

CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

DIPLOMA PROGRAMME IN CIVIL ENGINEERING

Semester – III

S. No	Board of Study	Course Code	Course	Periods/Week (in Hours)			Scheme of Examination					Credit L+(T+P)/2	
				L	T	P	Theory			Practical			Total Marks
							ESE	CT	TA	ESE	TA		
1.	Civil Engg.	220311 (20)	Surveying-I	4	-	-	100	20	20	-	-	140	4
2.	Civil Engg.	220312 (20)	Material Technology	4	-	-	100	20	20	-	-	140	4
3.	Civil Engg.	220313 (20)	Hydraulics	4	1	-	100	20	20	-	-	140	5
4.	Civil Engg.	220314 (20)	Civil Engg. Drawing	3	4	-	100	20	40	-	-	160	5
5.	Civil Engg.	220315 (20)	Building Construction	4	-	-	100	20	20	-	-	140	4
6.	Civil Engg.	220321 (20)	Surveying-I Lab	-	-	6	-	-	-	50	20	70	3
7.	Civil Engg.	220322 (20)	Material Technology Lab	-	-	2	-	-	-	50	20	70	1
8.	Civil Engg.	220323 (20)	Hydraulics Lab	-	-	2	-	-	-	50	20	70	1
9.	Civil Engg.	220324(20)	Construction Technology Lab	-	-	2	-	-	-	50	20	70	1
TOTAL				19	5	12	500	100	120	200	80	1000	28

PPA : Proficiency in Professional Activities.

L : Lecture hours : T : Tutorial hours, P : Practical hours

ESE – End of Semester Exam.; CT – Class Test; TA- Teacher’s Assessment.

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL
UNIVERSITY, BHILAI, CHHATTISGARH**

- A) SEMESTER : III
 B) COURSE TITLE : SURVEYING - I
 C) CODE : 220311 (20)
 D) BRANCH/DISCIPLINE : DIPLOMA IN CIVIL ENGINEERING
 E) RATIONALE:

The Civil Engineering technician are mainly involved in activities related to construction of buildings, roads, bridges etc for which the initial requirement is land surveying and leveling. The technicians should develop skills of measuring lengths, angles etc with the help of surveying instruments and plotting the same on the drawing sheet.

F) TEACHING AND EXAMINATION SCHEME:

Course Code	Periods/Week (In Hours)			Scheme of Examination						Credit [L+(T+P) 2]
	L	T	P	Theory			Practical		Total Marks	
				ESE	CT	TA	ESE	TA		
220311 (20)	4	-	-	100	20	20	-	-	140	4
220321 (20)	-	-	6	-	-	-	50	20	70	3

G) DISTRIBUTION OF MARKS AND HOURS:

S.No	Chapter No	Chapter Name	Hour		Marks
			Theory	Practical	
1	1	INTRODUCTION	2	-	5
2	2	CHAIN SURVEYING	14	24	20
3	3	COMPASS SURVEYING	14	18	20
4	4	LEVELLING & CONTOURING	24	36	35
5	5	PLANE TABLE SURVEYING	10	18	20
TOTAL			64	96	100

H) DETAILED COURSE CONTENTS:

Chapter -1 INTRODUCTION

- ✍️✍️ Purpose of engineering surveys
- ✍️✍️ Principles of surveying
- ✍️✍️ Various instruments used for length and angular measurements
- ✍️✍️ Plane and geodetic surveying.

Chapter - 2 CHAIN SURVEYING

- ✍️✍️ Types of chain and tapes Study of 20m and 30 m chain
- ✍️✍️ Accessories in chain surveying, Ranging methods- direct ranging
 - indirect/reciprocal ranging
- ✍️✍️ Use of line range, Chaining on plane and sloping ground
- ✍️✍️ Obstacles in chaining, offsets, Types of offsets
- ✍️✍️ Use of offsets Instruments used to take offsets
- ✍️✍️ Recording field book, chain traversing, base line, tie line, check line, and chain triangulation, Errors in chaining, tape and their correction
- ✍️✍️ Symbols and signs to indicate ground features.

Chapter - 3 COMPASS SURVEYING

- ✍️✍️ Types of compass prismatic and surveyors compass
- ✍️✍️ Bearing of lines fore bearing and back bearing
- ✍️✍️ Whole circle bearing and reduced bearing systems
- ✍️✍️ Local attraction and its detection
- ✍️✍️ Magnetic declination and dip Calculation of - exterior and interior angle
- ✍️✍️ Closed and open traverse, closing errors,
- ✍️✍️ Graphical adjustment of closing error.

Chapter - 4 LEVELING AND COUNTOURING

- ✍️✍️ Meaning of various terms used in leveling
- ✍️✍️ Types of levels and their uses
- ✍️✍️ Dumpy level, tilting level, quick set level
- ✍️✍️ Auto-set level and digital level
- ✍️✍️ Description of dumpy level
- ✍️✍️ Temporary adjustment of level
- ✍️✍️ Fundamental lines of levels and their relationships.

- ☞☞Recording level book
- ☞☞Computation of reduced level by H.I. method and rise and fall method
- ☞☞Methods of leveling:
 - Simple leveling, fly leveling, differential leveling, reciprocal leveling
- ☞☞Longitudinal and cross sectioning
- ☞☞Computation of missing readings, Errors in leveling.

Contouring - Definition of contours

- ☞☞Contour interval, horizontal equivalent,
- ☞☞Uses of contours, characteristics of contours,
- ☞☞Methods of contouring, direct and indirect method of contouring, Interpolation of contours, plotting of contour, use of Topo sheet

Chapter - 5 PLANE TABLE SURVEYING

- ☞☞Principles of plane table surveying
- ☞☞Plane table and its accessories, setting of plane table
- ☞☞Methods of plane table surveying
- ☞☞Suitability of each method
- ☞☞Plane table survey by radiation
- ☞☞Intersection and traversing
- ☞☞Advantages and disadvantages of plane table surveying .

I. SUGGESTED INSTRUCTIONAL STRATEGIES:

- ?? Lecture method
- ?? Industrial visit
- ?? Expert lecture
- ?? Demonstration.

J. SUGGESTED LEARNING RESOURCES :

(a) Reference books:

S.No.	Title	Author, Publisher, Edition & year
1	Surveying and leveling	T.P.Kanetkar Vol.1
2	Surveying and leveling	Dr. B.C. Punnia
3	Surveying and leveling	Hussain & Nagraj
4	Surveying	A Arora

COURSE TITLE : SURVEYING – I LAB

PRACTICAL CODE : 220321 (20)

HOURS: 96

LIST OF PRACTICALS / TUTORIALS:

1. To fixed station point and to measure length of a line by direct ranging with the help of chain and tape and plot it.
2. To perform a chain survey of closed traverse fixing the angle between two chain lines by time lines and to plot them and adjusting the closing error by graphical method.
3. Study the parts of prismatic compass and surveyor's compass and to measure the bearings of lines joining different station point
4. To take the fore bearing and back bearing of sides of a regular polygon and to calculate included angle and check them.
5. To perform a chain and compass survey of an area by open traverse and prepare a map.
6. To learn temporary adjustment of leveling instrument and to find the R.L. of the given point.
7. to find the difference of R.L. of two given point by shifting of instrument on change points and applying arithmetical checks.
8. To take the longitudinal and cross-section levels of an existing road.
9. To study the accessories of plane table surveying and to plot the objects by radial method.
10. To perform the plan table survey of small area by intersection method.
11. To take the block leveling of undulated site and to draw the contours using method of interpolation.
12. Preparing a contour map of a small area by direct method of contouring.
13. To draw contour map of a small panel and to calculate its capacity.
14. To study a Topo sheet of certain area and to mark on it watershed line and find out catchments area of a stream at a place.

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL
UNIVERSITY, BHILAI**

- A) **SEMESTER** : **III**
 B) **COURSE TITLE** : **Material technology**
 C) **CODE** : **220312 (20)**
 D) **BRANCH/DISCIPLINE** : **Civil Engineering**
 E) **RATIONALE:**

Construction technology and management technician has to work as a supervisor in the field of civil engineering construction works. He should there fore be in a position to select the proper material and use the same in the construction of a structure. It is therefore essential to know the properties, tests (whenever required) and skills in selection of the materials. The selection of materials and test should be according to I.S. specifications.

G) TEACHING AND EXMINATION SCHEME:

Course Code	Periods/Week (In Hour)			Scheme Of Examination						Credit [L+ <u>(T+P)</u>] 2
	L	T	P	Theory			Practical		Total Marks	
				ESE	CT	TA	ESE	TA		
220312 (20)	4	-	-	100	20	20	-	-	140	4
220322 (20)	-	-	2	-	-	-	50	20	70	1

H) DISTRIBUTION OF MARKS AND HOURS

S.No	Chapter No	Chapter Name	Hrs		Marks
			Theory	Practical	
1	1	INTRODUCTION	2	-	5
2	2	STONE AND AGGREGATE	8	12	10
3	3	CLAY PRODUCTS	10	4	10
4	4	BINDING MATERIALS	12	8	15
5	5	TIMBER	4	-	5
6	6	FLOORING MATERIALS	6	-	10
7	7	ROOFING MATERIALS	4	-	10
8	8	STEEL AND ALUMINUM PRODUCTS	4	4	10
9	9	PLASTICS	4	-	5
10	10	MISCELLANEOUS	10	-	20
11	11	MARKET SURVEY	-	4	-
Total			64	32	100

D) DETAILED COURSE CONTENTS:

Chapter - 1 INTRODUCTION

- ☒ Importance of material technology for civil engineer
- ☒ Name the common engineering materials

Chapter - 2 STONE & AGGREGATE

- ☒ Classification of rocks –geological(igneous, sedimentary and metamorphic)
- ☒ Properties of good building stones
- ☒ Methods of quarrying
- ☒ Stone as aggregate for road construction with their various grades as per I.S.
- ☒ Use of aggregate for building work at various stages
- ☒ sources and properties of aggregate and sand
- ☒ Important tests of stones and aggregates

Chapter - 3 CLAY PRODUCTS

- ☒ Clay products - . bricks, roofing tiles, flooring tiles
- ☒ Method of preparation of bricks
- ☒ Table moulded and ground moulded bricks
- ☒ Burning of bricks
- ☒ Hoffaman's continuous kiln
- ☒ Properties of good building bricks

Testing of bricks

Chapter - 4 BINDING MATERIALS

Lime

- Lime as binding material
- Types of lime :- fat lime, hydraulic lime, quicklime
- Properties of lime.

Cement

- Different ingredients used for manufacturing cement with their percentage
- Methods of preparation of cement by (i) wet process (ii) dry process
- Physical & Chemical Properties of Cement
- Testing of cement such as:-
 - Ordinary port land cement.
 - Low heat cement
 - Slag cement
 - Rapid hardening of cement.
 - Sulphate resistant cement
 - White & color cement.
 - Quick setting cement.
 - Portland Pozzolana cement.
 - Water repellent cement

Chapter - 5 TIMBER

- Difference between wood and timber
- Timber to be used as an engineering material
- Growth of timber:- exogenous, endogenous
- Defects in timber-knot, twisted fibers, rind gall
- Seasoning of timber
- Preservation of timber
- Plywood, veneers laminated plywood.

Chapter – 6 FLOORING MATERIALS

- Different types of floors used in building
 - Flag stone floor
 - Cement concrete floor
 - Mosaic flooring
 - Tile floors
 - Ceramic tile floor

- ?? Glazed tiling
- ?? Wooden floor
- ?? Glass floor.

Chapter - 7 ROOFING MATERIALS

- ☞☞ Roof covering materials - bamboo mats, galvanized iron sheets, corrugated types, asbestos cement sheet
- ☞☞ Plain and Trafford type tiles- Allahabad tiles, Manglore tiles, half round tiles, local country tiles

Chapter - 8 STEEL AND ALUMINUM PRODUCTS

- ☞☞ Steel as engineering materials in different shapes
 - ?? T section
 - ?? Angle section
 - ?? Channel section
 - ?? I section
 - ?? Steel sheets used in manufacturing of doors.
- ☞☞ Aluminium as construction material
- ☞☞ Different uses of steel and aluminium in building

Chapter - 9 PLASTICS

- ☞☞ P.V.C. pipes used as a materials in pipe laying for water supply purposes, irrigation etc.
- ☞☞ Water tanks
- ☞☞ P.V.C. sheets doors and windows

Chapter - 10 MISCELLANEOUS

- ☞☞ Use of material like glass, rubber, tar, emulsion, bitumen, glass wool
- ☞☞ Use of J bolts
- ☞☞ U hooks
- ☞☞ Stoneware pipes, Galvanized iron pipes
- ☞☞ Paints, Varnishes, Colour
- ☞☞ Fire proofing materials
- ☞☞ Acoustic materials
- ☞☞ Thermal insulating material (glass wool)
- ☞☞ Water proofing material.
- ☞☞

Chapter - 11 MARKET SURVEY

- ☞☞ Ask the students to collect the cost of items listed above and supplement the additional items with cost at the time of listing of item

J) SUGGESTED INSTRUCTIONAL STRATEGIES:

~~///~~ **Lecture Method.**

~~///~~ **Industrial visits.**

~~///~~ **Expert Lecture.**

~~///~~ **Demonstration.**

SUGGESTED LEARNING RESOURCES:

(a) Reference Books :

Sl. No.	Title	Author, Publisher, Edition & Year
1	Engineering materials	S.C. Rangwala
2	Engineering materials	Deshpande
3	Engineering materials	Ojha
4	Engineering materials	Surendra singh
5	Engineering materials	Gurcham singh
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(b) Others:

~~///~~ VCDs.

~~///~~ Learning Packages.

~~///~~ Lab Manuals.

~~///~~ Charts.

COURSE TITLE : Material technology Lab

PRACTICAL CODE : 220322 (20)

HOURS: 32

LIST OF PRACTICALS / TUTORIALS:

1. Grading of Aggregate:-
 - a. Fineness modulus of fine aggregate.
 - b. Fineness modulus of coarse aggregate
 - c. Bulking of sand.
2. Test on bricks:-
 - a. Water absorption test.
 - b. Compressive strength of bricks.
3. Test for cement
 - a. Fineness test of cement.
 - b. Normal consistency of cement.
 - c. Setting time test initial and final.
 - d. Tensile strength.
4. Testing for steel
 - a. Tensile strength of M.S. bar.
 - b. Shear strength on M.S. bar.
5. Market survey
 - a. Study of different engineering materials used in construction work and their price.

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL
UNIVERSITY, BHILAI, CHHATTISGARH**

- A) **SEMESTER** : **III**
 B) **COURSE TITLE** : **HYDRAULICS**
 C) **CODE** : 220313 (20)
 D) **BRANCH/DISCIPLINE** : **CIVIL ENGINEERING**
 E) **RATIONALE**

Constructional Engineer are often required to deal with flow of water through pipe lines and canals, therefore they must know various hydraulic phenomena with which they have to come across during their professional carrier.

Many times they may require to design pipe line for a colony, measure the discharge in canals, to work out the forces on hydraulic structures and to select proper type of pump for a given situation. In order to be able to do so, they must be trained properly to perform the above jobs satisfactorily.

The topics in hydraulics try to fulfill the needs of a construction engineer and is aimed at equipping them with the basic knowledge of the principles involved and preparing a base for further studies.

F) TEACHING AND EXMINATION SCHEME:

Course Code	Periods/Week			Scheme of examination					Total Marks	Credit [L+(T+P)] 2
				Theory			Practical			
	L	T	P	ESE	CT	TA	ESE	TA		
220313 (20)	4	1	-	100	20	20	-	-	140	5
220323 (20)	-	-	2	-	-	-	50	20	70	1

G) DISTRIBUTION OF MARKS AND HOURS:

Sno	Chapter No	Chapter Name	Theory Hrs	Practical Hrs	Marks
1.	1	INTRODUCTION	4	-	5
2	2	PRESSURE AND ITS MEASUREMENT	10	4	10
3	3	HYDROSTATICS	10	-	10
4	4	HYDRO KINEMATICS	7	-	10
5	5	HYDRODYNAMICS	8	2	10
6	6	WATER DISCHARGE MEASUREMENT	14	10	20
7	7	FLOW THROUGH PIPE	13	8	20

8	8	FLOW THROUGH OPEN CHANNEL	8	4	10
9	9	PUMPS	6	4	5
		TOTAL	80	32	100

H) DETAILED COURSE CONTENTS:

Chapter - 1 INTRODUCTION

- ☞☞ Definition of liquid,
- ☞☞ Ideal liquid and Real liquid
- ☞☞ Mass density
- ☞☞ Specific weight
- ☞☞ Compressibility
- ☞☞ Viscosity
- ☞☞ Surface tension,
- ☞☞ Branches of hydraulics- Hydro statics, hydro kinematics and hydrodynamics.

Chapter - 2 PRESSURE AND ITS MEASUREMENT

- ☞☞ Pressure
- ☞☞ Pressure intensity
- ☞☞ Variation of pressure with depth of liquid
- ☞☞ Pressure head
- ☞☞ Effect of shape and size of container on pressure.
- ☞☞ PASCAL's law
- ☞☞ Types of pressure - atmospheric pressure, gauge pressure, absolute pressure,
- ☞☞ Manometer, and differential monometer.
- ☞☞ Bourdons pressure gauge.

Chapter - 3 HYDRO STATICS

- ☞☞ Total pressure on plane horizontal surface , vertical surface and inclined surface
- ☞☞ Center of pressure and pressure distribution diagram

Chapter - 4 HYDRO KINEMATICS

- ☞☞ Law of conservation of mass
- ☞☞ Equation of continuity
- ☞☞ Steady and unsteady flow
- ☞☞ Uniform and non-uniform flow
- ☞☞ Laminar and turbulent flow

- ✍✍ Lines of flow
- ✍✍ Path line
- ✍✍ Stream line

Chapter - 5 HYDRO DYNAMICS

- ✍✍ Various forms of energies present in liquid flow - potential energy, kinetic energy, pressure energy, total energy
- ✍✍ Bernoulli's theorem
- ✍✍ Limitations of Bernoulli's theorem

Chapter - 6 WATER DISCHARGE MEASUREMENT

- ✍✍ Principles of discharge measurement through pipes
- ✍✍ Venturimeter, Equation of discharge through venturimeter
- ✍✍ Orifice meter
- ✍✍ Velocity measuring instruments
- ✍✍ Pitot tube
- ✍✍ Current meter
- ✍✍ Description method
- ✍✍ Orifice and flow through orifice
- ✍✍ Hydraulic co-efficient,
- ✍✍ Jet trajectory, Vena contracta
- ✍✍ Small and large orifice
- ✍✍ Expression for discharge for free flow
- ✍✍ Submerged flow
- ✍✍ Time required for emptying tank.
- ✍✍ Notch sharp crested, rectangular, triangular and trapezoidal
- ✍✍ Expression for discharge of flow through notches
- ✍✍ Weirs - definition, description and types of weirs and Discharge calculation.

Chapter - 7 FLOW THROUGH PIPES

- ✍✍ Characteristics of Pipe Flow
- ✍✍ Law of liquid friction for laminar flow and turbulent flow
- ✍✍ Expression for head loss in pipes due to friction
- ✍✍ Darcy's weish bach / equation.
- ✍✍ Major losses.
- ✍✍ Expressions for loss due to sudden enlargement, bends, minor losses
- ✍✍ Flow through long pipe.

- ✍✍ Discharge in open and discharge in another reservoir
- ✍✍ Pipes in series or compound pipe.
- ✍✍ Pipes in parallel
- ✍✍ Hydraulic grade lines
- ✍✍ Energy grade lines in various cases like venturimeter, sudden expansion, and convergent pipe, piping connection of two reservoirs having different water levels.
- ✍✍ Compound pipes connecting two reservoirs.
- ✍✍ Pipes connected in parallel equivalent siphon system

Chapter - 8 FLOW THROUGH OPEN CHANNELS

- ✍✍ Comparison between :
 - Pipe flow and open channel flow
 - Uniform flow and non uniform flow
- ✍✍ Wetted perimeter.
- ✍✍ Hydraulic mean depth
- ✍✍ Hydraulic gradient
- ✍✍ Chezy's formula
- ✍✍ Manning's formula
- ✍✍ Most economical section for rectangular and trapezoidal flow

Chapter - 9 PUMPS

- ✍✍ Definition, understanding and description of centrifugal pump, Its components and working principles
- ✍✍ Priming
- ✍✍ Layout selection criteria and situations where used
- ✍✍ Power requirement computations for centrifugal pump for given discharge and head.
- ✍✍ Reciprocating pumps - definition, description, component, working principles and situation where used
- ✍✍ Selection of pumps
- ✍✍ Submersible pump – description and use.

I) SUGGESTED INSTRUCTIONAL STRATEGIES:

- ✍✍ **Lecture Method.**
- ✍✍ **Industrial visits.**
- ✍✍ **Expert Lecture.**
- ✍✍ **Demonstration.**

J) SUGGESTED LEARNING RESOURCES:

(a) Reference Books :

Sl. No.	Title	Author, Publisher, Edition & Year
1	Hydraulics and Hydraulics machines	Shri K.D.Saxena
2	Hydraulics and Hydraulic machines	Dr. J.Lal
3	Hydraulics	R.S.Khurmi
4	Fluid Mechanics and machinery	Dr. A.K.Jain
5	Hydraulic	K.K.Jain

Course Title: Hydraulics Lab

PRACTICAL CODE : 220323 (20)

HOURS: 32

LIST OF PRACTICALS / TUTORIALS:

1. Pressure measurement at a point. To measure difference of pressure between two given points by U tube manometer and differential manometer.
2. Determination of Hydraulic coefficients C_c , C_v and C_d
3. Determine discharge through venturimeter.
4. Determine discharge through orifice meter.
5. Plotting hydraulic gradient line and total energy line.
6. Verification of Bernoulli's theorem.
7. Determine time of emptying tank
8. Determine friction losses through pipes
9. Determine losses in pipe due to sudden enlargement and sudden contraction
10. Determine discharge through open channel
11. Study the working of
 - a. Reciprocating pump
 - b. Centrifugal pump
 - c. Submersible pump

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL
UNIVERSITY, BHILAI,**

- A) SEMESTER : III
 B) COURSE TITLE : CIVIL ENGINEERING DRAWING
 C) CODE : 220314 (20)
 D) BRANCH/DISCIPLINE : CIVIL ENGINEERING
 E) RATIONALE:

Drawing is the language of engineers. No technician can supervise or guide civil engineering constructions without thorough knowledge and practice of preparing and interpreting civil engineering drawing. It is therefore essential that each student develop the requisite skill of preparing and interpreting drawings.

F) TEACHING AND EXMINATION SCHEME:

COURSE CODE	PERIODS/WEEK (IN HOUR)			SCHEME OF EXAMINATION						Credit [L+(T+P)] 2
	L	T	P	THEORY			PRACTICAL		TOTAL MARKS	
				ESE	CT	TA	ESE	TA		
220314 (20)	3	4	-	100	20	40	-	-	160	5

G) DISTRIBUTION OF MARKS AND HOURS:

S.No	Chapter No	Chapter Name	Theory Hrs	Marks
1	1	INTRODUCTION	7	5
2	2	BUILDING BYE-LAWS	7	5
3	3	PRINCIPLES OF PLANNING	7	5
4	4	DETAILS OF BUILDING & DRAWING	36	40
5	5	DOORS AND WINDOWS	14	10
6	6	STAIR CASES	14	10
7	7	PITCHED ROOFS INCLUDING ROOF TRUSSES	12	10
8	8	BOX & PIPE CULVERTS	8	10
9	9	MODIFICATIONS OF EXISTING BUILDING	7	5
Total			112	100

H) DETAILED COURSE CONTENTS:

Chapter1: INTRODUCTION

- ✍✍ Various types of drawings
- ✍✍ Importance and situations where above drawings are required.
- ✍✍ Types Of Projections;- First angle and Third angle projection,
- ✍✍ Symbols, conversions, and abbreviations commonly used in building drawing
- ✍✍ Scales used for various types of drawings
- ✍✍ Titles, margins, as per I. S. , sizes of various standard drawing sheets

Chapter 2: BUILDING BYE-LAWS

- ✍✍ Building bye-laws for residential buildings,
- ✍✍ Industrial and commercial buildings.

Chapter 3: PRINCIPLES OF PLANNING

- ✍✍ Principles of planning of residential building for
 - Room dimensions
 - Area
 - Heights
 - Privacy
 - Ventilation
 - Access
 - Circulation
 - Economy
 - Drainage aspect
 - Prospect
 - Orientation
 - Grouping etc.
- ✍✍ Principles of planning for school, hospital, post office, shopping centre, office building, industrial unit

Chapter 4: DETAILS OF BUILDING DRAWING

- ✍✍ Site plan
- ✍✍ Line plan
- ✍✍ Detailed plan
- ✍✍ Elevations
- ✍✍ Sections

- ✍✍ Foundation plan
- ✍✍ Layout plan
- ✍✍ Showing drainage septic tank water supplies and electricity

Chapter 5: DOORS AND WINDOWS

- ✍✍ Types of doors and windows according to materials,
- ✍✍ Types of doors and window according to the nature of their construction,
- ✍✍ Detailed drawing of panelled door and window
- ✍✍ Sketches of all types of doors and windows.

Chapter 6: STAIR CASES

- ✍✍ Importance of staircase in building
- ✍✍ Location of stair case
- ✍✍ Types of stair case used in building i.e. straight flight, dog legged, open well stair case

Chapter 7: PITCHED ROOF INCLUDING ROOF TRUSSES

- ✍✍ Types of pitched roofs
- ✍✍ Timber truss,
- ✍✍ King post & queen post truss
- ✍✍ Various members used in pitched roof like tie beam, principal rafter, ridge, eaves board, common rafter, purlin, batten
- ✍✍ Roof covering materials tiles, A. C. sheets, G.I. sheets.

Chapter 8: BOX & PIPE CULVERT

- ✍✍ Box & pipe culvert
- ✍✍ Component parts
- ✍✍ Detailed working drawing plan, elevation section

Chapter 9: MODIFICATION IN EXISTING BUILDING

- ✍✍ Addition and alterations to be incorporated in existing plan, safety aspects

I) SUGGESTED INSTRUCTIONAL STRATEGIES:

- ✍✍ **Lecture Method.**
- ✍✍ **Industrial visits.**
- ✍✍ **Expert Lecture.**

~~✓~~ **Demonstration.**

J) SUGGESTED LEARNING RESOURCES:

(a) Reference Books :

Sl. No.	Title	Author, Publisher, Edition & Year
1	Civil Engg. Drawing	S.C. Rangwala
2	Civil Engg. Drawing	D.K. Ghose
3	Civil Engg. Drawing	Shah , Kale and Patki
4	Civil Engg. Drawing	Xq:pj.k flag
5	Material Building Code	BIS
6	flfoy bath- M TM kbax	f`kokuan dkeM+s

LIST OF DRAWING TUTORIALS:

Recommended plates to

~~✓~~~~✓~~ Building drawing

- Plan
- Elevation
- Sections of one bed room and two bed room, residential building (2 sheets)
- Plan, elevation and sections of a double storyed residential building (2sheets)
- Preparation of detailed plan
- Elevation section of a public building (such as school, hospital, shopping centre etc.) referring to the given plan (3 sheets)

~~✓~~~~✓~~ One plate on straight flight and open well, one plate for dog legged stair case

~~✓~~~~✓~~ One sheet for timber truss including king post and queen post

~~✓~~~~✓~~ One sheet for steel truss

~~✓~~~~✓~~ One sheet for lean to roof with roof covering material used like tiles, half round tiles, G.I. sheets A.C. sheets

~~✓~~~~✓~~ Building services and their connections- one sheet, showing layout plan for water supply and sanitary arrangements

~~✓~~~~✓~~ One sheet showing layout plan for electricity connections

~~✓~~~~✓~~ Modification of existing building one sheet.



**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL
UNIVERSITY, BHILAI**

- A) **SEMESTER** : **III**
 B) **COURSE TITLE** : **BUILDING CONSTRUCTION**
 C) **CODE** : **220315 (20)**
 D) **BRANCH/DISCIPLINE** : **CIVIL ENGINEERING**

E) RATIONALE:

The main job of a civil technician is to supervise the construction work as per the design and drawing provided to him. Therefore, he must be able to understand various civil engineering constructions like foundation, masonry work, concreting etc. He must be able to choose correct construction procedure, equipment and method required to execute the job.

This subject is included so that the student develops abilities related to civil engineering construction activities like planning, designing, preparation of working drawings, layout, actual construction and maintenance of various civil engineering structures etc. Exposures to site conditions through site visits and extension lectures are also included for better understanding of the complicated procedures. Study of Indian standards, National Building Code, code of practices will enforce the theoretical concepts, safety precautions, awareness to low cost housing, environmental engineering etc.

F) TEACHING AND EXMINATION SCHEME:

Course Code	Periods/Week (In Hours)			Scheme of Examination					Total	Credit [L+(T+P)] 2
	L	T	P	Theory			Practical			
				ESE	CT	TA	ESE	TA		
220315 (20)	4	-	-	100	20	20	-	-	140	4
220324 (20)	-	-	2	-	-	-	50	20	70	1

G) DISTRIBUTION OF MARKS AND HOURS:

S.No	Chapter No	Chapter Name	Hours		Marks
			Theory	Practical	
1	1	INTRODUCTION	2	-	5
2	2	FOUNDATION	10	6	10
3	3	MASONRY	6	10	10
4	4	CONCRETING	6	6	10
5	5	DOOR AND WINDOWS	4	-	5
6	6	STAIRS	6	-	5
7	7	ROOF TRUSSES	10	-	10
8	8	FLOORS	6	4	10
9	9	FINISHING	4	4	10
10	10	SITE CLEARANCE & SCAFFOLDING	2	2	5
11	11	MACHINERY & EQUIPMENTS	2	-	5
12	12	SAFETY & ENVIRONMENTAL ASPECTS	2	-	5
13	13	PRECAST CONSTRUCTION	4	-	10
Total			64	32	100

H) DETAILED COURSE CONTENTS:

Chapter - 1 INTRODUCTION

- Components of a structure
- Sub/super structure
- Types of structure
- Framed & load bearing structure and comparison between the two
- Site selection
- Construction tool.

Chapter - 2 FOUNDATION

- Importance of foundation
- Necessity of foundation
- Types of foundation
- Trenches/pile type foundation
- Empirical formula for design of foundations
- Selection of foundation
- Bearing capacity
- Construction procedure
- Timbering, dewatering of trenches

- ☞☞ Type of piles
- ☞☞ Shoring in soft soil
- ☞☞ Lay out of building
- ☞☞ Under-reamed piles
- ☞☞ Timber pile
- ☞☞ Precast pile
- ☞☞ Concrete pile,

Chapter - 3 MASONRY

- ☞☞ Types of masonry - Stone, bricks, hollow concrete block
- ☞☞ Comparison between different types of masonry
- ☞☞ Uses of different types of masonry
- ☞☞ Technical terms involved in masonry
- ☞☞ Bond in bricks and stone masonry- Types and their merits

Chapter - 4 CONCRETE

- ☞☞ Types of concrete
- ☞☞ Grades as per I.S. code
- ☞☞ Workability
- ☞☞ Water cement ratio and its effect on workability and strength
- ☞☞ Testing of concrete for strength and workability
- ☞☞ Centering
- ☞☞ False work
- ☞☞ Mixing, laying and curing of concrete.

Chapter - 5 DOORS AND WINDOWS

- ☞☞ Types and details of doors and windows
- ☞☞ Materials used for doors and windows and their suitability
- ☞☞ Sizes of doors and windows as per I.S. code
- ☞☞ Selection criteria for doors and windows

Chapter - 6 STAIRS

- ☞☞ Various terms used in stairs
- ☞☞ Types of stairs and their suitability
- ☞☞ Material used in construction of stairs
- ☞☞ Relations between rise and tread
- ☞☞ Empirical formula and I.S. code for rise and tread
- ☞☞ Design of staircase for the given situation.

Chapter - 7 ROOF AND TRUSSES

- Types of roofs- flat and pitched roof
- Comparison & uses of roofs
- Terms related to pitched roof
- Components of pitched roofs
- Types of steel trusses-their uses and suitability for different types of roof

Chapter - 8 FLOORS

- Types of floors
- Different materials used in flooring
- Their merits and demerits
- Selection & suitability of different floors
- Procedure for construction of floors

Chapter - 9 FINISHING ITEMS

- Plastering and pointing**
- Difference between plastering and pointing
- Types of plastering and pointing
- Different materials used for finishing and their selection.

Chapter 10 SCAFFOLDING & SITE CLEARANCE

- Purpose of scaffolding
- Different types of scaffolding
- Importance of scaffolding
- Situation where scaffolding is used
- Merits and demerits of different types of scaffolding
- Necessity and procedure of site clearance.

Chapter -11 MECHINERY & EQUIPMENT

- List of machines and equipments required during building construction and their suitability

Chapter - 12 SAFETY & ENVIRONMENTAL ASPECTS

- Safety precautions to be observed during the construction viz. trenching, digging pits for foundation using machineries, masonry works, erection scaffolding, centering etc.
- Environmental consideration to be observed during construction of a building e.g. laying out of drainage line and water supply line, soak pit, septic tank

Precautions to be taken during site clearance considering environmental effect and avoiding unnecessary cutting of bushes and trees etc.

Chapter -13 PRECAST CONSTRUCTION

Advantages of precast construction

Materials of construction

Components of precast construction such as flooring, beams, columns, lintels, sunshades, manhole cover, window-door frame, railings, septic tank etc.

Stages of precasting concrete products

D) SUGGESTED INSTRUCTIONAL STRATEGIES:

Lecture Method.

Industrial visits.

Expert Lecture.

Demonstration.

J) SUGGESTED LEARNING RESOURCES:

(a) Reference Books:

Sl. No.	Title	Author, Publisher, Edition & Year
1	Building construction	S.K.Sharma
2	Building construction	Sushil kumar
3	Building construction	S.C. Rangwala
4	Hkou fuekZ.k	Xq:pj.k flag
5	fuekZ.k rduhdh	f'kokuan dkeM+s

Course: Construction Technology, Lab

PRACTICAL CODE : 220324(20)

HOURS: 32

LIST OF PRACTICALS / TUTORIALS:

1. Testing of concrete for workability
2. Testing of concrete for compressive strength
3. Layout of a room with verandah.
4. Layout of a residential building.
5. Layout of a framed structure.
6. Planning and layout of a staircase

SKETCHES TO BE PREPARED:

1. Various types of foundations.
2. Various types of brick bonds and masonry finishing.
3. Various types of doors and window.
4. Various types of stairs
5. Various types of scaffoldings.
6. Sketches knots and scaffolding.

VISIT TO SITE WHERE:

1. Different types of foundation work in progress.
2. Masonry works in progress.
3. Fabrication work is in progress.
4. Slab casting is in progress.
5. Flooring work is in progress.
 - a) Finished/completed building.
