

I. Introduction :

To meet the needs of fast changes in the present days construction industry, it is essential to develop the skills and techniques to match the requirements in this ever growing industry. In view of the above, the curriculum on "Public Health Engineering Technician" course has been designed and developed for a two-years course at the plus two stage of Higher Education.

Among all building services to be provided in a building, be it a residential or a public building, water supply and sanitary arrangements are the most essential services and well trained members with necessary skill sets are in great demand to attend the minor to major jobs in the buildings. This course provides the student, the techniques and the knowledge of plumbing systems in the building in addition to latest technology developed in Rural Water Supply and sanitation, Solar heaters, in hot water supply and wind energy in pumping water. This course imparts knowledge in all other subjects related to civil engineering field. Applications of computer software is also incorporated in drafting, estimating and documentation of civil works dealing in detail especially in water supply and sanitary works. The skills and techniques acquired during this course develop the required competency in performing job effectively whether one is placed in a waged employment or a self employment.

II. Objectives

- ★ To provide skills in handling the jobs in plumbing systems
- ★ To train the students in various techniques in the building services with more emphasis on water supply and sanitary services to develop competencies in assisting supervision, engineers and contractors and prepare them for self/wage employment.
- ★ To train the students in various techniques in civil engineering field.

III. Skills to be provided

- ★ Knowledge of plumbing tools, plumbing materials, fittings of water supply and sanitary items
- ★ Knowledge of preparing layouts for hot water supply
- ★ Knowledge of Installation of hot water supply appliances
- ★ Knowledge of Rural Water Supply and sanitation
- ★ Knowledge of Solar Heaters, their installation and preparation of layout of plumbing system.
- ★ Knowledge of wind mills in pumping water
- ★ Preparation of building drawings
- ★ Estimate the building works including water supply and sanitary works
- ★ Acquire the skill in surveying of the field
- ★ Apply the knowledge of computers in preparation of drawings, estimates, table, reports etc. using computer software
- ★ Estimation of different types of civil engineering works

IV. Job Opportunities :

a) Wage Employment :

1. Plumber, Painter, Carpenter, Supervisor for Civil Engineering Works.
2. Draughtsman Civil
3. Quantity surveyor of water supply and sanitary fittings and other related Civil Engineering works
4. Store keeper in construction industries for inventory control of plumbing materials.
5. Work Inspector in construction sites (Water supply and sanitary works and all other Civil Engineering related works)

b) Self Employment :

1. Contractor in water supply and sanitary works or in civil engineering works
2. As a licensed technician in plumbing works/Draughtsman/ in civil engineering works.
3. Dealer of a store in supplying the water supply and sanitary fittings to the market.
4. Dealer of a store in supplying civil engineering materials to the market.

**V. SCHEME OF INSTRUCTION & EXAMINATION
I & II YEAR**

Part - A	Theory		Practicals		Total	
	Periods	Marks	Periods	Marks	Periods	Marks
1. English	185	75	-	-	185	75
2. G.F.C.	185	75	-	-	185	75
Part - B						
3. Vocational Subjects						
Paper - I	160	50	160	50	320	100
Paper - II	160	50	160	50	320	100
Paper - III	160	50	160	50	320	100
Part - C						
4. On the Job Training -		-	210	50	210	50
Total	850	300	690	200	1540	500

Scheme of Instruction per week for Vocational Courses

Part - A	Theory	Practicals	Total
1. English	6	-	6
2. G.F.C.	6	-	6
Part - B			
3. Vocational subjects			
Paper - I	5	5	10
Paper - II	5	5	10
Paper - III	5	5	10

VI. SYLLABUS

Sl.No.	Paper	Subject	Periods	Marks
I Year				
Theory				
1.	I	Water Supply Engineering	160	50
2.	II	Surveying Theory	160	50
3.	III	Engineering Mechanics	160	50
Practicals				
4.	I	Civil Engineering Laboratory-1	160	50
5.	II	Surveying Practice	160	50
6.	III	Engineering Drawing	160	50
		On the Job Training	210	50
II Year				
Theory				
1.	I	Environmental Engineering	160	50
2.	II	Building Materials & Construction	160	50
3.	III	Estimating and Costing	160	50
Practicals				
4.	I	Civil Engineering Laboratory-2	160	50
5.	II	Civil Engineering Drawing	160	50
6.	III	Computer Lab	160	50
		On the Job Training	210	50

PUBLIC HEALTH ENGINEERING TECHNICIAN
WATER SUPPLY ENGINEERING
THEORY - PAPER I FIRST YEAR

(Max. Marks : 50, Periods per Week : 5, Periods per Year : 160)

Sl.No.	Major Topics	No.of Periods
1.	Introduction	5
2.	Water Demand	10
3.	Sources of Water Supply	10
4.	Quality of Water	20
5.	Treatment of Water	30
6.	Distribution System	30
7.	Appurtenances in the distribution system	10
8.	Water Supply Plumbing systems in Buildings and Houses	10
9.	Rain water Harvesting	5
10.	Hydraulics	5
	Total	160

Detailed Syllabus :

1.0. Introduction

- 1.1. Importance and Necessity for planned water supplies
- 1.2. Wholesome water
- 1.3. Status of protected water supply in India
- 1.4. Planning and Execution of Modern water supply schemes

2.0. Water Demands

- 2.1. Various types of water Demands
 - 2.1.1. Domestic Demand
 - 2.1.2. Industrial Demand
 - 2.1.3. Institutional and Commercial water demand
 - 2.1.4. Demand for Public uses
 - 2.1.5. Fire demand
 - 2.1.6. Losses and wastes
- 2.2. Per capita demand
- 2.3. Factors affecting per capita demand
- 2.4. Variations in demand
 - 2.4.1. Seasonal variations
 - 2.4.2. Daily variations
 - 2.4.3. Hourly variations
- 2.5. Design Period
- 2.6. Total requirement of water for a town or a city
- 2.7. Population forecasting methods and problems
 - 2.7.1. Arithmetical increase method
 - 2.7.2. Geometrical increase method
 - 2.7.3. Incremental increase method, etc.

3.0. Sources of water supply

- 3.1. Hydrological concepts

- 3.1.1. Definition
- 3.1.2. Precipitation, Infiltration, Run off, Evaporation, Evapo - Transpiration
- 3.2. Surface sources
 - 3.2.1. Natural ponds and lakes
 - 3.2.2. Streams and rivers
 - 3.2.3. Impounding reservoirs
- 3.3. Sub surface sources
 - 3.3.1. Infiltration galleries
 - 3.3.2. Infiltration wells
 - 3.3.3. Springs
 - 3.3.4. Wells
 - (a) shallow wells
 - (b) Deep wells
- 3.4. Intakes for collecting surface water, definitions and general introduction

4.0. Quality of water

- 4.1. General Introduction
- 4.2. Characteristics of Water
 - 4.2.1. Physical Characteristics
 - 4.2.1.1. Turbidity
 - 4.2.1.2. Colour and Temperature
 - 4.2.1.3. Taste and Odour
 - 4.2.2. Chemical Characteristics
 - 4.2.2.1. Total Solids and suspended solids
 - 4.2.2.2. PH value of water
 - 4.2.2.3. Hardness of water
 - 4.2.2.4. Chloride content
 - 4.2.2.5. Nitrogen content
 - 4.2.2.6. Metals and other Chemical substances

- 4.2.2.7. Dissolved Gases
- 4.2.2.8. Bio-chemical Oxygen Demand
- 4.2.3. Bacterial and Microscopical characteristics
- 4.3. Water Borne Diseases
- 4.4. Drinking water standards

5.0. Treatment of Water

- 5.1. General Introduction
- 5.2. Treatment unit flow diagram
- 5.3. Screening
- 5.4. Sedimentation
 - 5.4.1. Plain Sedimentation
 - 5.4.2. Sedimentation aided with Coagulation
- 5.5. Filtration
 - 5.5.1. Theory of filtration
 - 5.5.2. Slow sand filters construction and operation
 - 5.5.3. Rapid sand filters
 - 5.5.4. Pressure filters
- 5.6. Disinfection
 - 5.6.1. Methods of Disinfection
 - 5.6.2. Chlorination, pre, post, Break-point Chlorination and Dechlorination
- 5.7. Defluoridation - by Nalgonda technique

6.0. Distribution System

- 6.1. General Introduction
- 6.2. Requirements of a good distribution system
- 6.3. Layouts of Distribution Networks
 - 6.3.1. Dead end system
 - 6.3.2. Grid iron system
 - 6.3.3. Ring system

- 6.3.4. Radial system
- 6.4. Systems of Distribution
 - 6.4.1. Gravitational system
 - 6.4.2. Pumping system
 - 6.4.3. Combined system
- 6.5. Pumps
 - 6.5.1. Types of pumps and their suitability
 - 6.5.2. Centrifugal pumps - Components
 - 6.5.3. Selection of pump horse power
 - 6.5.4. Operation and maintenance
 - 6.5.5. Trouble Shooting
- 6.6. Requirement of pipe materials
 - 6.6.1. Different types of pipes
 - 6.6.2. Laying and Testing
 - 6.6.3. Maintenance
 - 6.6.4. Pipe Corrosion - Causes and Prevention

7.0. Appurtenances in the distribution system

- 7.1. Understand the various appurtenances in a distribution system
- 7.2. Use of
 - 7.2.1. Sluice valves
 - 7.2.2. Check valves or reflux valves
 - 7.2.3. Air valves
 - 7.2.4. Drain valves or Blow off valves
 - 7.2.5. Scour valve
 - 7.2.6. Water meter
 - 7.2.7. Fire Hydrants

8.0. Water supply plumbing systems in buildings and Houses

- 8.1. Plumbing System in Water Supplies
- 8.2. The House Water Connection
- 8.3. Stop Cocks
- 8.4. Water taps and Bib cocks
- 8.5. Pipe fittings
- 8.6. Storage of water in buildings
 - 8.6.1. Estimating Storage Capacity
 - 8.6.2. Overhead Storage, Underground Storage tanks
 - 8.6.3. Types of tanks, RCC, GI and HDPE tanks
 - 8.6.4. General requirements of domestic water storage
- 8.7. Water piping systems in building
 - 8.7.1. Piping system using direct supply
 - 8.7.2. Piping system using over head tanks
 - 8.7.3. Piping system using underground - overhead tank supply
 - 8.7.4. Pumped systems

9.0. Rainwater Harvesting

- 9.1. Rain water Harvesting structures into the ground
 - 9.1.1. Collection of rain water
 - 9.1.2. Seperation of first rain flush
 - 9.1.3. Filtration of rain water
 - 9.1.4. Storage of rain water
 - 9.1.5. Distribution of water
- 9.2. Rain water directed to Service wells
- 9.3. Rain water harvesting by percolation pit method

10.0 Hydraulics

- 10.1. Intensity of pressure
- 10.2. Pressure head
- 10.3. Bernoulli's theorem (statement only)
- 10.4. Losses in pipe flow with simple problems
- 10.5. Water hammer

Journals :

All leading Journals on Water Supply Engineering

**PUBLIC HEALTH ENGINEERING TECHNICIAN
SURVEYING THEORY
THEORY - PAPER - II FIRST YEAR
(COMMON TO P.H.E.T & C.T.)**

(Periods Per Week : 5 Periods Per Year : 160, Max.Marks : 50)

TIME SCHEDULE :

Sl.No.	Major Topics	No.of Periods
1.	Introduction	15
2.	Chain Surveying	40
3.	Compass Surveying	35
4.	Plane Table Surveying	20
5.	Levelling	30
6.	Theodolite Surveying	20
	Total	160

Detailed Syllabus :

1. Introduction :

Concept of surveying - purpose of surveying - linear and angular measurements - classification of surveying. Plane and geodetic surveying, classification based on instruments, engineering surveys - Reconnaissance, preliminary location survey, final location survey.

2. Chain Surveying

- Purpose and principle of chain survey - equipments used and their function - chains, arrows, tapes - ranging rods, pegs - plumb bob - cross staff - Conventional signs.
- Errors in chaining - corrections due to incorrect length of chain or tape.
- Types of survey lines - base line - tie line - check line-fixing of survey stations - types of survey stations
- Different operations in chain surveying - chaining - ranging setting out right angles - chaining on sloped ground. Principles used in chain Triangulation.
- Recording field notes - field book - conventional signs
- Obstacles in chain surveying.
- Calculation of Areas - Average Ordinate, Simpson, Trapezoidal methods.
- Measurement of Volume from cross sections, Spot Levels and Contours.

3. Compass Surveying

- Purpose and Principle of compass survey - description, use and working of prismatic compass.
- Concept of true meridian - magnetic meridian - Arbitrary meridian.
- Bearing - Representation of Bearing - WCB - Quadrantal Bearing. Conversion of whole circle bearing to quadrantal bearing.
- Compass traversing in field.
- Local attraction - detecting and correcting bearings

- Calculation of included angles in compass traverse.
- Errors in compass surveying - natural and instrumental.

4. Plane Table Surveying

- Principle and purpose of plane table surveying, accessories used in plane table surveying - their uses.
- Methods of plane table - Radiation, Traversing, Intersection.

5. Levelling

- Purpose of Levelling - definition of terms, level surface, datum bench marks, types of bench marks
- Types of levelling instruments - dumpy level - component parts - relationship between fundamental lines of instrument.
- Types of Levelling staves - description.
- Temporary adjustments of dumpy level
- Field work - field book - reduction of levels by height of collimation method, Rise and fall method.
- Errors due to curvature and refraction - corrections
- Classification of levelling - differential levelling, profile levelling, fly levelling, check levelling, cross sectioning, reciprocal levelling.

6. Theodolite Surveying

- Principles of Theodolite Surveying - component parts, technical terms - temporary adjustments
- Measurement of Horizontal angles, vertical angles
- Determination of heights and distances.

Note : Latest developments on this subject should be noted from time to time.

**PUBLIC HEALTH ENGINEERING TECHNICIAN
ENGINEERING MECHANICS
THEORY - PAPER - III FIRST YEAR
(COMMON TO P.H.E.T & C.T.)
(Periods Per Week : 5 Periods Per Year : 160, Max.Marks : 50)**

TIME SCHEDULE :

Sl.No.	Topics	No.of Periods	Weightage
1.	Systems of Measurements	8	4
2.	Forces and Moments	28	12
3.	Centroid and Moment of Inertia	32	14
4.	Simple Stresses and Strains	35	18
5.	Shear force and bending moments	42	20
6.	Graphic Statics	15	-
	Total	160	68

Detailed Syllabus :

1.0. Systems of Measurements and Units

- 1.1. S.I. and M.K.S. System
- 1.2. Base/Fundamental and Derived units
- 1.3. Units of Physical quantities used in Civil Engineering like length, area, volume, mass, force etc.

2.0. Forces and Moments

- 2.1. Definition of Force, Moment, Resultant, Equilibrant and Moment of a couple
- 2.2. Resultant of forces at a point, parallelogram law, Triangle law of forces, polygon law of forces
- 2.3. Distinguish between scalar and vector quantities, co-planar and non-co-planar forces, parallel and non-parallel forces, like and unlike forces
- 2.4. Conditions of Equilibrium of rigid bodies

3.0. Centroid and Moment of Inertia

- 3.1. Definition - Centroid, First moment of area, moment of inertia, Radius of gyration
- 3.2. Position of centroid of Rectangle, triangle, circle, semi circle.
- 3.3. Determine position of centroids of simple built up sections made of rectangle, triangle, circle, semi-circle.
- 3.4. Determine M.I. of simple and built-up sections by applying perpendicular axes theorem
- 3.5. Radius of gyration, polar M.I. of solid and hollow circular sections

4.0. Simple stresses and strains

- 4.1. Stress and strain - tensile, compressive and shear
- 4.2. Mechanical properties of materials - elasticity, plasticity, ductility, brittleness, malleability, stiffness, hardness, fatigue
- 4.3. Stress-strain curves for ductile materials - Mild steel, elastic limit, yield point, ultimate stress, breaking stress, working stress, factor of safety.

- 4.4. Hooke's Law - Young's modulus of elasticity, deformation under axial load
- 4.5. Composite sections - effect of axial loads and due to change of temperature
- 4.6. Longitudinal and lateral strain - poisson's ratio - Bulk modulus, relationship between elastic constants. (proof not required)
- 4.7. Composite sections - effect of axial loads and due to change of temperature

5.0. Shear Force and Bending Moments

- 5.1. Types of beams - cantilevers, simply supported, over hanging - fixed and continuous beams
- 5.2. Calculation of S.F. and B.M. values at different sections for cantilevers, simply supported beams, over hanging beams under point loads and uniformly distributed loads - position and significance of points of contraflexure
- 5.3. Relation between rate of loading, S.F. and B.M. - drawing S.F. and B.M. diagrams - Location of points of contraflexure

6.0. Graphic Statics

- 6.1. Represent force graphically, bows notation
- 6.2. Parallelogram law of forces, resultant and equilibrants
- 6.3. Graphical Method of determination of centre of gravity for I,L,T Sections
- 6.4. Drawign SFD and BMD by graphical method for SSB and cantilever beams

Note : Latest developments on this subject should be noted down time to time

**PUBLIC HEALTH ENGINEERING TECHNICIAN
CIVIL ENGINEERING LABORATORY - 1
PRACTICAL - PAPER - I FIRST YEAR**

(Periods Per Week : 5 Periods Per Year : 160, Max.Marks : 50)

Sl.No.	Major Topics	No.of Periods
1	Samples	5
2	Solutions	5
3	Titrations	20
4	Instrumental determinations	10
5	Solids	10
6	Microbiology	5
7	Study of pipe specials	4
8	Layout of typical pipe system in a building	8
9	Assembling	8
10	Preparation of line sketch of pipe system	5
11	Pipe connections to pumps	10
12	Tracing leakages of water supply and their repairing	9
13	Operation of pumps	5
14	Installation of Geysors	8
15	Pipe connections to handpump in a borewell	4
16.	Carpentry	10
17.	Fitters	8
18.	Smithy	8
19.	Foundry	8
20.	Tests on Metals	10
Total		160

* Field Visits as per the Syllabus
(according to Vocational Pattern)

Detailed Syllabus

1.0. Samples

- 1.1. Collection of samples, grab sample, composite sample, sample preservation

2.0. Solution

- 2.1. Preparation of normal solutions and standardisation

3.0. Titrations

4.0. Instrumental determination

- 4.1. Determination of hardness of water surface and ground water
- 4.2. Determination of Alum dosage for given sample of water
- 4.3. Determination of Residual chlorine of water
- 4.4. Determination of PH, conductivity, dissolved oxygen using instruments

5.0. Solids

- 5.1. Determination of total, total dissolved solids, settleable solids, suspended solids in water
- 5.2. Determination of C.O.D. of waste water

6.0. Microbiology

- 6.1. Theoretical demonstration of microbial tests. (like M.P.N., E-Coil, plate count)

7.0. Pipe specials (study)

- 7.1. Coupling, reducer, Elbow, Tee, Union, Cross, plug, ripple bend

8.0. Layout of typical pipe system in a building

9.0. Assembling

- 9.1. Pipe cutting, threading with die set
- 9.2. Assembling of a length of line with two joints
- 9.3. Assembling of a length with one turn and two turns

10.0. Preparation of line sketch of a pipe system

- 10.1. Single storeyed building
- 10.2. Multi storeyed building

11.0. Pipe connections to pumps

- 11.1. Centrifugal pump
- 11.2. Jet pumps

12.0. Tracing leakages in water supply connections and their repairing

12.1. Removal of air lock

13.0. Operation of pumps

13.1. Operation of centrifugal pump

13.2. Operation of Jet pump

14.0. Installation of Geysors

15.0. Pipe connections to handpump in a borewell

16. Carpentry :

16.1. Use and setting of different tools

16.2. Surface planing and finishing

16.3. Making simple joints - Mortise, Tenon, Dovetail etc.

16.4. Demonstration of wood working machine

17.0. Fitters

17.1. Use and setting of different tools

17.2. Marking, chiseling, hacksawing, filing, drilling

18.0. Smithy

18.1. Use and setting of different hand tools

18.2. Preparation of jobs involving bending, swaging, use of power hammers

18.3. Demonstration of Arc and Gas welding, cutting, brazing, soldering

19.0. Foundry

19.1. Use of hand tools

19.2. Preparing moulds and casting simple objects

19.3. Demonstration of Machine Moulding and casting

20.0. Tests on Metals

20.1. Tension test on mild steel

20.2. Double Shear test on mild steel rod

20.3. Rockwell and Brinell hardness tests on steel/brass

20.4. Izod and charpy impact tests on steel/brass

Journals :

All leading Civil Engineering Journals with respect to individual subjects

**PUBLIC HEALTH ENGINEERING TECHNICIAN
SURVEYING PRACTICE
PRACTICAL - PAPER-II FIRST YEAR
(COMMON TO P.H.E.T & C.T.)
(Periods Per Week : 5 Periods Per Year : 160, Max.Marks : 50)**

TIME SCHEDULE :

Sl.No.	Major Topics	No.of Periods
1.	Chain Surveying	30
2.	Compass surveying	20
3.	Plane table surveying	20
4.	Levelling	40
5.	Theodolite surveying	20
6.	Plotting	30
	Total	160

Detailed Syllabus :

1.0. Chain Surveying

- 1.1. Familiarity with instruments used in chain surveying
- 1.2. Practicing unfolding and folding of chain
- 1.3. Ranging and chaining of lines with offsets to objects and recording in field book
- 1.4. Chaining a line involving indirect ranging.
- 1.5. Measure of land area / chain triangulation and cross staff methods
- 1.6. Chain triangulation around a building covering a small area with other details, taking offsets and recording in the field book.
- 1.7. To prepare a layout of the given area covering buildings, roads etc

2.0. Compass Surveying

- 2.1. Familiarity with Instruments used in compass surveying - prismatic compass
- 2.2. Setting up the compass - observation of bearings
- 2.3. Traversing with prismatic compass and chain - calculation of included angles and check.
- 2.4. Traversing with prismatic compass and chain - closed traverse covering the given area recording
- 2.5. Traversing with prismatic compass and chain - open traverse and recording

3.0. Plane Table Surveying

- 3.1. Introduction to plane table equipments and accessories
- 3.2. Setting of the plane table and plotting a few objects (points) by radiation method
- 3.3. Plotting buildings and other features of the campus by Intersection method
- 3.4. Traversing an area by plane table

- 3.5. Calculating the area for the given land and marking plots by using plane table

4.0. Levelling

- 4.1. Study of dumpy level, levelling staff
- 4.2. Temporary adjustments of dumpy level
- 4.3. Taking out levels of various points and booking in a level field book
- 4.4. Differential or fly levelling - reduced levels by H.I. method and rise and fall method
- 4.5. Differential levelling involving invert levels - Reduction by H.I. and Rise and fall methods

5.0. Theodolite Surveying

- 5.1. Study of Theodolite
- 5.2. Measure of Horizontal angle between given lines
- 5.3. Measurement of vertical angle
- 5.4. Determining distance between two inaccessible points by measuring horizontal angle
- 5.5. Determining height of object by measuring vertical angle

6.0. Plotting

- 6.1. Conventional signs in surveying
- 6.2. Plotting of a perpendicular and oblique offsets
- 6.3. Plotting of land survey - chain and cross staff surveying - calculation of areas
- 6.4. Plotting of chain triangulation of small areas around building
- 6.5. Plotting of closed traverse by compass surveying - location of details
- 6.6. Plotting of open traverse by compass surveys - location of details

Note : Latest developments on this subject should be noted from time to time

**PUBLIC HEALTH ENGINEERING TECHNICIAN
ENGINEERING DRAWING
PRACTICAL - PAPER - III FIRST YEAR
(COMMON TO P.H.E.T & C.T.)**

(Periods Per Week : 5 Periods Per Year : 160, Max.Marks : 50)

Sl.No.	Major Topics	No.of Periods
1.	Introduction	6
2.	Lettering and Dimensioning	10
3.	Geometrical Constructions	24
4.	Orthographic Projections	45
5.	Isometric Projections	35
6.	Sections of Solids	20
7.	Development of Surfaces	20
	Total	160

Detailed Syllabus :

1.0. Introduction

- 1.1. Scope and objective of the subject
- 1.2. Importance of engineering drawing as a communication medium
- 1.3. Drawing instruments and their uses
- 1.4. Scales : Recommended scales, reduced & enlarged
- 1.5. Construction of Plain, Diagonal, Vernier Scales, Scale of Chords and Proportional Scales.
- 1.6. Sheet sizes : A0, A1, A2, A3, A4, A5. Layout of drawing sheet, sizes of title block and its contents
- 1.7. Simple exercises on the use of drawing instruments.

2.0. Lettering and Dimensioning

- 2.1. Types of Lettering
- 2.2. Guide Lines for lettering
- 2.3. Recommended sizes of letters and numbers
- 2.4. Single stroke letters.
- 2.5. Dimensioning - rules and systems of dimensioning - dimensioning a given drawing

3.0 Geometric Construction

- 3.1. Bisecting a line - perpendiculars - parallel lines - division of a line
- 3.2. Angles - bisection, trisection
- 3.3. Tangent lines touching circles internally and externally
- 3.4. Polygons - Regular polygons - circumscribed and inscribed in circles.
- 3.5. Conic sections - Definitions of focus, directrix, eccentricity
 - (i) Construction of Ellipse by Concentric circles method.
 - (ii) Construction of parabola by rectangular method.
 - (iii) Construction of Hyperbola when given the position of point from X-axis and Y-axis.

4.0 Orthographic Projection

- 4.1. Definition - Planes of Projection - Four quadrants - Reference line.
- 4.2. First angle projection - Third angle projection
- 4.3. Projections of points
- 4.4. Projections of straight lines
- 4.5. Projections of planes
- 4.6. Projections of solids
- 4.7. Conversion of pictorial views into orthographic views

5.0. Isometric Projection

- 5.1. Definition - Isometric axes, lines and planes
- 5.2. Isometric Scale - Isometric view
- 5.3. Drawing of isometric views of plane figures
- 5.4. Drawing of isometric views of prisms and pyramids
- 5.5. Drawing of isometric view of cylinders and cones

6.0. Sections of Solids

- 6.1. Need for drawing sectional views - section planes - sections - true shape of a section
- 6.2. Sections of prisms and pyramids
- 6.3. Sections of cones and cylinders.

7.0. Development of Surfaces

- 7.1. Need for preparing development of surface
- 7.2. Concept of true length - Principal methods of development
- 7.3. Development of simple solids like cubes, prisms, cylinders, pyramids, cones.

Note : Latest developments and modern techniques on this subject should be followed from time to time.

**PUBLIC HEALTH ENGINEERING TECHNICIAN
ENVIRONMENTAL ENGINEERING
THEORY - PAPER - I SECOND YEAR
(Periods Per Week : 5 Periods Per Year : 160, Max.Marks : 50)**

Sl.No.	Major Topics	No.of Periods
1	Introduction	05
2	Quantity of sewage	10
3	Sewerage systems	15
4	Sewer Appurtenances	15
5	Sewage Characteristics	10
6	Sewage Treatment and Disposal	30
7	Solid waste Management	30
8	Drainage and sanitation in buildings	15
9	Rural Water supply and Sanitation	10
10	Air pollution and Ecology	20
	Total	160

Detailed Syllabus :

1.0. Introduction

- 1.1. Objects of providing sewerage works
- 1.2. Definition of terms - Sullage, Sewage, sewer and sewerage
- 1.3. Classification of sewage
- 1.4. Systems of sewage disposal
- 1.5. Types of sewerage systems and their suitability separate, combined and partially separate systems

2.0. Quantity of Sewage

- 2.1. Quantity of discharge in sewers, dry weather flow, variability flow
- 2.2. Determination of storm water flow
- 2.3. Surface drainage - requirements, shapes, laying and construction
- 2.4. Use of monograms as per IS 1742 to determine the unknown value of gradient, diameter, discharge and velocity

3.0. Sewerage systems

- 3.1. Different shapes of cross section for sewers, circular and non-circular, merits and demerits
- 3.2. Brief description and choice of types of sewers - stoneware, cast Iron, cement concrete and A.C. pipes
- 3.3. Laying of Sewers - setting out alignment of a sewer, excavation, checking the gradient, preparation of bedding, handling, lowering, laying and jointing, testing and back filling

4.0. Sewer Appurtenances

- 4.1. Brief description, location, function and construction of
 - 4.1.1. Manholes
 - 4.1.2. Drop Manholes
 - 4.1.3. Street inlets
 - 4.1.4. Catch basins
 - 4.1.5. Flushing tanks

4.1.6. Regulators

4.1.7. Inverted siphon

4.2. Necessity of pumping sewage - location and component parts of pumping station

5.0. Sewage Characteristics

5.1. Strength of sewage, sampling of sewage, characteristics of sewage, physical, chemical and biological

5.2. Analysis of Sewage - significance of the following tests. 1. Solids, 2. C.O.D, 3. B.O.D, 4. PH- value, 5. Chlorides (No details of tests)

5.3. Characteristics of industrial waste water - principles of treatment, reduction of volume, and strength of waste water, equalization, neutralization and proportioning

6.0. Sewage treatment and disposal

6.1. Preliminary treatment - Brief description and functions of the following units 1. Screens, 2. Skimming tanks and 3. Grit chambers

6.2. Primary treatment - Brief description and functions of plain sedimentation

6.3. Secondary treatment - Brief description of 1. Trickling filters, 2. Activated sludge process, 3. Oxidation ditches, 4. Oxidation pond, 5. Aerated lagoons and Anaerobic lagoons.

6.4. Septic tank

6.5. Sewage disposal - dilution, disposal on to lands, groundwater recharge, reuse etc

7.0. Solid Waste Management

7.1. Municipal, Industrial, Hazardous solid wastes, their characteristics, study of solid waste treatment systems - Sources - collection methods - transportation - disposal methods - dumping, sanitary land fill, incineration - composting - preparation

8.0. Drainage and sanitation in Buildings

- 8.1. Aims of building drainage and its requirements - General layout of Sanitary fittings to a house, drainage arrangements for a single and multi storeyed buildings as per IS code of practice
- 8.2. Sanitary fittings - traps, water closets, flushing cisterns, urinals, inspection chambers, antisiphonage inspection, testing and maintenance of sanitary fittings

9.0. Rural water supply and sanitation

- 9.1. Disinfection of wells
- 9.2. Rural Sanitation and sanitary latrines, brief description and operational details of bio-gas plant using cow dung, night soil and agricultural waste

10.0. Air pollution and Ecology

- 10.1. Definition - sources of air pollution - effects of air pollution
- 10.2. Control of air pollution - methods - air pollution control at source - zoning - installation of control devices and equipment - brief description of internal separators, gravity settling chamber, cyclones, fabric filters, electrostatic precipitator
- 10.3. Air pollution control by stacks and vegetation
- 10.4. Environment - Biosphere - Atmosphere - Acid rains, Greenhouse effect - Ozone layer depletion
- 10.5. Ecology and Ecosystem - Components of Ecosystem flow of matter in an ecosystem - flow of energy in an ecosystem - Ecological balance and stability of Eco system.

Journals :

1. All leading Journals on Environmental Engineering
2. All leading Journals on Air Pollution
3. All leading Journals on Solid Waste Management

**PUBLIC HEALTH ENGINEERING TECHNICIAN
BUILDING MATERIALS AND CONSTRUCTION
THEORY- PAPER - II SECOND YEAR
(Periods Per Week : 5 Periods Per Year : 160, Max.Marks : 50)**

Sl.No.	Major Topics	No.of Periods
1.	Stones	10
2.	Bricks	10
3.	Cement	10
4.	Sand	10
5.	Mortar	10
6.	Concrete	10
7.	Timber	10
8.	Miscellaneous Building materials	30
9.	Types of buildings	8
10.	Foundations	19
11.	Masonry	05
12.	Floors	10
13.	Roofs	10
14.	Damp Proof & Fire Proof Construction	8
	Total	160

Detailed Syllabus :

1. Stones

- 1.1. Classification of rocks
 - 1.1.1 Geological Classification
 - 1.1.2. Physical Classification
 - 1.1.3. Chemical Classification
- 1.2. Uses of Stones
- 1.3 Requirements of good building stones
- 1.4. Characteristics of stones - Granite, Sand Stone, lime Stone and marble
- 1.5. Selection of Stones and marble
- 1.6. Artificial Stones
- 1.7. Introduction of aggregate - grading of aggregates

2. Bricks

- 2.1. Definition - Composition of good brick earth - Manufacturing process
- 2.2. Classification of bricks
- 2.3. Properties of bricks
- 2.4. Special types of bricks and their uses
- 2.5. Compressive strength of bricks
- 2.6. Grade of bricks as per B.I.S.

3. Cement

- 3.1. Definition - Composition of ordinary portland cement - Functions of cement, ingredients
- 3.2. Different types of cements
- 3.3. Grades of cement (33, 43 and 53)
- 3.4. General Uses of Cement
- 3.5. Admixtures - uses
- 3.6. Lime as basic ingredient of cement - importance of lime in construction - classification of lime - Fat, Hydraulic and poor lime - modern usage of lime as cem.

4. Sand

- 4.1. Sources of sand
- 4.2. Characteristics of good sand
- 4.3. Grading of sand
- 4.4. Bulking of sand

5. Mortar

- 5.1. Definition - Properties and uses of mortar
- 5.2. Types of mortar - Cement, Lime mortar
- 5.3. Preparation of cement mortar

6. Concrete

- 6.1. Definition - Constituents of concrete and their requirements
- 6.2. Uses of Concrete - Types of Concrete
- 6.3. Preparation of cement concrete - Hand mixing, Machine mixing and Ready mix concrete
- 6.4. Compaction of concrete - Methods
- 6.5. Curing of concrete - Methods

7. Timber

- 7.1. Common Varieties of Timber
- 7.2. Defects in timber - Seasoning of timber
- 7.3. Wood based products
- 7.4. Characteristics of good timber

8. Miscellaneous building Materials

- 8.1. Metals
 - 8.1.1. Types of metals used in construction - cast iron - steel - Mild steel - Galvanised iron - Aluminium - Copper and Alloys.
 - 8.1.2. Uses of different types of metals
- 8.2. Plastics
- 8.3. Asbestos - Uses of asbestos
- 8.4. Adhesives - Uses of Adhesives
- 8.5. Glass
- 8.6. Thermocole

- 8.7. Plaster of Paris
- 8.8. Linoleum
- 8.9. Wall paper
- 8.10. P.V.C
- 8.11. Bitumen and tar
- 8.12. Plasti crete
- 8.13. Fal-G Concrete

9. Types of Buildings

- 9.1. Classification of building as per NBC
- 9.2. Component parts of building

10. Foundations

- 10.1. Definition - Functions of Foundation
- 10.2. Classification of Soil
- 10.3. Types of foundations - Shallow and deep
- 10.4. Bearing capacity of soil
- 10.5. Requirements of good foundation
- 10.6. Causes of failures of foundations and remedial measures

11. Masonry

- 11.1. Stone Masonry - Definition - Material required for stone masonry
- tools required - types of masonry - rubble and ashlar
- 11.2. Brick masonry - Definition - Types of brick masonry - English
and flemish bonds

12. Floors

- 12.1. Types of floor - Method of construction, cement concrete, Mosaic,
and Terrazzo floors

13. Roofs

- 13.1. Types of roofs - Pitched and flat roofs.

14. Damp Proof and Fire Proof Construction :

- 14.1. Different methods of construction used for damp proofing of
foundations, super structure and roofs.
- 14.2. Different methods of construction used for fire proofing of
buildings.

Note : Latest developments and modern techniques on this subject should be noted from time to time

**PUBLIC HEALTH ENGINEERING TECHNICIAN
ESTIMATING AND COSTING
THEORY - PAPER III SECOND YEAR**

(Max. Marks : 50, Periods per Week : 5, Periods per Year : 160)

Sl.No.	Major Topics	No.of Periods
1.	Introduction	10
2.	Methods of Building Estimates	35
3.	Analysis of Rates	35
4.	Estimation of Open drains and roads	40
5.	Estimation of Public Health Engineering works	40
	Total	160

Detailed Syllabus :

1.0. Introduction

- 1.1. Definition - Purpose
- 1.2. Types of estimates
 - 1.2.1. Detailed Estimate - Abstract estimate - Definitions - formats for detailed and abstract estimates
 - 1.2.2. Preliminary estimate or Approximate estimate - plinth area estimate - cubic rate estimate
- 1.3. Units of measurement of various Items of work as per IS Code 1200

2.0. Methods of Building Estimates

- 2.1. Preparation of detailed estimates of building using centre line method/long wall - short wall method
 - a) Single room building
 - b) Single room with varandah
 - c) Two rooms building
 - d) Two rooms building with Varandah
 - e) Single bedroom house including with RCC staircase
 - f) Double bedroom house including with RCC staircase
 - g) Compound wall and steps

3.0. Analysis of Rates

- 3.1. Cost of material at source and at site
- 3.2. Standard Schedule of Rates (SSR) of different materials
- 3.3. Types of Labour - Wages as per SSR
- 3.4. Lead and lift - preparation of lead statement
- 3.5. Preparation of unit rates for finished items of works using standard data & SSR
- 3.6. Methods of calculating quantities of ingredients of various proportions of cement concrete

4.0. Estimation of Open Drains and Roads

- 4.1. Estimation of open drain in rural area
- 4.2. Estimation of earthwork by trapezoidal Rule
- 4.3. Estimation of earthwork by prismoidal method
- 4.4. Estimation of roads (abstract estimates) of
 - a) Gravel road
 - b) Water bound Maccadam
 - c) Cement Concrete Road

5.0. Estimation of public health engineering works

- 5.1. Preparation of detailed estimates of
 - a) Septic tank
 - b) RCC overhead tank
 - c) Estimation of quantity of sanitary pipes and pipe specials and fittings for a building from the plan of the building

Note: Latest developments on this subject should be followed from time to time

**PUBLIC HEALTH ENGINEERING TECHNICIAN
CIVIL ENGINEERING LABORATORY 2
PRACTICAL - PAPER I SECOND YEAR**

(Max. Marks : 50, Periods per Week : 5, Periods per Year : 160)

Sl.No.	Major Topics	No.of Periods
1.	Construction of Brick Bonds	6
2.	Construction of Stone Masonry	6
3.	Water absorption test for bricks	4
4.	Fineness modulus of aggregates - Sieve Analysis	4
5.	Bulking of sand	4
6.	Standard Proctor compaction test	4
7.	Initial setting of cement	4
8.	Slump Test	4
9.	Consistency of Cement	4
10.	Layout of stone ware pipes from water closet to septic tank	10
11.	Collecting of waste water samples	5
12.	Preparation of conversion tables	5
13.	Study of plumbing tools	5
14.	Layout of Cold Water Distribution	10
15.	Layout of Hot Water Supply in a residential building	10
16.	Layout of sanitation system in a building	10
17.	Preparation of Electrical diagrams for a building	10
18.	Layout of Fire fighting arrangements	5
19.	Rainwater harvesting plan, section	10
20.	Observation of solid waste schemes, sanitary land fills, composting plants, by local visit	20
21.	Study of Pollution Control Equipments and about Air Pollution	20

Detailed Syllabus:

1. Construction of Brick Bonds
2. Construction of Stone Masonry
3. Water absorption test for bricks
4. Fineness modulus of aggregates - Sieve Analysis
5. Bulking of sand
6. Standard Proctor compaction test
7. Initial setting of cement
8. Slump Test
9. Consistency of Cement
10. Layout of stone ware pipes from water closet to septic tank using pipe specials
11. Collecting of waste water samples - grab and composite
12. Preparation of conversion tables between different units (Length, area, volume, discharge, pressure)
13. Study of plumbing materials and tools with sketches.
14. Preparing a layout showing the coldwater distribution for a highrate building indicating the components
15. Preparing a layout for hotwater supply in a residential building indicating the appliances, their insulation by following systems
 - a) direct system b) indirect systemUsing electric water heater, gas heater and solar water heater.
16. Preparing a layout of sanitation system in a building using the following systems
 - a) fully vented one pipe system
 - b) fully vented two pipe system
 - c) single stack system
 - d) partially ventilated single stack system

17. Prepare electrical distribution diagram for the following
 - a) Schematic diagram main switch board
 - b) layout drawing of main switch board panel
 - c) Electrical Connections for centrifugal pump
18. Preparing a typical layout showing the fire fighting arrangements
19. Preparation of plans and sections of rain water harvesting structures by percolation pit method and connecting to service wells
20. Observation of solid waste schemes, sanitary land fills, composting plants, by local visit.
21. Study of Pollution Control Equipments and about Air Pollution

Journals :

All leading Civil Engineering Journals should be followed with respect to concerned subjects.

**PUBLIC HEALTH ENGINEERING TECHNICIAN
CIVIL ENGINEERING DRAWING
PRACTICAL - PAPER - II SECOND YEAR**

(Max. Marks : 50, Periods per Week : 5, Periods per Year : 160)

Sl.No.	Major Topics	No.of Periods
1.	Conventional Signs Doors, windows, footings, single wall	25
2.	Building Drawing	60
3.	Detailed drawings of water supply and drainage connections to building	15
4.	Layout of various water supply and sanitary fittings in bath and W.C	10
5.	Overhead tank	5
6.	Septic tank, manhole, dispersion trench	15
7.	Layout sketch of water purification plant	5
8.	Layout sketch of sewage treatment plant	5
9.	Tracing and preparation of ammonia prints	20
	Total	160

Detailed Syllabus

1. Conventional signs
 - 1.1. Conventional signs used in civil engineering
 - 1.2. Doors
 - 1.2.1. Panelled door
 - 1.2.2. Glass door
 - 1.3. Windows
 - 1.3.1. Panelled window
 - 1.3.2. Glazed window
 - 1.4. Footings
 - 1.4.1. Square footing
 - 1.4.2. Rectangular footing
 - 1.5. Plan and section of single wall

2. Building Drawing

- 2.1. Preparation of plan, elevation and section of
 - 2.1.1. Single room house
 - 2.1.2. Two rooms house
 - 2.1.3. Single bedroom house
 - 2.1.4. Double bedroom house
 - 2.1.5. Two storeyed building

3. Detailed drawings of water supply and drainage connections to building

- 3.1. Showing the position of various fittings like manhole, gully trap, etc.

4. Layout of various water supply and sanitary connections in

- 4.1. Bathroom
- 4.2. Water closet

5. Overhead tank

- 5.1. Detailed drawing of overhead tank with complete pipe system

6. Pipe connections to

- 6.1. Septictank

- 6.2. Manhole

- 6.3. Dispersion trench

- 7.0. Layout sketch of water purification plant

- 8.0. Layout sketch of sewage treatment plant

9.0. Tracing and preparation of ammonia prints

- 9.1. Buildings

- 9.2. Water supply and sanitary units

- 9.3. Layouts of water supply and sanitary units

- 9.4. Air Pollution and Solid Waste Management Units

Note : Latest developments and modern techniques on this subject should be followed from time to time

**PUBLIC HEALTH ENGINEERING TECHNICIAN
COMPUTER LAB**

PRACTICAL - PAPER - III SECOND YEAR

(Max. Marks : 50, Periods per Week : 5, Periods per Year : 160)

Sl.No.	Major Topics	No.of Periods
1.	Introduction to Computer Concepts	10
2.	Data representation	20
3.	MS-Windows	10
4.	MS-Office	30
5.	Computer Networks	15
6.	Internet	15
7.	Auto CAD	60
	Total	160

Detailed Syllabus :

1. Introduction

History of Computers - Computer Generations, Classification of Computers, Characteristics of Computers, Advantages and disadvantages of Computers, basic computer architecture, input and output devices, memories, storage media.

2. Data Representation

Number system, conversions, software concepts - types of software, types of languages, operating systems - History and evolution, Dos - Booting, directories, files, wild cards, various commands in Dos.

3. MS-Windows

- 3.1. Practice on elements of Windows-98 like My Computer, My Documents, Internet Explorer, Network Neighbourhood, Recycle Bin, My Briefcase, etc.
- 3.2. Practice on Starting a Program (Application) like Start Menu, Programs Menu, Documents Menu, Find and Help Menu.
- 3.3. Creating and Editing Text files - Deleting and Restoring files and folders.
- 3.4. Copying and Moving objects - Drag and Drop feature - using Keyboard - using Standard Tool bar - Right Dragging Method.
- 3.5. Printing from Windows

4. MS-Office

Introduction to MS-Office and applications

- 4.1. Prepare a document report using MS-Word properly formatted with tables for test reports of sieve analysis
- 4.2. Using MS-Excel prepare a graph for experiment conducting in Civil Engineering Laboratory.
- 4.3. Prepare a comparative statement for purchase of materials and equipment using MS-Word/MS-Excel software.

- 4.4. Prepare a lead statement, data sheet of abstract estimate for C.R.S Masonry in foundation of buildings using MS-Word/MS-Excel/MS-Access.
- 4.5. Working with MS-Power point create a presentation on any selected topic.
- 4.6. Working with MS-Access create a database on any selected topic

5. Computer Networks

Local area network, Metropolitan area networks, wide area network, network topologies.

6. Internet

Definition of Internet, Intranet and extranet, Network, client and servers, Host and terminals, www, Hypertext, URL, web browsers, Intranet.

7. Auto CAD

- 7.1. Introduction to Auto CAD as drafting package.
- 7.2. Practice on Auto CAD with necessary commands.
- 7.3. Draw the Orthographic views of regular solids using Auto CAD commands.
- 7.4. Section of Solids - Draw sectional Views of given objects using Auto CAD commands
- 7.5. Using Auto CAD software draw & print the following drawings
 - 7.5.1. Draw conventional signs a per I.S.
 - 7.5.2. Draw the important joinery components of the building like elevation of fully panelled double leaf door, elevation of partly glazed and partly panelled window.
 - 7.5.3. Draw the important building components like section of load bearing wall, foundation to parapet.
 - 7.5.4. Prepare plan and section of rain water harvesting pits.
 - 7.5.5. Preparation of building drawings prepare plan, section and elevation of 2 bed roomed residential building with R.C.C., flat roof from the given line diagram and specifications

- 7.5.6. Prepare layout of electrical, water supply and sanitary lines in a residential building on number of layers.
- 7.5.7. Preparation of approval drawing to be submitted to corporation or municipality showing required details in one sheet such as
- Site Plan
 - Plan, section & Elevation
 - Key plan
 - Septic tank, plan & section
 - Rainwater harvesting pit
 - Typical foundation details
 - Title block

Journals :

1. Journal of Management
2. Computers Today, New Delhi
3. Date Quest, New Delhi
4. Vikas, Ahmedabad

VII. Additional Equipment for revised course

1. Chemicals and glassware
2. Jar test apparatus
3. Chlorine comparator kit i.e. chloroscope
4. PH meter
5. Conductivity meter
6. D.O. meter
7. Muffle furnace 10 x 10 x 20 cm - upto 900°C
8. Desicator
9. Reflux assembly
10. Computer with peripherals
11. Software
 - MS Office [MS Excel, MS Word, Access, Power Point]
 - Auto CAD release 2002
12. Pipe specials
13. G.I. pipe 1/2" diameter — 5 lengths
14. Die set, Pipe wrench, Bench vice, spanner set etc
15. Centrifugal pump — 0.5 H.P.
16. Jet pump — 0.5 H.P.
17. Borewell hand pump
18. Theodolite
19. Plane Table
20. Carpentry tools
21. Fitter tools
22. Smithy tools
23. Foundry tools
24. Drawing table with drawing boards.
25. T.Square/Mini drafter
26. Drawing instruments set.

27. Set Square set,
28. Compass set
29. Plumb bob cross staff
30. Tapes
31. Spirit level
32. Bar bending bench
33. Bar bending tools (complete set with different diameters)
34. Survey chain (30 meters)
35. Dumpy level with stand
36. Cross staff
37. Theodolite with stand
38. Plane table with stand
39. Helmets
40. Gum boots
41. 1mt x 1 mt x 0.01 nt (Mixing tray)
42. Weighing balance
43. Trowels
44. Cement Concrete cube moulds
45. Slump cone apparatus.
46. Compressive testing Machine (100 tonnes capacity)
47. Set of sieves 80 mm, 40 mm, 20mm 10mm, 4.75 mm, 2.36 mm
1.18 mm 0.6 mm, 0.3 mm, 0.15 mm
48. Sieve Shaker for coarse aggregate. (30 cm Dia)
49. Vicat apparatus
50. I.S. Testsieve - sieve No. 90 Microns
51. Weighing Balance (wt. 50 gm - to 5 kgs)
52. Fractional weight Box
53. Table Vibrator
54. Needle vibrator

55. Drawing Models
56. Drawing Model with sections.
57. Electric Oven
58. Universal testing machine
59. Shear tool assembly
60. Rockwell hardness Testing Machine
61. Brinell Hardness Testing Machine (TKB - 3000 Model)
62. Brinell Microscope with light arrangement
63. Impact testing machine (Izod, Charpy)
64. Procter Mould with Metal Rammer

VIII. IMPORTANT SUGGESTIONS

1. Local visits to the buildings under construction such as residential buildings, multi-storey buildings, factory buildings and water supply treatment plants, etc. shall be arranged for practicals wherever necessary.
2. Local visits to sewage treatment plants, multi-storey buildings, study of water supply and sanitary fittings, etc. may be arranged.
3. Educational tour and visits to Engineering works may be arranged.
4. The On the Job Training program may be arranged in specific areas like masonry work, plumbing, carpentry, bar-bending, painting, etc.
5. For all Practical subjects Field visits should be there as per the syllabus (according to Vocational Pattern)
6. Scientific Calculators are allowed for this course students in the public examinations.

IX. a. Collaboration Institutions for Curriculum transaction

1. Panchayat Raj Department
2. Municipalities
3. Metro Water Works and Sewerage Board
4. Municipal Corporation
5. Public Health Department
6. Effluent treatment plants/industries
7. Roads and Buildings Department
8. Irrigation Department etc.,
9. Transportation Departments etc.
(Highways, Railways, airways, Water Ways)
10. Technical training institutes (like Polytechnics, survey of India, Technical Teachers training institutes, Testing labs, (NAC) National Academy of Construction

b. On the Job Training :

Sites :

1. Local Water Supply (protected) authority
2. Sewage Board or local bodies managing sewage
3. pollution Control Board, Pollution related activities etc.,
4. Sanitation - Municipal Corporation / Municipalities / Gram Panchayats
5. All activities/works, related to Transportation Engineering, etc.,
(Highways, Railways, Air ways, Water ways)
6. All activities / works related to Solid Waste Management
7. Government Departments like R & B, MCH, Huda, MES, Concrete ready Mix plants, Private builders and contractors. Building Materials Manufacturing Units like Tiles/ Bricks industries / precast units / cement industries.
8. Survey of India and survey camps
9. Environment Pollution Training Research Institute (EPTRI, Gachibowli)
10. All works related to civil Engineering field

Evaluation :

1. Project work
2. Seminar on the Project
3. Viva - voce

X. Qualification of Lecturers

1. B.E. / B.Tech (Civil), B.Tech.(Structural) or AMIE (Civil) or Equivalent
2. DCE/LCE with three years of teaching experience

Qualification of Lab Assistants

- a) Vocational passouts of WS & SE/Public Health Engineering Technician / S&E / R & B Course / C.T.
- b) NCVT/ITI passed or any equivalent

XI. Vertical Mobility

Passouts of this course may continue education in the following courses

On Completion of Bridge Course :

1. B.E. / B.Tech through EAMCET
2. Diploma in Civil Engineering
3. A.M.I.E.
4. B.Sc. (Mathematics) etc.,

Without Bridge Course

Graduation in arts like B.A., B.Com., B.B.A, B.Sc,B.B.M, B.Com (Computers), C.A, I.C.W.A., A.C.S., LL.B., etc.

XII. Reference Books :

1. Public Health Engineering Practice Volume I&II - L.B. Escrit

2. Environmental Engineering

Water Supply & Sanitary Engineering — G.S.Birdie

Water Supply & Sanitary Engineering — Rangwala

Waste Water treatment & Disposal — Medcaff & Graw

Water Supply Engineering — Santosh Kumar Garg

Sewage Disposal and Air Pollution Engineering — S.K. Garg

Plumbing Designes & Practice — S.G.Deolalikar

Water Treatment & Sanitation — Simple Methods for Rural areas
- H.P.Mann & D. Willianson

Water supply & Sewarage — E.W.Steel

Water Supply & Waste Water Disposal

— W.A.Hardenbergh & E.R.Rodie

Water Supply & Waste Water Disposal

— G.M. Fair, J.C.Geyar & Oken

Environmental Lab Manual — Shivaji Rao

Solid Waste Management — Shivaji Rao

Environmental Engineering — *Balijeet Kapoor*

Environmental Engineering — *Ramachandraiah*

Water Supply and Sanitary Engineering — *V.N. Vazirani*

Water Supply and Sanitary Engineering — Duggal

3. Building Materials

Building Materials — Rangala

Construction Materials — G.J. Kulkarni

Building & Components — A. Komar, Mir Publication

A text book of building construction — S.P. Arora & S.P.Bindra

Engineering Materials — Punmia

A text book of Building Construction — R.S. Desh Pande

A text book of Building Construction — Rangawala

A text book of Building Construction — Sushil Kumar

4. Surveying :

Survey I and II — B.C. Punmia

Surveying and levelling — T.P. Kanetkar

Surveying and levelling — S.K. Hussain and Nagaraj

Surveying and levelling — A. Kamala.

Plane & Geodetic Surveying — David Clark

Surveying — Norman Thomas

Surveying — Higgins

5. Engineering Mechanics :

Engineering Mechanics — R.S. Kurmi

Engineering Mechanics — N. Srinivasulu

Engineering Mechanics — A. Kamala & AVRT Sharna

Engineering Mechanics — K.L. Narsimham

Engineering Mechanics — Ramamrutham

Engineering Mechanics — Prasad

Engineering Mechanics — G. Venkateswar Rao

Engineering Mechanics Statics — Dayarathnam

Engineering Mechanics — Punmia

6. Engineering Drawing :

Engineering drawing — N.D. Bhatt

Engineering drawing — B.R. Gupta

Engineering drawing — Srinivasulu

Engineering drawing — Gurucharan Singh

Engineering drawing — Gopala Krishna

7. Estimating and Costing :

Estimating and Costing — B.N Dutta

Estimating and Costing — Birdie

Quantity surveying — A.K. Kamala

Quantity Surveying (Estimating & Costing) — P.L. Bhasin

Estimating & Costing — R.L.Peurifoy

Estimating & Costing — Subramanyam

8. Civil Engineering Drawing :

Civil Engineering Drawing I and II — A. Kamala

Civil Engineering Drawing 'A' Series — V.V.S. Murthy

Civil Engineering Drawing — B.P. Vermon

Principles of Building Drawing — M.G. Shah & C.M.Kale

Design of Houses (Low, middle and upper income group)

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VOCATIONAL CURRICULUM-2005 (with effect from the Academic Year 2005-2006)

Curriculum of Intermediate Vocational Course in

PUBLIC HEALTH ENGINEERING TECHNICIAN



STATE INSTITUTE OF VOCATIONAL EDUCATION &

BOARD OF INTERMEDIATE EDUCATION A.P.

Nampally, Hyderabad.

FOREWORD

The National Policy on Education (1986) while proposing educational reorganization, placed high priority on the programme of vocationalisation of education. It emphasized that well planned, systematic and rigorously implemented vocational education will create a distinct stream to prepare students for identified occupations encompassing several areas of activity. The primary aim of vocational courses was to cut across several occupational fields and prepare students with employable skills in organized sectors and self employment. Vocationalisation through re-orientation of educational strategies focused on creating a talent pool of skilled youth who are trained in courses relevant to the market and emerging needs of the various sections of the economy.

Inspired by this vision of the National Policy, the Government of Andhra Pradesh introduced Vocational Education at +2 level with an aim to diversify a sizeable segment of students at the senior secondary stage to the world of work. The State Government aimed at reducing the pressures on higher education through empowering youth by harnessing their capabilities. The requirement of skilled manpower industry is being fulfilled by charting a student's career with right options based on aptitude and talent. A right alternative to medical and engineering courses is envisaged in vocationalisation of education in the State.

In view of the changing needs of the students and growing demand for a spectrum of skill competencies in the economy, the Board of Intermediate Education has reviewed the curriculum of Vocational Courses in order to re-orient them based on their viability and practicability. The revised curriculum for Vocational Courses at Intermediate Level will come into effect from the Academic Year 2005-06 for 1st Year and from the Academic Year 2006-07 for 2nd Year students.

I am confident that the revised curriculum will attract more and more students into vocational stream and help them train in need-based, productive courses leading to gainful employment.



SHASHANK GOEL

Secretary, BIE

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