moment shear force and thrust. Suspension bridges, Analysis of cables with concentrated and continuous loadings, Basics of two and three hinged stiffening girders, Influence line diagram for B.M, S.F. in the stiffening girders.

IV. Basics of force and displacement matrix methods for beams, plane frames('rigid and pin jointed):

V. Basics of Plastic Analysis, Application of Static and Kinematic theorem for plastic analysis of beam and plane frames.

CE 1506-P **STRUCTURAL ANALYSIS LAB**. (0-0-3)

List of Experiments

1. Clark Maxwell's Reciprocal theorem using a beam.
2. Analysis of a redundant joint.
3. (a) Deflections of a truss.
   (b) Maxwell's reciprocal theorem.
4. Elastic displacements of curved member.
5. Elastic properties of beams.

6. Three hinged arch.
7. Two hinged arch.
8. Behaviour of stmts.
9. Experimental and Analytical study of 3 bar pin-jointed truss.
10. Experimental and Analytical study of deformations in bar-beam combination.
11. Experimental and Analytical study of deflections in 'unsymmetrical bending.
12. Verification of Muller-Breslau principle- Arch/continuous beam/frame models.
13. Verification of Muller-Breslau principle-Begg's deformeter.
14. To find carryover factor for the beam with far end fixed.

References

1. Coates. R.C., Coutic, M.G. Sz Kong, F.K., "Structural Analysis", English Language Bo Society & Nelson. 1980.
2. Ghali, A. & Neville, M., "Structural Analysis", Chapman &.-Hall Publications, 1974.
3. Jain. AK.. "Advanced Structural Analysis", Nem Chand Bros. Roorkee, India, 1996.
4. Jain, a.p. & Arya A.S., 'Theory of Structures", Vol. II. Nem Chand Bros., Roorkee, 1976.
5. Kinney, J.S., "Indeterminate Structural Analysis", McGraw Hill Book Company, 1957.
6. Prakash Rao, D S., "Structural Analysis". Universal Press (India) Limited, Hyderabad, 1997.
7. Wang, C.K. , "Intermediate Structural Analysis" McGraw Hill Book Company? 1983.
8. Weaver W & Gere, J.M. "Matrix Analysis of Framed Structures", CBS Publishers and Distributors, Delhi, 1990.

CE 1503 CONCRETE STRUCTURES I (3-1-0)

I. Material Properties

Properties of concrete and reinforcing steel characteristic - strengths, stress-strain curves, I.S. specifications.

II. Design Philosophies

Working stress, ultimate strength and. limit stales of design.

III. Analysis and Design of Sections in Bending

Flexure of beams by working stress and limit state methods, singly and doubly sections, T and L sections.

IV. Shear and Bond

Behavior of beams in shear and bond. Design for shear, anchorage and splicing of reinforcement, detailing of reinforcement.

V. Serviceability Conditions

Limit states of deflection and cracking, calculation of deflections.

VI. Design of Columns

Short and long columns, eccentrically loaded columns.

VII. Slabs, Lintels & Staircases.

Design of one way and two way slabs, circular slabs, yield Iine theory for slabs, beam and Slab.

construction, lintels and staircases.

VIII. Flat Slabs.

Introduction to flat slabs.

IX. Torsion

Design of beams for torsion.

X. Column Footings.

Isolated and combined column footings.

XI. Cantilever Retaining Walls

Design of cantilever type retaining walls.

Reference:

1. Dayaratnam P. "Reinforced Concrete Structures", Oxford and IBH Publishing Co. 1986.
2. Sinha. S.N.,"Reinforced Concrete Design", Tata McGraw Hill Pub. co., New Delhi, 1990.
3. Krishna, J•, and Jain O.P., "Plain and Reinforced Concrete". Vol. 1, Nem Chand & Bros Roorkee_1990.
4. Jain, AK.. "Reinforced Concrete Limit State Design", Nem Chand & Bros., Roorkee, 1993
5. Syai, I.C. and Ummat, R.K., "Afialysis and Design of Reinforced Concrete Elements", A.H. Wheeler and Co Ltd., Allahabad, 1992.
6. Ram" Chandra, "Design of Concrete Structures", Vol. 1, Standard Book House, New Delhi1995.
7. Nilson, A,L1-1 and George winter, "Design of Concrete Structures", McGraw Hill Hook Co 10th Ed. 1986
8. Wang, C.K. and Salmon, C.G., "Reinforced Concrete, Design", international Text Book Co. 1985:
9. Park, R. and Pauley, T., "Reinforced Concrete Structures", John Wiley and Sons, 1975
10. "Design Aids for Reinforced Concrete to LS. - 456 - l978". SP - l6, 1980 Bureau of Indian Standards New Delhi.

CE 1504 GEOTECHNICAL ENGINEERING I (3-1-0)

I. Introduction

Introduction to Geotechnical Engineering: Unique nature of soil, Soil formation and soil types.

II. Simple Soil Properties Basic definitions; phase relations; Index properties of soil. Soil grain and aggregate properties of coarse grained and fine grained soils.

III. Soil Classification

Indian standard soil classification system.

IV. Compaction Behaviour

Clay minerals (basic concepts) and soil structure: Compaction - Theory of compactions, Laboratory Compaction tests; Different methods or compaction control.

V. Principle of Effective Stress and Related Phenomenon

Principle of effective stress; Capillarity; Seepage force and quicksand condition; Total, Pressure and Elevation heads.

VI. Permeability

One dimensional flow; Permeability of soils - Darcy's law; Laboratory methods of determination; Permeability as a function of soil type permanent, void ratio', soil fabric, and effective stress; Pumping out test for field determination of permeability

VII. Seepage through Soils

Two dimensional flow problems - Steady flow, confined now and unconfined flow; Flow nets and their characteristics; Uplift pressure, exit gradient. failure due to piping; Criteria for design of filters.
Shear Strength Behavior

Stress at a point *and* Mohr's stress circle; Mohr - Coulomb failure criterion; Laboratory tests shear strength determination; Effective stress and total stress shear strength parameters; LTU, CU and tests and test relevance to field problems; Shear strength characteristics of normally consolidated and lays; Shear strength characteristics of sands.

List of Experiments

1. Visual soil classification.

VIII. Compressibility and Consolidation Behavior

Compressibility - Effects of soil type, stress history and effective stress on compressibility: Consolidation - Factors affecting consolidation and compressibility parameters; Nom 1 ally consolidated and over consolidated soils; Different forms of primary consolidation equation: Transient flow condition; Terzaehi theory of one - dimensional consolidation and time-rate of consolidation; Evaluation of compressibility and consolidation parameters from consolidation test data

IX. Shear Strength Behaviour

Introduction; Stress at a point and Molt is stress circle; Mohr - Coulomb fail ore criterion; Laboratory tests shear strength determination; Effective stress and total stress shear strength parameters; UU, CU and tests and their relevance to field problems; Shear strength characteristics of • normally consolidated and clays; Shear strength characteristics of sands.

CE 150S-P GEOTECHNICAL ENGINEERING I LAB (0-0-3)

List of Experiments

1. Visual sod classification.
2. Different methods of determining water content. Specific gravity test,
3. .Core cutter and s2nd bottle method of determining the in situ density.
4. Void ratio and degree of saturation.
5. Sieve analysis.
6. Hydrometer analysis.
7. Atterberg limits

8.Perneability tests.

9.Compaction test.

10 Direct shear test.

11 Unconfined compression test.

12. Unconfined compression test.

References

1. Gopal Ranjan and Rao, A.S. R "Basic and Applied Soil Mechanics." (Revised **Edition).** New Age International, New Delhi, 1998,

2. Holtz. R. and Kovacs. W.D. "introduction to Geotechnical Engineering", John Wiley, New York. 1981,

3. Lambe. T.W. and Whitman, R.Y. "Soil Mechanics', John Wiley, New York. 1969.

4. Terzaghi, K,, and Peck, R. 8., "Soil Mechanics in Engineering Practice", John Wiley, N York, 1968.

5. Taylor, D..W, " Fundamentals of Soil Mechanics ", John Wiley, New York, 1948.

6. Lambe, T W "Soil Testing for Engineers", John Wiley, New York, 1951.

CE 1505 ENVIRONMENTAL ENGINEERING 1 (3-1-0)

I. General

Environment and its components, Importance of water. Role of an Environment Engineer. Historical overview.

II. Water Demand Design Flows, design periods, design population, Factors affecting consumption, variations of water demand. design. capacities for various water supply **c**omponents.

III. Sources of Water and Collection Works Alternative sources i.e. *rain,* surface and ground water Assessment of yield and development of the source.

IV. Quality of Water

The hydrological cycle and water quality, physical, chemical and biological water quality parameters

water quality requirements. Indian standards

V. Transmission of Water

Hydraulics of conduits. Selection of pipe materials, pipe materials and joints, pumps, pump stations.

VI. Treatment of Water

Historical overview of water treatment, Water treatment processes, water treatment processes (theory and application) Aeration, solids separation, settling operations, coagulation, softening, filtration, disinfection, - treatment processes: dissolved solids removal, treatment plant design, preparation of hydraulic profiles

VII. **Distribution of Water**

Methods of distributing water, distribution reservoirs, distribution systems, distribution system components, capacity and pressure requirements, design of distribution systems, hydraulic Analysis of distribution systems, pumping required for Water supply systems.

VIII. **Plumbing of Building for Water Supply**

Service connections, fixture units, simultaneous flow, and design of plumbing system.

CE 1509-P ENVIRONMENTAL ENGINEERING I LAB (0-0-3)

1. Determination of turbidity, color and conductivity
2. Determination of pH, alkalinity and acidity
3. Determination of hardness and chlorides
4. Determination of residual chlorine and chlorine demand.
4. Determination of dissolved oxygen.
5. Determination of most probable number of coliforms.

References

1. Pavy. H.S. Rowe. D.R. and Tchobanoglous. G.. "Environmental Engineering", McGraw Hill Book Company. 1985.

2. G.M., Geyer, J.C. and Okun. D.A., "Water and Wastewater Engineering", John Wiley and Sons, 1966.

3. Viessman, Jr. and Hammer, NU., "Water Supply and Pollution Control", Harper Co is College Publishers,

VI SEMESTER

CE 1601 OPEN CHANNEL FLOW (2-1-0)

I. Introduction

Difference between open channel flow and Pipe Flow. geometrical Parameters of a channel continuity equation

II. **Uniform Flow**

Chezv's and Manning's equations for uniform flow in open channel, velocity distribution, most efficient channel section.

III. Energy and Momentum Principles

Critical depth, concepts of specific energy and specific force, application of specific energy principle for interpretation of open channel phenomena, flow through vertical and horizontal contractions.

IV. Non-Uniform Flow in Open Channel

Equation of gradually varied flow and its limitations, flow classification and surface profiles. integration of varied now equation by analytical, graphical and numerical method. channels.

V. Hydraulic Jump, Surges, Water Waves

Classical hydraulic jump, evaluation of the jump elements in rectangular and rectangular channels on horizontal and sloping beds, equation of motion for unsteady flow, open channel surge celerity of the gravity wave, deep and shallow water waves

.

CE 1608 OPEN CHANNEL FLOW LAB. (0-0-3)

List of Experiments

1. To determine the Manning's coefficient of roughness 'n' for the bed of a given flume.
2. To study the velocity distribution in an open channel and to determine the energy and momentum correction factors.
3. To study the flow characteristics over a hump placed in an open channel.
4. To study the flow through a horizontal contraction in a rectangular channel.
5. To calibrate a broad-crested weir and study the pressure distribution on the upstream face of weir.
6. To study the characteristics of' free hydraulic jump.
7. To study the flow over a free over fall in an open channel and to determine the end depth.

References

1. Garde, R,J., and A.G. Mirajgaoker, "Engineering Fluid Mechanics (including Hydraulic Mechanics)" 2nd ed. Nem Chand & Bros., Roorkee, 1983.
2. Ranga Raju. "Flow Through Open Channels". Tata McGraw Hill, **New** Delhi, 1993.
3. Asawa GL " Experimental Fluid Mechanics", Vol 2. Nem Chand and Bros 1992.

CE 1602 CONSTRUCTION MANAGEMENT (2-1-0)

I. Introduction

Objectives and functions of project management Finance and cost accounting, Quality con Methods of motivation and incentives, Importance of safety and safety measures.

II. Network Techniques

Introduction to **CPM/PERT** methods and their use in construction planning, preparation construction. Schedules for jobs, materials, equipments, Labour and funds, and project monitoring

III. Construction Equipments

Different types of construction equipments viz., earth moving equipments, dewatering and pumping equipments, grouting equipments, pile driving equipments and other construction equipment such as conveyors. cranes, concrete mixers, vibrators, road construction machine compactors etc. Factors affecting the selection of construction equipments.

IV. Equipment Management

Productivity, operational cost, owning and hiring cost and the work motion study.

V. Contract management

Leal aspects of contraction, **laws** related to contracts, land acquisition, Labour safety and welfare
Different types of contracts, their relative advantages and disadvantages. Elements of tender operation prequalification of contracts, Evaluation of tenders, Contract negotiation and award of works, settlement of disputes, arbitration and commissioning of the project.

References

1. Sreenatli L.S "PERI and **CPM",** Affiliated East West Press, New Delhi, 1975. .
2. Punmia B.C., and Khancielwal K.K.. "PERT and CPM", Laxmi Pub., New Delhi, 19'
3 Peurifoy R.L., "Construction Planning, Equipments and Methods", McGraw Hill Book Co., Inc., New York, 1979.
4. Verma Mahesh, "Construction Planning and Management"— Delhi Metropolitan, 1996.
6 R.L.Peurify ."Construction Planning: Equipments and Methods". Tata McGraw Hill, Inc.
7. S.Satyanarayanan & Saxena, "Construction Planning and Equipment", Standard Publishers Distributors, New Delhi, 1994.

CE 1603 **TRANSPORTATION ENGINEERING II (3-1-0)**

I. History of Indian Railways, Component parts of railway track, Problems of multi gauge system wheel and axle arrangements, Coning- of wheels, various resistances and their evaluation, hauling capacity and tractive effort, stresses in rail, sleepers, ballast and formation.

II. Permanent Way Component Parts

Types of rail sections creep, "Wear and **failure in** rails, Rail joints, welding of rails, SWR and LWR sleepers requirements and types. Rail fittings, bearing plates. anti-creep devices, check and r rails. Ballast requirement Specifications, Formation, cross section, drainage.

III. Geometric Design

Alignment, horizontal curves, super elevation, equilibrium cant and cant deficiency, Length of curves, Gradients and grade compensation, vertical curves.

IV. Points and Crossing

Design of simple turn out, various types of track junction and their configurations.

V. Signaling and Interlocking Control of train movements and monitoring, types of signals principle of interlocking, Modernization of railways and railway tracks. High speed tracks.

VI. Air Transport Development Airport scenario in India-Stage of development**.** Aircraft characteristics. airport planning, site selection obstruction and Zoning Laws, imaginary surfaces. Approach zones and turning zones.

VII. Runway and Taxiway Design

Elements of runway, orientation and configuration, Basic runway length and corrections. Gcome design elements. Taxiway design. Entry and exit Taxiways. Separation clearance, Holding approval Typical airport layouts. Terminal building, gate position ..

VIII. Visual Aids and Air Traffic Control Airport marking and lighting, Airway and airport traffic control, Instrumental landing systems and other air navigation aids.

IX. .Harbours

Types of harbors. Size and accessibility. Tides. wind and wave, Dynamic effect of wave action Breakwaters and their classification, mound construction.

X. Docks

Types of Docks, Shape and size. Caissons for dock entrances, Floating docks and their design considerations.

References

1. Aggarwal, MM.. "Railway Engineering", Student Edition: Prabha & Co., New Delhi. 1997.
2. Saxena SC and Arora, S.P, "A Text Book of Railway Engineering" Dhanpat Rai S Sons. 1997.
3. Mundrev. I. S. "Railway hack Engineering". Tata McGraw-Hill Publishing Company Ltd. New Delhi 1994

4. Track Manuals of Indian Railways.
5. Indian Railways Permanent Way Manual, 1986.

CE 1604 CONCRETE STRUCTURES II (3-1-0)

I. Elements of Prestressed Conerete

Principles and systems, material properties, losses of prestress. I.S. specifications, analysis and design of sections for flexure and shear. Introduction to continuous beams.

II. continuous and Curved Beams

Design of continuous R.C. beams. moment redistribution, beams curved in plan.

IV. Shrinkage and Creep

Effect of shrinkage and creep on stresses in R.C. columns and beams.

IV. Multistoried Building Frames

Analysis by approximate methods, design and detailing, I.S. specification and loading standards.

V.Water Tanks and Towers

Water Tanks and Water Towers-design of rectangular, circular and Intn type tanks, column brace type staging and circular raft foundations.

VI. Culverts and Bridges

Design of slab culverts, bridge decks. cross and main beams for bridges, T-beam bridge design for I.R.C. loadings.

CE 1607-P CONCRETE LAB (0-0-3)

List of Experiments

1 Initial drying shrinkage, moisture movement, and coefficient of expansion of concrete. 2. Stress strain curve of concrete.

3 Behavior of under reinforced and over reinforced R.C. beams in flexure.

4 Behavior of R.C. **beams,** with and without shear reinforcement in shear.

5. Bond strength between steel bar and concrete (a) in a beam specimen and (b) by pull-out test.

6. a) Fineness of cement by Air Permeability method.
   b) Soundness of cement by Le-Chatalier's Apparatus
   c) Compressive strength of cement.

7. (a) water content for standard consistency of cement.
   (b) Initial and final setting times of cement.

8. Moisture content and bulking of fine aggregate

9. Fineness modulus of coarse and fine aggregates.

10. Workability of cement concrete by (a) Slump test, and (b) compaction factor test. 11 .,Concrete mix design for a given concrete strength and slump by LS. Code method

References

I. Krishna, Jai and Jam, 0.P., "Plain and Reinforced Concrete", Vol. II, Nem Chand and Bros., R.00rkee, 1998.

2. Chandra Ram, "Design of Concrete Structures", Vol. II, Standard Book House, New **De.lhi, 1986.** 3.Gray, W.S. and Mannings, G.!., "Reinforced Concrete Water Towers", Bunkers, Silos & Gantnes', Concrete Publication Limited. 1073.

4 Reynolds. C.E. and Steadman, *Jo.*. "Reinforced Concrete Design Hand Book", Cement **and Concrete** Association, London. 1976.

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CE 1605 GEOTECHNICAL ENGINEERING 11 (3-1-0)

I. Soil Exploration

Purpose; Methods of soil exploration: Boring. sampling: Standard penetration test; Static and dynamic cone tests: Correlations between penetration resistance and strength parameters; Plate load test.

Planning of soil investigation; Number of bore holes and depth of exploration; Types of tests to suit soil conditions

II. Earth Pressures and Retaining Structures

Earth pressure at rest: Active and passive earth pressure computations using Rankine's and Coulomb's earth pressure theories; Culmann's graphical construction: Additional earth pressure due to surcharge and earthquake loading.

Stability analysis for retaining walls; Choice of backfill material and importance of drainage. Bracings for open cuts-Recommended design diagrams of earth pressure for typical soils. Arching and its practical implications.

III. Foundations

Common types of foundations with examples; Brief illustration of situations where each one of them is adopted; Basis for design: Review of major soil parameters used in proportioning of foundations.

IV. Shallow Foundations

Types and their selection: Terminology.

Bearing capacity- Terzaghi's equation; Computation o[bearing capacity in cohesionless and cohesive soils; Effect of various factors on bearing capacity: Use of field test data.

Settlement: Components of settlement; Limits of settlement: Stresses in soil below loaded areas: Boussines equation for vertical stress; Concept of pressure bulb; New mark chart; Estimation of settlement of footings and rafts on sand using penetration and load test data; Estimation of settlement footings rafts on cohesive soils using consolidation test data: Corrections for rigidity and 3D effect: Proportioning of footings.

V. Pile Foundations

Situations where adopted; Types of piles: Outline of steps involved in proportioning; Bearing capacity and settlement of single and group of piles: Proportioning with field/lab data as input.

VI. Well Foundations

Situations where adopted; Elements of. wells: Types: Methods of construction; Tilt and shift; Remedial measures.

Proportioning, - Depth and size of well I son the basis of scour depth. bearing capacity and settlement: Terzaghi's lateral stability analysis.

VII. Embankment Slopes

Examples of embankments Road and earth dam embankments: Modes of failure and the usual protective measures: Slope inclinations usually adopted; Stability Analysis: Infinite slopes and the concept of factor of safety, Friction circle method; Method of slices Bishop's simplified method: Acceptable values of factor of safety; Critical conditions for the stability of earth darns, and approximate analyses.

VIII. Introduction to Machine Foundations

Types of machine and their foundation Terminology. Design criteria: Field methods of determination

design parameters-Cycle plate load test; Block vibration test; Response of block foundation under vertical vibrations.

IX. Foundation on Expansive Soil

Identification of expansive soil Problems associated with expansive soil, Design consideration of foundation on expansive soil, Under reamed piles.

CEI609-P GEOTECHNICAL ENGINEERING II LAB. (0-0-3)

Laboratory Experiments

1. Direct shear test.
2. Triaxial test
3. CBR test
4. .Consolidation test
5. Plate toad test.
6. Boring, Sampling and SPT.
7. Vane shear test
8. Block vibration test.
9. Static and dynamic cone tests.

References

1. Gopal Ranjan and Rao A.S.R "Basic and Applied Soil Mechanics:. (Revised Edition) New Age. New Delhi 1998.
2. Peck, R.B. , Hanson, W.E. and Thom burn. “WH Foundation Engineering", 2nd Edition, John Wiley, New York. 1976
3. Tomlinson, M.J. "Foundation Design and Construction". 5th Edition, ELBS, Singapore.] 988.
4. Alam Singh "Soil Engineering in *Theory* and Practice". Vol 1. Asia Publishing House, New Delhi.

CE 1606 ENVIRONMENTAL ENGINEERING 11 (3-1-0)

I. General

Terms: Sewerage, domestic sewage, sewage treatment, disposal, scope, role of an environmental engineer, historical overview.

II. **Sewage Characteristics**

Quality parameters 1300, COD, TOC, Solids, Do, Nitrogen, Phosphorus, Standards of. disposal into natural water courses and on land, Indian standards.

III. Collection of Sewage

Systems of sewerage: separate, combined, and partially separate, components of sewerage *systems*, systems of layout, quantity of sanitary sewage and variations, quantity of stOffil water, Rational method, shapes of sewer, circular and egg shaped, Hydraulic desiim of sewers: diameter, self cleansing velocity and slopes. Construction and testing of sewer lines, Sewer materials, joints and appurtenances, Sewage pumping and pumping stations, Maintenance of sewerage system.

IV. Sewage Treatment

Various units: their purposes sequence and efficiencies. Preliminary treatment: screening and grit removal units, oil and grease removal, Primary treatment, Secondary treatment activated sludge process, trickling filter. Sludge digestion and drying beds. Stabilization pond, Septic tank, Soakage systems, Imhoff tank, Recent trends in sewage treatment, advanced wastewater treatment nutrient removal, solids removal.

V. Wastewater Disposal and Reuse

Disposal of sewage by dilution, self purification of streams, sewage disposal by irrigation 61: sewage farming. Wastewater reuse.

VI. Plumbing for Drainage of Buildings

Various systems of plumbing - one pipe, two pipe, single stack, traps, Layout of house drainage.

CE I610-P ENVIRONMENTAL ENGINEERING II LAB (0-0-3)

List of Experiment

1. .Determination of TI.O.D of sewage
2. Determination of C.O.D. of domestic and industrial sewage.
3. Determination of kjeldal nitrogen
4. Determination of volatile, mixed, filterable and dissolved solids.
5. Determination of optimum dose of coagulants.
6. Determination of iron and two heavy metals.
7. Measurement oh SO2 in the ambient air

8. Measurement of particular matter in air.

References

1. Peavy. H.S.. Rowe. D.R. and Tchobanoglous, G., "Environmental Engineering", McGraw Hill Company. 198$
2. Fair G M., Govt.'s, I.e. and Okun, D.A.. "Water and Wastewater Engineering**",** John and Sons, Inc 1966
3. Viessman, Jr and Hammer, M.J, "Water Supply and Pollution Control", Harper Coil' College Publishers. 1985.
4. Standard Methods for the Examination of Water and Wastewater. 19th Edition, Prepared and published jointly by APHA, AWWA, WEF", 1985.

VII SEMESTER
CE 1702 STEEL STRUCTURES (3-1-0)

I. Introduction

Properties of Structural Steel, 1.S. Rolled Sections, LS Specifications.

II. Design Approach Factor of Safety, Permissible and Working stresses, Elastic method, Plastic method. Introduction to limit states of design.

III. Connections

Riveted, bolted and welded connections, Strength & Efficiency and Design of Joints. Introduction to high strength friction grip bolts.

IV. Tension Members

Steel members and high strength steel cables.

V. Compression Members

Struts and Columns including built-up columns. lacings and battens.

VI. Beams

Stability of flange and web, Build-up sections Plate girders including stiffeners connections and curtailment of flange plates.

VII. Beam-columns

Stability base, Gusseted base and Grillage footing

VIII. Column bases.

Stability base, Gusseted base and Grillage footing.

References

1.Arya.A.S. & Ajmani. IL "Design of Steel Structures". Nem Chand Bros., Roorkee (UP), 1992

2.B roster, B. Lin, TY. and Scalzi, J.B "Design of Steel Structures", Wiley Eastern Pvt. Ltd New Delhi, 1970.

3. Duggal, S.K., "Design of Steel Structures". Tata McGraw - Hill Book Pub. Co. Ltd New Delhi, 1993

4. Kazimi. S.M.A. and Jindal, S.K. "Design of Steel Structures", Prentice Hall of India Pvt, Ltd., New Delhi, 1989.

5.Krishnamachar, B.S. and Sinha, D.A., "Design of Steel Structures", Tata McGraw Hill Pub. Co. Ltd , New Delhi. 1987.

6.Negi I S.. "Design of Steel Structures", Tata McGraw Hill Pub Co. Ltd., New Delhi, 1995.

7. Punmia, B.C., Jain, AX. and Jam, "Design of Steel Structures". Vol. 1, Arihant Publications, Bombay - Jodhpur. 1995.

8.M "Design of Steel Structure". 'Fain McGraw-1-1•11 Pub. Co. Ltd . New' Delhi, 1995

9.Chandra, Ram. "Design of Steel Structures", Standard Book House, Nai Sarak, Delhi -6, **1975.**

EC 1712 PHOTOGRAMMETRY AND REMOTE SENSING (3-1-0)

I. Photogrammetry

Definition of Photogrammetric Terms, Geometry of aerial and terrestrial photographs. Aerial camera and photo theodolite Scale of a Photograph. Tilt and Height displacements, Stereoscopic vision and stereoscopes, Height determination from parallax measurements, Flight planning. Maps and Map substitutes and their uses,

II. Remote Sensing

Introduction and definition of' remote sensing terms, Remote Sensing System, Electromagnetic radiation and spectrum; Spectral signature, Atmospheric windows, Different types of platforms, sensors and their characteristics, Orbital parameters of a satellite. Multi concept in Remote Sensing

III. Image Interpretation

Principles of interpretation of aerial and satellite images, equipments and aids required for ground truth collection and verification. Advantages of multidate and multiband images. Digital image processing concept.

References

1 .Campbell, J.B., "Introduction to Remote Sensing", The Guilford Press, London, 1986.

2.Curran, *Pi.,* "Principles of Remote Sensing", Longman, London. 1985.

3.Kennie, T J M. and Petric, G., -Engineering Surveying, Technology-, Blackie & Sons Ltd, London. 1990.

4 Wolf, P,R., "Elements of Photogrammetry", Tam McGraw Hill Book Company, New Delhi. 1986.

CE 1701 WATER RESOURCES ENGINEERING I (3-1-0)

I. Introduction

Definitions, functions and advantages of irrigation, present status of irrigation In classification for agriculture, soil moisture and crop-water relations. irrigation water quality, consumptive use of water, principal Indian crop seasons and water requirements, multiple cropping, hybrid crops.

II. Canal Irrigation

Types of canals, parts of a canal irrigation system, channel alignment, assessment of water requirements, estimation of channel losses, design of Channels, regime and semi-theoretical approaches (kennedy's Theory, Lacey's theory), cross-sections of channels, silt control in canals.

III. Water Distribution System

Rotational delivery (warabandi), continuous delivery and delivery on demand, Role, of command area development authority. Functions and organization structures.

IV. Distribution of Canal Water

System of regulation and control, outlets. assessment of canal revenue

V. Hydraulics of Alluvial Rivers

Critical tractive force, regimes of flow, resistance relationship for natural] streams, bed load, suspended load and total load equations, different sages of rivers, meandering, meandering and degradation. river training & bank protection works.

VI. **Water Logging**

Causes, preventive and curative measures, drainage of irrigated lands, saline and alkaline lands, types of channel linings and design of lined channel.

VII. Principles of Design of Masonry and Other Structures for Canals

Design for surface and sub-surface flows, Bligh's, Lane's and Khosla's methods, design of falls, distributary and cross-regulators, energy dissipation.

VIII. **Well Irrigation**

Open wells and tube wells, types of tube wells, duty of tube well water

IX. **Hydrology**

Definition. Hydrologic cycle, Application to Engineering problems, Measurement of rainfall, rain-gauge, Peak flow, Flood frequency method. Catchment area formulae, Flood hydrograph, Rainfall

analysis, Infiltration, Run off, Unit hydro graph and its determination. Estimation of run off.

References

1. Asawa, G.L., "Irrigation Engineering", New Age International Publishers, Hnd ed., New Delhi, 1996.
2. Bharat Singh, "Fundamentals of Irrigation Engineering", 7th Ed., Nem Chand & Bros., 1983.
3. Varshney, R.S., Gupta and Gupta," Theory and design of Irrigation structures vol I & II.
4. PunamiCI,B.C. and Pandey, 'B.B.Lal," Irrigation and Water Power Engineering.

CE 1703-P STRUCTURAL DETAILING (0-0-3)

To prepare working drawings manually as well as on computer for the following

1. Simple beam/Lintel
2. T-Bearn floor.
3. Rectangular slabs.
4. Brick wall and isolated footing.
5. Combined rectangular and Trapezoidal footing
6. Water tank
7. T-Shape retaining wall.
8. Detailing of Retaining walls.
9. Water Tanks
10. Rolled sections and connections
11. Built-up columns and beams
12. Guesset base.
13. Grillage footing.
14. Trusses

CE 1704-P ESTIMATION AND EVALUATION (0-0-3)

I. Building Drawing

Objective of pick all elevation and sectional elevations Scale and types of drawings. I.S. Specifications.

II. Quantity Estimation

Principles of estimation, methods and units. Estimation of materials in buildings: walls, floors and roofs. R.B. ar..f R.C.C. works, plaster, white washing, distempering and doors and windows, lump Sum items Principles of genera i and detailed specifications for building works, analysis of rates and schedule of rates.

III. Drawing Estimation

Survey of an existing building on the campus. Preparation of a report giving its salient features including the following details on the drawing sheets: Ground floor plan. two sectional elevations, front and *side* elevations, plan and sectional elevation of a stair case door, window! ventilator. Floor and roof.

IV. Analysis of Rates

Definition of analysis of rates, Prime cost, Work charged establishment, Resource planning through analysis of rates, P.W.D. Schedules and cost for building material and Labour, Measurement and measurement book, a

V. Valuation

Purposes of valuation, Terminology, Factors affecting the value of a property, valuation and its different aspects, methods of valuation such as Rental method, Direct compensation method, Profit based method and development method, Capitalized value and depreciation.

References

1. Arva, A.S., "Masonry and Timber Stnictures includin[g] Earth Resistant Design. Nem Chand Bros.. Roorkee(U.P.), 1987

2. Bellis. 1-1.F & Schmidt, W.A.-Architecture Drat-611$_{1,}$i¨. McGraw-Hill Book Co. Inc., London, 1961. Dutta. B.N.. "Estimating and Costing in Civil Engineering -Theory & Practice". UBS Publishers.

Distributors Ltd .. New Delhi. I 994.

4. Goyal, S.C. and Jain, 0P." Manual of Estimating". Nem chand & Bros., Roorkee(U.P.). 1960.
5. Hoelscher. R.P & Springer, C.H " Engineering Drawing- & Geometry", John Wiley & Sons Inc. London. 1958.
6. Shah. M.G., Kale, C.M. and Patki, S.Y., " Building Drawing". Tata McGraw Hill publishing Co. Ltd 2nd edition, New Delhi. 1985.
7. Chakraborty. M. " estimating costing and valuation in civil Eng.".

VIII SEMESTER

CE 1801 STEEL STRUCTURES II (3-1-0)

I. **Moment-resistant Connections**

Connections for frames, brackets.

II. Industrial Buildings

Loads, General arrangement and stability considerations. Design of purl ins, roof trusses industrial building frames, gantry girder and bracings.

III. Bridge

Plate girder and truss bridges, General arrangement. Design loads for highway /railway bridges. Design of truss bridge for railway loading.

IV. Tanks

Cylindrical tanks. Pressed steel tanks, Staging's for tanks.

V. Towers

Transmission line towers, Microwave towers, Design loads, Classification, design procedure specifications.

VI. Plastic methods

Analysis and design of beams and frames.

References

1. Arya, A.S. Ajmani, J.L.. "Design of Steel Structures". New Chand & Bros, (U.P.), 1992.
2. Bresler, B,Lin, T.Y. and Scalzi, IB., "Design of *Steel* Structures", Wiley Eastern Pvt. Ltd. New Delhi, 1970,
3. Duggal, S.K. "Design of Steel Structures", Tata McGraw - Hill Book Pub. Co. Ltd New Delhi ,1993.
4. Kazimi, S.M.A. and Jindal, S.K., "Design, of Steel Structures", Prentice Hall **of India** Pvt. Ltd., New Delhi. 10.
5. Jar, B.S. and Sinha U.A., " Design of Steel Structures", Tata McGraw Hill Pub. Co. Ltd.. Nev.' Delhi, 1979.
6. Negi, L.S., "Design of Steel Structures", Tata McGraw Hill Publishing Co Ltd., *New* Delhi, 1995.
7. Punmia, B.C., Jain, AK. and Jain. AK.. "Design of Steel Structures", Vol. 1, Arihan Publications, Bombay - Jodhpur. *1995.*
8. Raghupati M "Design of Steel Structures". Tata McGraw-Hill Pub Co. Ltd . New Delhi. 1995

9. Ram Chandra "Design of Steel Structures", Standard Book House, Nai Sarak, Delhi - 6, 1975.
10. Cooper, S.E. and Chen, AC "Designing Steel Structures". Prentice-Hall, Inc.. N.J. USA, 1985
11. Gaylord, E.H., Jr. and Gaylord, C.N. Charles, 'Design of Steel Structures", International Student Edn., McGraw Hill Book Co., Inc./Koga-kusha Co. Ltd., 1975.
12. Marcow H.W. "Elements Of Steel Design", Prentice - Hall Inc., N.J., USA, 1987..
13. McCorinac, J.C "Structural Steel Design", International Text book co. Pennsylvania, USA, 1967
14. McGuire, Wiliam, "Steel Structures", Prentice Hull Inc N.J., U.S. A., 1968.

CE 1802 WATER RESOURCES ENGINEERING II (3-1-0)

I. Regulation Works

Falls, classification of falls. Design of falls, Distributary head regulator and cross-head regulator, Escape. Bed bars.

II. Cross-Drainage Structures

Necessity, of cross-drainage structures. their types and selection, comparative merits and demerits. designs of various types of cross-drainage structures-aqueduct, siphon aqueducts, super passage. siphon, level crossing and other types.

III Diversion Head works

Selection of site and layout, different parts of diversion -head works, types of weirs and barrages,
Design of weirs on permeable foundation, silt excluders and different types of silt ejectors.

IV. Dams

Suitable sites, different types, principles of design of straight gravity and earth dams, mass concreting of dams.

V. Spillways

Spillway capacity. flood routing through spillways. different types of spillways and gates, energy Dissipation below spillways.

VI. Hydro-Power Plants

General features of hydroelectric schemes, elements of power house structure. selection of turbines

draft tube and setting of turbine, cavitations.

V11. Ground Water

Occurrence and distribution of ground water, acquifers, movement of ground water, Darcy's law, safe yield of a basin, steady flow towards well in confined and unconfined acquifers, well losses and specific capacity of well, ground water quality and ground water budget. types of wells, construction and design of wells - screens, and gravel packs, pumping equipment.

References

1. Asawa, G.L., "Irrigation Engineering", 2nd Ed._ New Age International Publishers, New Delhi. 1996.
2. Bharat Singh. "Fundamentals of Irrigation Engineering", 7th Ed Nern Chand & Bros., Roorkee, 1983
3. Varshney, R.S., S.C. Gupta and R.L. Gupta, "Theory and Design of Irrigation Structures", Nem Chand & Bros, Roorkee, 1982.
4. Sharma, H.D. and Chawla, A.S., "A Manual on Ground Water and Tube Wells", Report No. 18, CBIP, New Delhi, I 977.

CE 1804-P COLLOQU1UM (0-0-2)

Student has to select a topic of current interest in his branch of Engg. and finally to be approved by his head.

Then he has to prepare his interest in writing with suitable diagrams and references and then to present it in about 15 minutes, before a panel of teacher of his department who will mark them each teacher will give marks separately and an average of these marking (round off) should be entered in the final mark sheets.

This gives a chance to the student to present the subject matter before the audience (his class fellows and teachers of the department), which will further increase their confidence n facing the audience