

Bhavnagar University
B.E. Semester V (Civil)
C-501: Structural Analysis - II

Teaching Scheme			Examination Scheme				Total Marks
Hours per week			Theory		Pract/ Oral /Marks	T.W. Marks	
Theory Lectures Hours	Tut Hours	Practical	Marks	Hrs.			
04	--	02	100	04	25	25	150

1. **UNSYMMETRICAL BENDING** : PRINCIPAL AXES OF A SECTION, CRICLE OF INERTIA, MOMENTAL ELLIPSE, UNSYMMETRICAL BENDING, Z-POLYGON.
2. **PLASTIC DESIGN** : ELEMENTARY PLASTIC THEORY OF BENDING, MOMENT- CURVATURE RELATIONSHIPS, PLASTIC HINGES, PLASTIC MOMENT OF RESISTANCE, LOAD FACTOR, SHAPEFACTOR, COLLAPSE MECHANICS, COLLAPSE LOAD, EQUILIBRIUM, MECHANISM & YIELD CONDITIONS, METHOD OF VIRTUAL WORK & COMBINING ELEMENTARY MECHANISMS, SIMPLE DESIGN OF CONTINUOUS BEAMS & PORTAL FRAMES.
3. **MATRIX METHODS OF STRUCTURAL ANALYSIS** : FLEXIBILITY METHOD APPLIED TO PIN JOINTED TRUSSES. STIFFNESS METHOD WITH SYSTEM APPROACH APPLIED TO RIGID BENTS, PORTAL FRAMES, AND BUILDING FRAMES WITH COMPUTER PROGRAMMING.
4. **INFLUENCE LINES** : INFLUENCE LINES FOR INDETERMINATE STRUCTURES, INFLUENCE COEFFICIENT, MULLER BRESLAU'S PRINCIPLE, INFLUENCE LINES FOR PROPPED CANTILEVER; FIXED BEAMS; CONTINUOUS BEAMS; TWO HINGED ARCHES.
5. **ANALYSIS OF GABLE FRAMES & BOX CULVERTS.**
6. **APPROXIMATE METHODS** : ANALYSIS OF FRAMES, PORTAL AND CANTILEVER METHODS, SUBSTITUTE FRAME METHOD FOR RIGID FRAMES.
7. **VIBRATIONS** : DEGREES OF FREEDOM, FREE UNDAMPED AND DAMPED VIBRATIONS, NATURAL FREQUENCIES, SINGLE &S TWO DEGREES FREEDOM SYSTEM, RESONANCE, AMPLITUDES & MODE SHAPES, CONDITIONS OF KORTHOAGONALITY, BEAM VIBRATIONS, RAYLEIGH'S METHOD, DUNKERLEY'S METHOD.
8. **FINITE ELEMENT METHOD** : INTRODUCTION, APPLICATION TO SIMPLE BEAM, PLANE STRESS & STRAIN ELEMENTS.

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Bhavnagar University
B.E. Semester V (Civil)
C-502: Water Resources Engineering-I

Teaching Scheme			Examination Scheme				Total Marks
Hours per week			Theory		Pract/ Oral /Marks	T.W. Marks	
Theory Lectures Hours	Tut Hours	Practical	Marks	Hrs.			
04	--	02	100	03	25	25	150

A. Water Resources Management:

1. Introduction

Scope and necessity for conservation and development of water resources; Local and global water resources; methods of conservation; types and need based priorities for water resources utilization. Need for mono and multipurpose water resources projects, water resources locally and globally.

2. Hydrology:

Hydrological cycle, probability concepts in hydrology; rain gauging hydrographs and unit hydrograph analysis ; estimation of runoff, classification of catchments, use of rainfall, runoff and stream flow data. River Gauging, sours of water. Shallow water and deep water, tube wells.

3. Water Storage:

Types of sources of water and types of storage dam's surface and under ground sources and storage, reservoirs. Reservoirs and planning for dam reservoirs; types of reservoirs, capacity of reservoirs, storage zones, pool levels, reservoir yields, sedimentation silting control reservoir losses, selection of suitable site for reservoir, economic high of a dam, cost benefit considerations and optimization, water resources planning, economics and organization.

4. Flood Control

Flood control reservoirs, purpose, location, size and operation problem, flood routing and floor adsorption capacity, land management of flood control. Economics of flood, river training works and river engineering.

5. Miscellaneous:

System engineering approach applied to water resources. Planning, pumping, necessity, types and their suitability.

B. Irrigation Engineering:

6. General:

Necessity and importance of irrigation, benefits and ill effects, irrigation systems. Irrigation in India, Major, Medium and minor irrigation schemes, Future needs.

7. Irrigation water:

Principal crops in India, Crops and seasons/water requirements of crops, soil and moisture, optimum mainture content and wilting coefficient crop rotation.

8. Irrigation Methods:

Water application methods perennial, inundation and bandanas irrigation, Boarder, Basin, Furrow, Drop, Sprinkler and sub irrigation method irrigation scheduling, Rotational water systems (RNS, Varabandhi) Drip irrigation.

9. Irrigation distribution Systems:

Alignment and types of main canal, regulatory works, cross drainage works and outlet works, Branches and distributaries; Classification; Capacity and command of canal, Design of canal by reactive force method, Land equitation, canal lining.

10. Miscellaneous:

Productive and protective works, benefit cost analysis, Financial return, Lift litigation, necessity, suitability, applications water logging, salinity ingrers and drainage, causes, effects, problems, preventive and remedial measures.

Text Book			
1	Water Resources and Hydrology	Garg S.K.	Khana Publishers, Delhi
2	Irrigation and water power engineering	B.C.Punmia, Dr. Pande, B.B.Lal	Standard publishing Distributors, Nai sarak Delhi
3	Irrigation & Hydraulic structures	S.K. Garg	Khana Publishers, 2-B, Nath market, Nai sark, Delhi.
Reference Books:			
1	Ground water Resource Evaluation	Wilto, willinc C	Mc Greow Hill Kogakusha, Japan, Tokyo)
2	Irrigation water management	K Patani sami J.F. Mistry	6, Revervalley Projects of India

Bhavnagar University
B.E. Semester V (Civil)
C-503: Fluid Mechanics- II

Teaching Scheme			Examination Scheme				Total Marks
Hours per week			Theory		Pract/ Oral /Marks	T.W. Marks	
Theory Lectures Hours	Tut Hours	Practical	Marks	Hrs.			
04	--	02	100	03	25	25	150

1. Basic Equations;

Types of flow; concepts of stream lines and stream tubes; continuity. Equation for 3-dimensional flow; graphical addition, stream function and Velocity - Rotation; Potential function; Flow nets; Euler's equation of motion for 3-dimensional flow and its application for derivation of Bernoulli's equation.

2. Dimensional and Model Analysis:

Raleigh's and Buckingham are II - Theorem methods, and their application. Hydraulic Modeling; scale ratio, similarities Dimensionless numbers.

3. Laminar Flow:

Viscosity and its measurements; Reynaldo's experiments; Laminar flow between two stationary plates; Cottee flow; Laminar flow through pipe.

4. Turbulent flow:

Mixing length hypothesis; smooth and rough pipes; Moody's diagram. Hardy cross method of pipes network. Basic concepts of theory of boundary layer.

5. Unsteady flow:

Basic concepts of water hammer and surges.

6. Open Channel Flow:

Classification and types specific energy and it's application. Non uniform flow; Concepts of gradually varied and derivation of dynamic equations. Rapidly varied flow.

Term Work:

Term work, Practical/Oral shall be in the form of laboratory experiment, (Minimum 5 experiments) mini project (1 minimum, 1 Mini project) & assignments.

Text Book:

A. text book of Fluid mechanics,

1. Mody & Seth
2. Arora
3. Dr R.K.Bansal

Reference Book:

1. Engineering Fluid Mechanics by R.J. Garde and A.G. Mirajgaoker, Nem chand & Bros Publication Roorkee.
2. Fluid Mechanics by Dr. A.K.Jain, Khanna, Publishers- 2-B, Nath Market, Nai Sark, Delhi-6.
3. Engineering Flue Mechanics by K.L.Kumar Eurasia Publishing House (PO Ltd. Ramnaga, New Delhi-5.
4. Flue Mechanics with engineering application .By Robert L. Laugherty, Mc-Graw Hill International Book Company, London.
5. Open channel Hydraulics By: Ven-Tee chau, Me-Graw-Hill Int. Book Co.
6. Flow in Open channel By : K.Subrammicum, flow in tata Mc-Graw Hill Publishing Co. Ltd.
7. I.S. and Other standards & Publications.
8. Fluid Mech. With engg. Application - Daugherty Mic grow Hill pub. Co., Franzini New Delhi.
9. Open channel Hyd. Frech New Delhi.
10. Industrial Hyd. Pippenger Hicks New Delhi.

Bhavnagar University
B.E. Semester V (Civil)
C-504: Town Planning and Housing

Teaching Scheme			Examination Scheme				Total Marks
Hours per week			Theory		Pract/ Oral /Marks	T.W. Marks	
Theory Lectures Hours	Tut Hours	Practical	Marks	Hrs.			
04	--	02	100	03	25	25	150

1. General:

Definition, scope and objects of town planning; History, origin and growth of towns; Ancient city planning in India; Case studies of mohan-jo-daro, Lothal, etc., Evolution of modern city; problems of city development and civil design; Impact of Industrialization and communication; Urbanization, its effects and remedial measures.

2. Civil Surveys:

Necessity and types of civil surveys; survey data and methods of presentation; Uses of surveys in town planning and renewals.

3. City planning:

Principles governing selection of site for a new town; Basic elements of city planning land use pattern and joining, town planning Environment, Landscape pattern and aesthetics, circulation pattern and transportation, building group pattern and civil amenities; master plan and its preparation; Town planning theories, New trends of town planning, garden city, satellite township, suburban towns, green belt ; case studies of Chandigarh, Gandhinagar, New Delhi, Twin city of Bombay, Gandhidham, Jaweharnagar, Fortilizernagar, Kevaida colony, etc.

4. Town Ancillaries:

Central areas- town centre, civil spaces, shopping centers, public buildings, Marketing yards, parks and gardens; open specs and reservation; Industries; Town services – transport, water supply, drainage, refuse, lighting, telecommunication, gas supply, Regional planning.

5. Urban Renewal:

Drawbacks and defects of existing towns; problems congestion, traffic & parking, environmental pollution, and corrective measures, Improvement and redevelopment of central areas and towns; comprehensive urban reveal projects; Ribbon development and its control.

6. Housing:

Types of residential accommodation; Housing needs and quality; Housing layouts and standards; Neighborhood unit; Housing problems, and solution; sums and slum clearance.

7. Planning legislations:

Town planning act and town planning Rules – salient features and provisions; Regional and area development plans, town planning schemes – procedure, salient features, legal implications; Building bye laws – principles and main provisions; Land ceiling act; Land acquisition act; controlling, Implementing and financing authorities and agencies.

8. Rural Housing and Village Planning:

Rural housing problem, requirements, planning and design; Village planning approach, surveys and layouts; Redevelopment and expansion of existing villages; Improvement of existing houses; community building; Rural service; Rules and regulation for rural areas.

9. Ecological Crises and Imbalances:

Upsetting natural eco-systems, preservation and improvements of human habitat, for future generation. Preventing minimizing global pollution conservation of natural resources, improving quality of life on earth.

Term Work:

Term work shall be based on tutorials, assignments, laboratory experiments, mini project, based on the above course.

Book:

1. Town planning- S.C. RINGWALA
2. Planning the Modern city volume I & II by Harold Maclean Lewis
3. Principles of city planning by Karl Lahman
4. Modern town and county planning by Games W.RAdm
5. The urban pattern city Planning & Design – Arthur B Gallion
6. Town and Country planning by Regboy Childs
7. Town Design by Fredride Gibberd.

Bhavnagar University
B.E. Semester V (Civil)
C-505: Environmental Engineering-I

Teaching Scheme			Examination Scheme				Total Marks
Hours per week			Theory		Pract/ Oral /Marks	T.W. Marks	
Theory Lectures Hours	Tut Hours	Practical	Marks	Hrs.			
04	--	02	100	03	25	25	150

A: Public Health Engineering:

1. Introduction:

The environment: Concept and scope; Components, Impact of human upon environment and impact of environment upon human; improvement of environmental quality; Ecology; Ecosystem and its principles, C.N.P & S Cycles, ecological pyramids; Environmental resources, its distribution, Ethics, quality of life.

2. Environmental Sciences:

Environmental chemistry:

Molar, molal, normal, standard and stock solutions, primary and secondary solutions, chemical buffers. Principles involved in analyses and estimation of testing parameters. Qualitative and instrumental analysis.

Environmental physics:

Physisorption and chemisorptions; osmosis and dialysis, Qualitative and quantitative and applied principle. Involved in analyses and estimation of water and waste water parameters.

Environmental Bioscience:

Definition, micro and microbiology, evolution and scope of Bioscience; characteristics and classification of microbes, microbes and nanobes microbial activities, pathogenic organisms, microbiology of soil, air, water, waste water, food and milk.

3. Community Health:

Definition, Epidemiology, communicability, sources, host, carrier, vehicle, routes of transfer and channels of infection. Microbes, Reservoirs and diseases, infection, contagious, epidemic, endemic, sporadic, pandemic and other communicable diseases, General methods of prevention and control of communicable diseases, health standards, health evaluation and awareness.

4. Sanitation:

Principles of sanitation, urban and rural sanitation, Low cost sanitation alternatives; dug, VIP, pour flush, aqua privy, septic tank, latrine/s connected to biogas plant

5. PH Organization:

Role of Environmental engineering Public health and public health engineering organizations.

B. Pollution Control Engineering:

6. Introduction:

Definition, scope and importance of pollution and control, Environmental pollution – classification.

Water pollution; Definition, aqua system, physical, chemical, biological and other effects of water pollution and methods of measurement. Standards for discharging in to various sinks river monitoring...

7. Pollution, prevention and control:

Water pollution:

Prescribed for discharging in to various sinks; effluent and environmental (stream) standards, river monitoring self purification of river.

Atmospheric Pollution:

Definition parameter, Atmosphere, aerosols and their sources, dry and estimated air contents, permissible limits.

Air Pollutions:

Effects of air pollutant on human, vegetation, animals and materials measurement control methods.

Noise Pollution:

Definition, sound noise and musical tones, pitch intensity, timbre and landless, rumination and subtraction of decibels, phone, limits of audibility and intensity ranging, ultra and super sonic, effects on human, measurement and control method.

Radiation pollution:

Natural radio activity, radio isotopes, local worldwide fallout from unclear explosions, decay rates, methods of measurements and surveillance, radiation effects on many radiation and x-ray protection, management of radioactive wastes. Measurements and control methods.

8 Environmental Legislation:

Atmospheres, land, water Noise and other environmental pollution control Acts other pollution prevention and control acts familiarization with important section preventing & control acts implementation and Monitoring.

9. Misalliances:

Environmental Engineering planning Economics and Organization – Environmental impact analysis – case study.

Term Work:

Determination of various parameters of water and public health engineering, and pollution visit of water treatment plant and its report; visit of distribution system and its report; project/design/problems; assignments. Books.

Text Book			
No	Title	Author/s	Publisher
1	Environmental Engineering	Peavy & Rowe	Mc Grow Hill book Company
2	Chemistry for Environmental Engineering	Swayer and Mc Carty	Mc Grow Hill
3	Water supply & sanitary Engineering	S.K.Hussain	Oxford & IBH publishing co, Delhi
4	Standard Methods for the Examination of water & Wastewater.	America public Health association	America public Health association Washington DC
5	Air pollution its Origin and control	by keaneth work	--
6	Pollution Management in Industries	By R.K.Trivedi	--
7	Industrial water pollution control	By Eckenfelder	--
8	Environment Impact analysis	By Raju and Woocoten	--
9	Standard Hand Book of Environment Engg.	By Corbitt	--
List of IS Standard			
1	1. IS-10500 Drinking water standards. 2. IS-1622-1964 Samples for bacteriological Examination(MPN) 3. IS 5187-1969 Environmental sanitation Part – I to X NIS, WHO, IRMR and other standards...		