Programme Structure

SCHOOL OF ENGINEERING & TECHNOLOGY

Diploma in Civil Engineering

Programme Code:0102

Batch: 2023-2026

Vision of the University

To be recognized as an Institution of excellence, facilitating learning, fostering creativity, knowledge creation, innovations, consultancy and leadership in multiple areas to build a conscious community that will positively impact living beings for a sustainable future.

Mission of the University

1. **Offers a wide range of Undergraduate and Post graduate Courses.**
   To create conducive environment for an interactive and application oriented experiential learning making the Institute a preferred destination for work and study.

2. **Research, Innovation, Consultancy & Entrepreneurial Culture**
   To Foster creativity, research and innovation orientation in students and faculty in basic and applied areas in all of its disciplines, provide cost effective solutions and nurture entrepreneurial capabilities to accelerate growth.

3. **Social Relevance with local actions on global thoughts**
   To act as a catalyst in social change by developing academic, social, political, technological, scientific, industrial and business leadership in the spirit "Think Globally and Act Locally"; by providing ample opportunities to develop team spirit, sportsmanship and love for culture and national heritage.

Core Values

Integrity

Leadership

Diversity

Community

Vision of the School of Polytechnic

To become a centre of excellence for providing quality and value based education in the field of diploma engineering that will produce skilled technocrats to meet industry requirements.

Mission of the School of Polytechnic

- To provide technical knowledge and skills by using latest engineering tools.
- To facilitate industry-institute interaction to explore the industrial knowledge of the students.
- To inculcate ethical and professional values among students.
- To impart quality education to the students coming from rural parts and to conduct different curricular & co-curricular activities to enhance the academic.

Core Values

Integrity

Leadership

Diversity

Community

Programme Educational Objectives (PEO's)

PEO 1. To provide solid foundation in electronics engineering along with good communication and Entrepreneurship skills for tackling social issues.

PEO 2. To impart students with good scientific and engineering knowledge in order to analyse, Design and create novel products for giving practical solutions to real life problems.

PEO 3. To create engineers with sound technical knowledge for facing all sorts of challenges in Industry or in pursuance of higher studies.

PEO 4. To motivate students, to acquire aptitude for lifelong learning along with leadership skills, team spirit and ethical values so that they upgrade themselves with the latest trends in the field of engineering in order to serve the society.

PROGRAMME OUTCOMES (POs)

PO 1. **Basic and Discipline specific knowledge:** Apply knowledge of basic mathematics, natural sciences and engineering fundamentals and civil engineering specialization to solve complex engineering problems.

PO 2. **Problem analysis:** Identify, formulate, and analyze complex civil engineering problems reaching substantiated conclusions using principles of mathematics, natural sciences, and engineering sciences.

PO 3. **Design/ development of solutions:** Design solutions for complex civil engineering problems and design system components or processes that meet specified needs with appropriate consideration for public health and safety, and environmental considerations.

PO 4. **Engineering Tools, Experimentation and Testing:** Apply modern engineering tools, techniques, and resources to civil engineering activities, with an understanding of the limitations.

PO 5. **Engineering practices for society, sustainability and environment:** Apply knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice.

PO 6. **Project Management:** Demonstrate knowledge and understanding of civil engineering management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO 7. **Life-long Learning:** Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

PSO 1. An ability to design, analyze, and evaluate structural components and systems by applying principles of structural engineering to ensure safety, reliability, and efficiency in the built environment..

PSO 2. An ability to understand and implement modern construction practices, project management techniques, and use of construction materials and equipment to deliver quality construction projects within constraints such as cost, time, and sustainability.

PSO 3. An ability to apply concepts of soil mechanics and foundation engineering to design and analyze foundations, retaining structures, and other geotechnical systems, ensuring stability and performance under various loading conditions.

PSO 4. An ability to perform land surveying, mapping, and utilize remote sensing and GIS technologies for planning, designing, and managing civil engineering.

PSO 5. An ability to communicate effectively in both oral and written forms, present technical information clearly, work collaboratively in multidisciplinary teams, and demonstrate professional ethics, social responsibility, and awareness of environmental impacts in civil engineering practices.

SDGI GLOBAL UNIVERSITY, GHAZIABAD

SCHOOL OF ENGINEERING & TECHNOLOGY

SCHEME OF STUDIES AND EVALUATION FOR DIPLOMA IN CIVIL ENGINEERING

W.E.F. Session : 2025-26 **(Batch : 2023-2026)** **Semester - V**

S. No	Status	Paper Code	Subjects	Study Scheme Lec / Week			Hours	Credits	CIE	ESE	Total	Pass Marks
				L	T	P						
1	DC	D060923501	Water & Waste Water Engineering	2	1	0	3	2	50	50	100	40
2	DC	D060923502	Railways, Bridges and Tunnels	2	1	0	3	2	50	50	100	40
3	DC	D060923503	Earthquake Engineering	2	1	0	3	2	50	50	100	40
4	DC	D060923504	Soil Mechanics & Foundation Engineering	3	1	0	4	3	50	50	100	40
5	DC	D060923505	Surveying-II	2	1	0	3	2	50	50	100	40
6	DC	D060923506	Waste Water and Irrigation Engineering Drawing	4	0	0	4	4	50	50	100	40
7	VAC	D06VA23507	Universal Human Values	3	0	0	3	3	50	50	100	40
8	DC	D060923551	Water & Waste Water Engineering Lab	0	0	2	2	1	60	40	100	40
9	DC	D060923554	Soil Mechanics & Foundation Engineering Lab	0	0	2	2	1	60	40	100	40
10	DC	D060923555	Surveying-II Lab	0	0	4	4	2	60	40	100	40
11		D060923560	Summer Internship / Industrial Training	0	0	0	0	2	0	100	100	40
Total				18	5	8	31	24	530	570	1100	440

Semester-05

SCHOOL OF ENGINEERING & TECHNOLOGY

WATER & WASTE WATER ENGINEERING

(D060923501)

L	T	P
2	1	0

JUSTIFICATION

One of the basic necessities of life is water which is not easily available to a lot of people. Providing potable water at the first place then collection and disposal of waste solids and liquids are important activities of civil engineering field. This subject provides acknowledge and skills in the field of water supply system and waste disposal system. Classroom instructions should be supplemented by field visits to show functional details of water supply and waste disposal systems. It will also be advantageous to invite professionals from field to deliver extension lectures on specialized operations

DETAILED CONTENTS

A. WATER SUPPLY

UNIT 1: Introduction — **08 Hours**

1.1 Necessity and brief description of water supply system.

1.2 Sources of water - surface/sub-surface sources

Quantity of Water

1.3 Water requirement

1.4 Rate of demand and variation in rate of demand

1.5 Per capita consumption for domestic, industrial, public and fire fighting uses as per BIS standards (no numerical problems)

1.5 Population Forecasting

UNIT 2: Quality of Water — **08 Hours**

2.1 Meaning of pure water and methods of analysis of water

2.2 Physical, Chemical and bacteriological tests and their significance

2.3 Standard of potable water as per Indian Standard

2.4 Maintenance of purity of water

Water Treatment (brief introduction)

2.5 Sedimentation - purpose, types of sedimentation tanks

2.6 Coagulation/flocculation - usual coagulation and their feeding

2.7 Filtration - significance, types of filters, their suitability

2.8 Necessity of disinfection of water forms of chlorination, break point chlorine, residual chlorine, application of chlorine.

2.9 Flow diagram of different treatment units, functions of (i) Aeration fountain (ii) Mixer (iii) floculator, (iv) classifier, (v) slow and rapid sand filters (vi) chlorination chamber.

UNIT 3: Conveyance of Water — **08 Hours**

3.1 Different types of pipes - cast iron, PVC, steel, asbestos cement, concrete and lead pipes. Their suitability and uses, types of joints in different types of pipes.

3.2 Appurtenances: Sluice, air, reflux valves, relief valves, scour valves, bib cocks, stop cocks, fire hydrants, water meters their working and uses

Laying of Pipes

3.3 Setting out alignment of pipes

3.4 Excavation for laying of pipes and precautions to be taken

3.5 Handling, lowering and jointing of pipes

3.6 Testing of pipe lines

3.7 Back filling

Building Water Supply

3.8 Connections to water main (practical aspect only)

3.9 Water supply fittings (with sketches) and terminology related to plumbing

B. WASTE WATER ENGINEERING

UNIT 4: Introduction **06 Hours**

4.1 Purpose of sanitation

4.2 Necessity of systematic collection and disposal of waste

4.3 Definition of terms in sanitary engineering

4.4 Collection and conveyance of sewage

4.5 Conservancy and water carriage systems, their advantages and Disadvantages

4.6 (a) Surface drains (only sketches) : various types, suitability
(b) Types of sewage: Domestic, industrial, storm water and its seasonal variation

Sewerage System

4.7 Types of sewerage systems, materials for sewers, their sizes and joints

4.8 Appurtenance: Location, function and construction features. Manholes, drop manholes, tank hole, catch basin, inverted siphon, flushing tanks grease and oil traps, storm regulators, ventilating shafts

UNIT 5: Laying and Construction of Sewers **06 Hours**

5.1 Setting out/alignment of sewers

5.2 Excavations, checking the gradient with boning rods preparation of bedding, handling and jointing testing and back filling of sewers/pipes.

5.3 Construction of surface drains and different sections required

Sewage Characteristics

5.4 Properties of sewage and IS standards for analysis of sewage

5.5 Physical, chemical and bacteriological parameters

Natural Methods of Sewerage Disposal

5.6 General composition of sewage and disposal methods

5.7 Disposal by dilution

5.8 Self-purification of stream

5.9 Disposal by land treatment

5.10 Nuisance due to disposal

Sewage Treatment

5.11 Meaning and principle of primary and secondary treatment and activated sludge process their flow diagrams

5.12 Introduction and uses of screens, grit chambers, detritus tanks, skimming tanks, plain sedimentation tanks, primary clarifiers, secondary clarifiers, filters, control beds, intermittent sand filters, trickling filters, sludge treatment and disposal, oxidation ponds (Visit to a sewage treatment plant) Oxidation ditch, duckweed pond, Vermin culture

Building Drainage

5.13 Aims of building drainage and its requirements

5.14 Different sanitary fittings and installations

5.15 Traps

5.16 Introduction to smart water supply and waste water management
A field visit may be planned to explain and show the relevant things.

TEXT BOOKS

1. Public Health Engineering by D.V Gupta Asian Publishers Distributors, Muzaffarnagar.

REFERENCE BOOKS

1. Water Supply and Sanitary Engineering by Rangwala, SC; Charotar Book Stall, Anand
2. Water Supply Engineering by Kshirsagar, SR; Roorkee Publishing House, Roorkee
3. Sewage and Sewage Treatment by Kshirsagar, SR; Roorkee Publishing House, Roorkee
4. Water Supply and Sanitary Engineering by Birdie, GS; Dhanpat Rai and Sons, Delhi
5. Water Supply Engineering by Garg, Santosh Kumar; Khanna Publishers, Delhi
6. Sewage and Waste Water Disposal Engineering by Garg, Santosh Kumar; Khanna Publishers, Delhi
7. A Laboratory Manual in Public Health Engineering by Duggal, Ajay K and Sharma, Sanjay; Galgotia Publications, 2006, New Delhi
8. Public Health Engineering by D.V Gupta Asian Publishers Distributors, Muzaffarnagar.

SCHOOL OF ENGINEERING & TECHNOLOGY

RAILWAYS, BRIDGES AND TUNNELS

(D060923502)

L	T	P
2	1	0

JUSTIFICATION

The subject will cater to the needs of those technicians who would like to find employment in the construction of railway tracks, bridges and tunnels. The subject aims at providing broad based knowledge regarding various components and construction of railway track, bridges and tunnels

DETAILED CONTENTS

PART - I: RAILWAYS

UNIT 1: Introduction **08 Hours**

1.1 Introduction to Indian Railways

1.2 Mass Transit System: Metro, Mono-rail, Tube

1.3 Railway surveys: Factors influencing the railways route, brief description of various types of railway survey

1.4 Classification of permanent way describing its component parts

1.5 Rail Gauge: Definition, types, practice in India (gauges in different countries knowledge scale)

1.6 Rails - types of rails

1.7 Rail Fastenings: Rail joints, types of rail joints, fastenings for rails, fish plates, bearing plates

UNIT 2: Sleepers **06 Hours**

2.1 Sleepers: Functions of sleepers, types of sleepers, requirements of an ideal material for sleepers.

2.2 Points of Crossings and signalling: Brief description regarding different types of crossings/ signalling

2.3 Maintenance of track: Necessity, maintenance of track, inspection of soil, track and fixtures; maintenance and boxing of ballast maintenance gauges, tools

2.4 Earth work and drainage: Features of rail road, bed level, width of formation, side slopes, drains, methods of construction, requirement of drainage system

2.5 Station and yards: purpose and types of stations and yards

PART - II: BRIDGES

UNIT 3: Introduction **08 Hours**

3.1 Bridge - its function and component parts, difference between a bridge and a culvert

3.2 Classification of Bridges

3.3 Their structural elements and suitability:

3.4 According to life-permanent and temporary

3.5 According to deck level - Deck, through and semi-through

3.6 According to material -timber, masonry, steel, RCC, pre-stressed

3.7 According to structural form

- Grade Separators-Railway Road Over Bridges (ROB), Road Under Bridge (RUB)
- Beam type -RCC, T-Beam, steel girder bridges, plate girder and box girder, Balanced cantilever, Trussed bridges.
- Arch type - open spandrel and filled spandrel barrel and rib type
- Suspension type - unstiffened and stiffened and table (its description with sketches)

- According to the position of highest flood level submersible and non submersible

3.8 IRS, IRC introduction of IRS and IRC

3.9 Concept of Railway ROB and RUB - Precast components of ROB, drainage problems and solutions of RUB

3.10 Bridge Foundations: Introduction to open foundation, pile foundation, well foundation.

UNIT 4: Bridges **06 Hours**

4.1 Piers, Abutments, Retaining walls, Wing walls and Toe walls

4.2 Piers-definition, parts; types -solid (masonry and RCC), open

4.3 Abutments and wing walls - definition, types of abutments (straight and tee), abutment with wing walls (straight, splayed, return and curved)

4.4 Toe walls: Importance and Functions

4.5 Retaining Walls: Types, functions, parts, MSE(Mechanically stabilized earth) walls

4.6 Bridge bearings

4.7 Purpose of bearings; types of bearings - fixed plate, rocker and roller and pin bearing, Elastomeric bearings, PTFE bearing, Sliding bearing.

4.8 Super structure: Components, features, cross-section and services, footpath, median crash banner, light pole

4.9 Maintenance of Bridges

4.10 Inspection of bridges

4.11 Routine maintenance

PART - III: TUNNELS

UNIT 5: Conveyance of Water **08 Hours**

5.1 Definition and necessity of tunnels, method of tunneling, machinery used in tunnelling

5.2 Typical section of tunnels for a national highway and single and double broad gauge railway track

Ventilation -necessity and methods of ventilation, by blowing, exhaust and combination of blowing and exhaust

5.3 Drainage method of draining water in tunnels

5.4 Lighting of tunnels

3.5 Field visits may be organized to Bridge construction site or a Bridge/Tunnel construction site/Railways tracks to explain the various components and a field visit report shall be prepared by the students, as teamwork

5.6 Examiners should set questions from all the parts

REFERENCE BOOKS

1. Railway Bridges & Tunnels by D.V Gupta Asian Publishers Distributors, Mujaffarnagar

REFERENCE BOOKS

1. Railway Engineering by Vaswani, NK; Publishing House, Roorkee
2. Railway Engineering by Rangwala, SC; Anand, Charotar Book Stall
3. A Text Book of Railway Engineering by Deshpande, R; Poonam United Book Corporation
4. Bridge Engineering by Algia, JS; Charotar Book Stall, Anand
5. Essentials of Bridge Engineering by Victor Johnson; Oxford and IBH, Delhi
6. Bridge Engineering by Rangwala S.C; Charotar Book Stall, Anand IRC Bridge Codes.

SCHOOL OF ENGINEERING & TECHNOLOGY

EARTHQUAKE ENGINEERING

(D060923503)

L	T	P
2	1	0

JUSTIFICATION

Diploma holders in civil engineering have to supervise construction of various earthquake resistant buildings. Therefore, the students should have requisite knowledge regarding terminology of earthquake and the precautions to be taken while constructing earthquake resistant buildings

DETAILED CONTENTS

UNIT 1: Elements of Engineering Seismology **06 Hours**

1.1 General features of tectonic of seismic regions. Causes of earthquakes, Seismic waves, earthquake size (magnitude and intensity), Epicentre, Seismograph, Classification of earthquakes, Plate Tectonics, Elastic Rebound Theory.

UNIT 2: Seismic Behaviour of Traditionally-Built Constructions of India **08 Hours**

2.1 Performance of building during earthquakes and Mode of failure (Out-of-plane failure, in-plane failure, Diaphragm failure, Connection failure, Non-structural components failure)single degree of freedom system, fundamental time period, mode Shapes.

UNIT 3: Special construction method **08 Hours**

3.1 Special construction method, tips and precautions to be observed while planning, designing and construction of earthquake resistant building.

UNIT 4: Seismic zone of India **06 Hours**

4.1 Introduction to seismic zone of India provision given by IS: 1893: 2002 (part I) static and dynamic loading, base shear calculation.

UNIT 5: Retrofitting **08 Hours**

5.1 Seismic provision of strengthening and retrofitting measures for traditionally-built constructions

5.2 Provision of reinforcement detailing in masonry and RCC constructions as per IS 13920 and IS 4326.

5.3 Introduction to Earthquake early warning system

5.4 Disaster Management: Disaster rescue, psychology of rescue, rescue workers, rescue plan, rescue by steps, rescue equipment, safety in rescue operations, debris clearance and casuality management.

TEXT BOOKS

1. Earthquake Engineering by Sanjay Kumar, J.N.P Meerut..

REFERENCE BOOKS

1. Elements of Earthquake Engineering by Jai Krishana and AR Chandersekaran; Sarita Parkashan, Meerut.
2. Building Construction by BL Gupta and NL Arora; Satya Prakashan, New Delhi
3. Manual Published by Earthquake Engineering department, IIT Roorkee / IIT Kanpur
4. IS 13920, IS: 13827, IS: 13828, IS 1893-2002, IS 4326 (latest edition)
5. Earthquake Resistant Building Construction by Neelam Sharma
6. e-books/e-tools/relevant software to be used as recommended by AICTE/UBTE/NITTTR,Chandigarh.
7. Earthquake Engineering by Sanjay Kumar, J.N.P Meerut.

SCHOOL OF ENGINEERING & TECHNOLOGY

SOIL MECHANICS AND FOUNDATION ENGINEERING

(D060923504)

L	T	P
3	1	0

JUSTIFICATION

Civil Engineering diploma engineers are required to supervise the construction of roads, pavements, dams, embankments, and other Civil Engineering structures. As such the knowledge of basic soil engineering is the pre-requisite for these engineers for effective discharge of their duties. This necessitates the introduction of Soil and Foundation Engineering subject in the curriculum for Diploma Course in Civil Engineering.

DETAILED CONTENTS

UNIT 1: Introduction — **08 Hours**

1.1 Importance of Soil Studies in Civil Engineering

1.2 Geological origin of soils with special reference to soil profiles in India: residual and transported soil, alluvial deposits, lake deposits, local soil found in UP, dunes and loess, glacial deposits, black cotton soils, conditions in which above deposits are formed and their engineering characteristics.

1.3 Names of organizations dealing with soil engineering work in India, soil map of India

1.4 Physical Properties of Soils

1.5 Constituents of soil and representation by a phase diagram

1.6 Definitions of void ratio, porosity, degree of saturation, water content, specific gravity, unit weight, bulk density/bulk unit weight, dry unit weight, saturated unit weight and submerged unit weight of soil grains and correlation between them

1.7 Simple numerical problems with the help of phase diagrams

UNIT 2: Flow of Water Through Soils — **10 Hours**

2.1 Darcy's law, coefficient of permeability, seepage velocity and factors affecting permeability

2.2 Comparison of permeability of different soils as per Indian Standards

2.3 Measurement of permeability in the laboratory

2.4 Simple numerical problems

2.5 Effective Stress (Concept only)

2.6 Stresses in subsoil

2.7 Definition and meaning of total stress, effective stress and neutral stress

2.8 Principle of effective stress

2.9 Importance of effective stress in engineering problems

2.10 Deformation of Soils
Meaning, conditions/situations of occurrence with emphasis on practical significance of:
a) Consolidation and settlement
b) Creep
c) Plastic flow
d) Heaving
e) Lateral movement
f) Freeze and thaw of soil

2.11 Definition and practical significance of compression index, coefficient of consolidation, degree of consolidation.

2.12 Meaning of total settlement, uniform settlement and differential settlement; rate of settlement and their effects

2.13 Settlement due to construction operations and lowering of water table
2.14 Tolerable settlement for different structures as per IS
2.15 Simple numerical problems

UNIT 3: Shear Strength Of Soil **10 Hours**

3.1 Concept and Significance of shear strength
3.2 Determination of shearing strength by direct shear test, unconfined compression test and vane shear test. Drainage conditions of test and their significance
3.3 Factors contributing to shear strength of cohesive and cohesion less soils, Coulomb's law
3.4 Stress and strain curve, peak strength and ultimate strength, their significance
3.5 Examples of shear failure in soils
3.6 Numerical problems
3.6.1 Compaction
3.6.2 Definition and necessity of compaction
3.6.3 Laboratory compaction test (standard and modified proctor test as per IS) definition and importance of optimum water content, maximum dry density; moisture dry density relationship for typical soils with different compactive efforts
3.6.4 Compaction control; Density control, measurement of field density by core cutter method and sand replacement method, moisture control, Proctor's needle and its use, thickness control, jobs of an embankment supervisor in relation to compaction
3.6.5 Soil Exploration
3.6.6 Purpose and necessity of soil exploration
3.6.7 Reconnaissance, methods of soil exploration, Trial pits, borings (auger, wash, rotary, percussion to be briefly dealt)
3.6.8 Sampling; undisturbed, disturbed and representative samples; selection of type of sample; thin wall and piston samples; area ratio, recovery ratio of samples and their significance, number and quantity of samples, resetting, sealing and preservation of samples.
3.6.9 Presentation of soil investigation results

UNIT 4: Bearing Capacity of soil **10 Hours**

4.1 Concept of bearing capacity
4.2 Definition and significance of ultimate bearing capacity, net safe bearing capacity and allowable bearing pressure
4.3 Guidelines of BIS (IS 6403) for estimation of bearing capacity
4.4 Factors affecting bearing capacity
4.5 Concept of vertical stress distribution in soils due to foundation loads, pressure bulb
4.6 Applications of SPT, unconfined compression test and direct shear test in estimation of bearing capacity
4.7 Plate load test (no procedure details) and its limitations
4.8 Simple numerical problems on bearing capacity.

UNIT 5: Foundation Engineering **08 Hours**

5.1 Concept of shallow and deep foundation; types of shallow foundations: combined, isolated, strip, mat, and their suitability.
5.2 Factors affecting the depth of shallow Foundations
5.3 Deep foundations
5.4 Type of piles and their suitability
5.5 Pile group and pile cap.
5.6 Pile classification on the basis of material,
5.7 Ground improvement techniques
5.8 Pre-loading, vibro compaction, stone columns, soil nailing, grouting, sand drain.

TEXT BOOKS

1 Soil Mechanics & Foundation Engineering by SK Sharma, Asian Publishers Distributors, and Mujaffarnagar

REFERENCE BOOKS

1. Soil Mechanics and Foundations by Punmia, BC; Standard Publishers, Delhi
2. Soil Mechanics and Foundations Engineering by Bharat Singh and Shamsher Prakash; Nem Chand and Bros, Roorkee,
3. Soil Sampling and Testing - A Laboratory Manual by Duggal, AK. Ramana, TR.,Krishnamurthy, S; Galgotia Publications, Delhi
1. BIS Codes IS 6403 (latest edition) and IS 1498 (latest edition)
2. Shallow Foundations by NITTTR, Chandigarh
3. Video films on Geo-technical Laboratory Practices by Vinod Kumar; NITTTR, Chandigarh

SURVEYING-II

(D060923505)

L	T	P
2	1	0

JUSTIFICATION

The important functions of a civil engineer includes the jobs of detailed surveying, plotting of survey data, preparation of survey maps and setting out works. While framing the curriculum for the subject of surveying, stress has been given to the development of knowledge and skill in theodolite surveying; tachometry surveying, curves and use of minor and modern instruments have been included in this subject.

DETAILED CONTENTS

UNIT 1: Contouring Survey **08 Hours**

1.1 Concept of contours, purpose of contouring, contour interval and horizontal equivalent, factors effecting contour interval, characteristics of contours, methods of contouring: Direct and indirect, use of stadia measurements in contour survey, interpolation of contours; use of contour map, Drawing cross section from a contour map; marking alignment of a road, railway and a canal on a contour map, computation of earth work and reservoir capacity from a contour map

UNIT 2: Theodolite Survey **08 Hours**

2.1 Working of a transit vernier theodolite, axes of a theodolite and their relation; temporary adjustments of a transit theodolite; concept of transiting, swinging, face left, face right and changing face; measurement of horizontal and vertical angles. Prolonging a line (forward and backward) measurement of bearing of a line; traversing by included angles and deflection angle method; traversing by stadia measurement, theodolite triangulation, plotting a traverse; concept of coordinate and solution of omitted measurements (one side affected), errors in theodolite survey and precautions taken to minimize them; limits of precision in theodolite traversing. Height of objects - accessible and non-accessible bases

UNIT 3: Tacho-metric surveying **06 Hours**

3.1 Tachometry, Instruments to be used in tachometry, methods of tachometry, stadia system of tachometry, general principles of stadia tachometry, examples of stadia tachometry and Numerical problems.

3.2 Assumptions made in the theory of simple bending, derivation and application of bending equation to circular cross-section, I section, T&L sections only

UNIT 4: Curves **08 Hours**

4.1 Simple Circular Curve

Need and definition of a simple circular curve; Elements of simple circularcurve - Degree of the curve, radius of the curve, tangent length, point of intersection (Apex point), tangent point, length of curve, long chord deflection angle, Apex distance and Mid-ordinate. Setting out of simple circular curve:

a) By linear measurements only:
- Offsets from the tangent
- Successive bisection of arcs
- Offsets from the chord produced

b) By tangential angles using a theodolite

4.2 Transition Curve

Need (centrifugal force and super elevation) and definition of transition curve; requirements of transition curve; length of transition curve for roads; by cubic parabola; calculation of offsets for a transition curve; setting out of a transition

curve by tangential offsets only

4.3 Vertical curve

4.4 Setting out of a vertical curve

4.5 Introduction to the use of Modern Surveying equipment and techniques such as

4.5.1 EDM or Distomat

4.5.2 Planimeter (Digital)

4.5.3 Total station

4.5.4 Introduction to remote sensing and GPS

4.5.5 Auto level

4.5.6 Digital theodolite

UNIT 5: Total station **06 Hours**

5.1 Installation, calibration concept of coordinate system

5.2 Analysis of dater, plotting, Remote sensing , GIS & GPS concept and application in various fields

REFERENCE BOOKS

1. Surveying-II by D.V. Gupta, Asian Publishers Distributors, Mujaffarnagar,

REFERENCE BOOKS

1. A Text Book of Surveying by Kocher, CL; Katson Publishing House Ludhiana,
2. Surveying and Leveling by Kanetkar,TP and Kulkarni, SV; AVG Parkashan, Pune
3. Surveying and Leveling-Vol.2 by Kanetkar, TP and Kulkarni, SV; AVG Prakashan, Pune
4. Surveying and Leveling by Punima, BC; Standard Publishers Distributors, Delhi
5. Surveying-II by Mahajan, Sanjay; Satya Prakashan, Delhi

SCHOOL OF ENGINEERING & TECHNOLOGY

WASTE WATER & IRRIGATION ENGINEERING DRAWING

(D060923506)

L	T	P
4	0	0

JUSTIFICATION

Diploma holders in Civil Engineering are expected to supervise construction of water supply and wastewater treatment works and irrigation structures. This subject aims at imparting skills for preparing water supply and waste water and irrigation engineering drawings to develop competencies for reading the drawings, and their execution in their field.

DETAILED CONTENTS

UNIT 1: Drains and Sewers — **08 Hours**

1.1 Cross section of standard types of open drains (circular, V-shaped and U-shaped) with their foundations
1.2 Cross section of earthen ware and RCC sewer pipes
1.3 Cross sections of masonry sewers (circular and egg shaped)
1.4 Traps, manholes and inspection chamber
1.5 Detailed section of floor trap and gully trap
1.6 Detailed plan and section of an inspection chamber
1.7 Detailed plan and section of a manhole
1.8 Septic Tank and Soak Pit
Detailed plan and cross sections of a domestic septic tank for 10 users. Draw detailed X-section of an empty soak pit and filled soak.

UNIT 2: Bath room and W.C connections: — **08 Hours**

2.1 Cross-section through the external wall of lavatories at ground and first floor showing the one and two pipe system and the connections of the lavatory to Inspection chamber.
2.2 Plan of a bathroom showing positions of lavatory, bath tub, wash-basin, taps and showers
2.3 Study of drawing of two storied building showing details of one pipe and two pipes systems with sanitation system.
2.4 Practice of reading water supply and sanitary engineering working drawings (PWD/urban Development agencies) including hot water and cold water supply System of a two room set.

UNIT 3: Typical cross-section of a channel — **10 Hours**

3.1 - L-section of a channel for given data
- Typical cross section of an unlined and lined channel in cutting, partly Cutting and partly filling and fully in filling with given design data.
3.2 Layout plan of a canal head works
3.3 Draw the typical L-section of a weir

UNIT 4: Draw the X-section of an Earthen Dam — **10 Hours**

4.1 Homogeneous
4.2 Zoned type
4.3 Diaphragm type

UNIT 5: Cross section of a tube well with pump house. — **10 Hours**

5.1 Layout and cross section of rain water harvesting system.

TEXT BOOKS

1. Water Waste & Irrigation Engineering by Keshav Kumar,, Bharat Bharti Publications, and Meerut.

REFERENCE BOOKS

1. Civil Engineering Drawing by Layal JS; Satya Parkashan, New Delhi
2. Civil Engineering Drawings by Chandel RP
3. Civil Engineering Drawing by Kumar NS; IPH, New Delhi
4. Civil Engineering Drawing by Malik RS and Meo GA ; Asian Publishing House, New Delhi
5. Civil Engineering Drawing by S.K. Garg; Khanna Publishers

SCHOOL OF ENGINEERING & TECHNOLOGY

UNIVERSAL HUMAN VALUES

(D06VA23507)

L	T	P
3	0	0

JUSTIFICATION

Diploma holders in Civil Engineering are expected to supervise construction of water supply and wastewater treatment works and irrigation structures. This subject aims at imparting skills for preparing water supply and waste water and irrigation engineering drawings to develop competencies for reading the drawings, and their execution in their field

DETAILED CONTENTS

UNIT 1:	**Course Introduction - Need, Basic Guidelines, Content and Process for Value Education**	**8 Hours**
1.1	Understanding the need, basic guidelines, content and process for Value Education	
1.2	Self-Exploration–what is it? - its content and process; 'Natural Acceptance' and Experiential Validation- as the mechanism for self-exploration	
1.3	Continuous Happiness and Prosperity- A look at basic Human Aspirations	
1.4	Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority	
1.5	Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario	
1.6	Method to fulfill the above human aspirations: understanding and living in harmony at various levels	
UNIT2:	**Understanding Harmony in the Human Being - Harmony in Myself!**	**8 Hours**
2.1	Understanding human being as a co-existence of the sentient 'I' and the material the Body'	
2.2	Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha	
2.3	Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer)	
2.4	Understanding the characteristics and activities of 'I' and harmony in 'I'	
UNIT3:	**Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship**	**8 Hours**
3.1	Understanding Harmony in the family – the basic unit of human interaction	
3.2	Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; a.Trust (Vishwas) and Respect (Samman) as the foundational values of relationship	
3.3	Understanding the meaning of Vishwas; Difference between intention and competence	
3.4	Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship	
3.5	Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astitvaas comprehensive Human Goals	
3.6	Visualizing a universal harmonious order in society- Undivided Society (AkhandSamaj), Universal Order (SarvabhaumVyawastha)- from family to world	

family!
-Practice Exercises and Case Studies will be taken up in Practice Sessions.

UNIT4: Understanding Harmony in the Nature and Existence - Whole existence as Coexistence **6 Hours**

4.1 Understanding the harmony in the Nature

4.2 Interconnectedness and mutual fulfilment among the four orders of nature-recyclability and self regulation in nature

4.3 Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space

4.4 Holistic perception of harmony at all levels of existence

-Practice Exercises and Case Studies will be taken up in Practice Sessions

UNIT5: Implications of the above Holistic Understanding of Harmony on Professional Ethics **6 Hours**

5.1 Natural acceptance of human values

5.2 Definitiveness of Ethical Human Conduct

5.3 Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order

5.4 Competence in professional ethics:

a) Ability to utilize the professional competence for augmenting universal human order.
b) Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems.
c) Ability to identify and develop appropriate technologies and management patterns for above production systems.

5.5 Case studies of typical holistic technologies, management models and production systems

5.6 Strategy for transition from the present state to Universal Human Order:
a) At the level of individual: as socially and ecologically responsible engineers, technologists and managers
b) At the level of society: as mutually enriching institutions and organizations

5.7 To inculcate Human Values among Students: The Role of self ,Parents and Teachers
-Practice Exercises and Case Studies will be taken up in Practice Sessions.

5.8 Practical Session also Includes Different Yogic Exercises and Meditation Session

REFERENCE BOOKS

1. Universal Human Values by Ankit Kumar, J.N.P Meerut.

REFERENCE BOOKS

1. Value Education websites, http://uhv.ac.in, and http://www.aktu.ac.in
2. Story of Stuff, http://www.storyofstuff.com
3. Al Gore, an Inconvenient Truth, Paramount Classics, USA
4. Charlie Chaplin, Modern Times, United Artists, USA
5. IIT Delhi, Modern Technology–the Untold Story
6. Case study Hevade Bazar Movie.

SCHOOL OF ENGINEERING & TECHNOLOGY

WATER & WASTE WATER ENGINEERING LAB

(D060923551)

L	T	P
0	0	2

DETAILED CONTENTS

S. No	Name of Practical
1	To determine turbidity of water sample by (i) JTU (ii) NTU
2	To determine dissolved oxygen of given sample
3	To determine pH value of water
4	To perform jar test for coagulation
5	To determine BOD of given sample
6	To determine residual chlorine in water
7	To determine conductivity of water and total dissolved solids
8	To study the installation of following: a) Water meter b) Connection of water supply of building with main c) Pipe valves and bends d) Water supply and sanitary fittings
9	To study and demonstrate the joining/Hourseading of GI Pipes, CI Pipes, SWG pipes, PVC pipes and copper pipes.
10	To demonstrate the laying of SWG pipes for sewers
11	Study of water purifying process by visiting a field lab.
12	Demonstration of plumbing tools.
13	Testing of pipes (GI, CI, PVC, and SWG) as per BJI standards.

TEXT BOOKS

1. Public Health Engineering by Anant Prakash, J.N.P Meerut.

REFERENCE BOOKS

1. Elements of Public Health Engineering by Duggal, KN; S. Chand and Co. New Delhi
2. Water Supply and Sanitary Engineering by Rangwala, SC; Charotar Book Stall, Anand
3. Water Supply Engineering by Kshirsagar, SR; Roorkee Publishing House, Roorkee
4. Sewage and Sewage Treatment by Kshirsagar, SR; Roorkee Publishing House, Roorkee
5. Water Supply and Sanitary Engineering by Birdie, GS; Dhanpat Rai and Sons, Delhi
6. Water Supply Engineering by Garg, Santosh Kumar; Khanna Publishers, Delhi
7. Sewage and Waste Water Disposal Engineering by Garg, Santosh Kumar; Khanna Publishers, Delhi
8. A Laboratory Manual in Public Health Engineering by Duggal, Ajay K and Sharma, Sanjay; Galgotia Publications, 2006, New Delhi.

SCHOOL OF ENGINEERING & TECHNOLOGY

SOIL MECHANICS & FOUNDATION ENGINEERING LAB

(D060923554)

L	T	P
0	0	2

DETAILED CONTENTS

S. No	Name of Practical
1	To determine the physical properties of cement such as fineness, consistency, setting time, soundness and compressive strength of cement as per IS Codes
2	To determine flakiness and elongation index of coarse aggregate
3	To determine silt content in fine aggregate
4	Determination of specific gravity and water absorption of aggregates
5	Determination of bulk density and voids of aggregates
6	Determination of particle size distribution of fine, coarse and all-in-one aggregate by sieve analysis (grading of aggregate)
7	To determine bulking of fine aggregates
8	To determine workability by slump test and to verify the effect of water, fine aggregate/coarse aggregate ratio and aggregate/Cement ratio on slump
9	To determine compressive strength of concrete cubes for different grades of concrete
10	Rebound Hammer Test

TEXT BOOKS

1. Soil Mechanics & Foundation Engineering by SK Sharma, Asian Publishers Distributors, and Mujaffarnagar.

REFERENCE BOOKS

1. Concrete Technology by Krishnamurthy, KT Rao, A Kasundra and Khandekar, AA; Dhanpat Rai And Sons, Delhi
2. Text Book of Concrete Technology by Gupta BL and Gupta Amit; Standard Publishers Distributors, Delhi.
3. Concrete Tecnology by Handoo, BL, Puri, LD and Mahajan Sanjay; Satya Prakashan, New Delhi.
4. Engineering Chemistry - A Text Book by H. K. Chopra & A. Parmar, Narosa Publishing House, New Delhi.
5. Concrete Technology by Birinder Singh; Kaption Publications, Ludhiana.

SCHOOL OF ENGINEERING & TECHNOLOGY

SURVEYING-II LAB

(D060923555)

L	T	P
0	0	4

DETAILED CONTENTS

Contouring

1 Preparing a contour plan by radial line method by the use of a Tangent Clinometer/Tachometer
2 Preparing a contour plan by method of squares
3 Preparing a contour plan of a Road/Railway track/Canal by taking cross-sections

Theodolite

4 Taking out the Theodilite, mounting on the tripod and placing it back in the box
5 Study of a transit vernier theodolite; temporary adjustments of theodolite
6 Reading the vernier and working out the least count, measurement of horizontal angles by repetition and reiteration methods
7 Measurement of vertical angles and use of tachometric tables

Curves

08 Setting out of a simple circular curve with given data by the following methods
a) Offsets from the chords produced
b) One theodolite method

Minor instruments

09 Demonstration and use of minor instruments like Ceylon Ghat Tracer, Tangent Clinometer, Pantagraph, Abney level etc.

TEXT BOOKS

1. Surveying-II by D.V. Gupta, Asian Publishers Distributors, Mujaffarnagar.

REFERENCE BOOKS

1. A Text Book of Surveying by Kocher, CL; Katson Publishing House Ludhiana,
2. Surveying and Leveling by Kanetkar,TP and Kulkarni, SV; AVG Parkashan, Pune
3. Surveying and Leveling-Vol.2 by Kanetkar, TP and Kulkarni, SV; AVG Prakashan, Pune
4. Surveying and Leveling by Punima, BC; Standard Publishers Distributors, Delhi
5. Surveying-II by Mahajan, Sanjay; Satya Prakashan, Delhi
6. Surveying-II by D.V. Gupta, Asian Publishers Distributors, Mujaffarnagar.