Study Scheme & Syllabus of

B.Voc.

(Construction Technology)

Batch 2020 onwards

By

Board of Study CIVIL AND ENVIRONMENTAL SCIENCE

Department of Academics

IKG Punjab Technical University

Study Scheme for B .Voc. (Construction Technology)

Bridge courses for candidates with NSQF certification in other trades or NSQF non-certified candidates: Category-2 and 3

Semester-I / Level-4

S. No.	Course Code	Course Title	Marks			Credits
			Int	Ext	Total	
1	BVCT001	Construction Technology	100	---	100	6
2	BVBG002	Bridge Workshop	100	---	100	6
3	BVBG003	Information Technology Workshop	100	---	100	6
4	BVBG004	Basic Engineering Drawing	100	---	100	6
5	BVBG005	Engineering Drawing with AutoCAD	100	---	100	6
			500	**---**	**500**	**30**

- The students are advised to complete the bridge course along with **LEVEL-5** regular course. The credits earned are of qualifying nature and should be completed for obtaining Diploma/Advanced Diploma / B.Voc. Degree, as a pre-requisite. The evaluation of bridge course will be done at institute level (internal) only. NSQF LEVEL-4 certification may be done through the respective agencies/sector skill council involved.

- Category-2 students to take Level-4 course on Construction Technology, and Engineering Drawing with Autocad which they have not studied during their vocational course.
- Category-3 students to take all the courses for completing the requirements of level- 4 certification.

Study Scheme for B Voc. (Construction Technology)

Regular courses for all categories of candidates

Semester- 1 / Level-5

S. No.	Course Code	Course Title	Hours per week			Marks			Credits
			L	T	P	Int	Ext	Total	
1	BVBCT-101-20	Applied Physics	3	0	0	**40**	60	100	3
2	BVBCT-102-20	Applied Mathematics	3	0	0	**40**	60	100	3
3	BVBCT-103-20	Applied Chemistry	3	0	0	**40**	60	100	3
4	BVBCT-104-20	Communication Skills	3	0	0	**40**	60	100	3
5	BVBCT-105-20	Applied Physics Lab	0	0	3	**60**	40	100	1.5
6	BVBCT-106-20	Applied Chemistry Lab	0	0	3	**60**	40	100	1.5
7	BVBCT-107-20	Communication Lab	0	0	3	**60**	40	100	1.5
8	BVBCT-108-20	Civil Workshop Training	0	0	3	**60**	40	100	1.5
9	BVCT-102-20	On Site Training*	180 hrs			**--**	200	200	12
			12	**0**	**12**	**420**	**680**	**1000**	**30**

*The students are advised to undergo 180 hrs training in house/ industry/ Skill Knowledge Provider (SKP)/ Sector Skill Council (SSC) during the progress of the semester on week-ends or winter Vacation and submit a training report on completion of training.

B.Voc .(Construction Technology)

Semester- 2 / Level-5

S. No.	Course Code	Course Title	Hours per week			Marks			Credits
			L	T	P	Int	Ext	Total	
1	BVCT-201-20	Construction material	3	0	0	**40**	60	100	3
2	BVCT-202-20	Construction planning and scheduling	3	0	0	**40**	60	100	3
3	BVBCT-202-20	Estimating & Costing	3	0	0	**40**	60	100	3
4	BVCT-203-20	Principles of construction management	3	0	0	**40**	60	100	3
5	BVCT-204-20	Construction planning Lab.	0	0	4	**60**	40	100	2
6	BVBCT-206-20	Estimating and costing Lab.	0	0	4	**60**	40	100	2
7	BVCT-205-20	Construction materials Lab.	0	0	4	**60**	40	100	2
8	BVCT-206-20	Sector skill training*	6 weeks			**---**	200	200	12
			12	**0**	**12**	**340**	**560**	**900**	**30**

*Students will undergo 6 weeks training at Industry/Skill Knowledge Provider (SKP)/ Sector Skill Council (SSC) pertaining to any one Level-4/5 Quality Packs (QP) prescribed by Construction skill development council of India (CSDC) and submit a training report on completion of training.

Bridge courses - Level-4 (Semester-I)

(BVCT001) Construction Technology

Theory

UNIT 1. Construction site: Site Selection for construction, various components of a building (sub structure and super structure with elaboration of technical terms). Foundations: Need and function of foundation, different types of foundations and their uses.

UNIT2

Construction Equipment: Introduction, significance of equipment in construction industry - laboratory setting including plan reading, specification reading, construction scheduling and estimating, Job layout and its importance.

UNIT 3

Equipment for Earthwork: Fundamentals of Earth Work Operations - Earth Moving Operations - Types of Earth Work Equipment –Excavation equipment- Power Shovels, Back Hoe, Drag line, Clamshell – Excavating and Earth Moving Equipment – Scrapers, Bull Dozers, Tractors, Hauling Equipment – Dump trucks, Dumpers Loaders, trucks, Earth Compaction Equipment-Tamping Rollers, Smooth Wheel Rollers, Sheepsfoot Roller, Pneumatic-tyred Roller, Vibrating Compactors, Vibrocompaction methods.

UNIT 4.

Concrete Technology: Definition of concrete, different types of concrete and their uses, Ingredients of Concrete. Preparation of concrete: Batching, Mixing, Transportation, Placement, Compaction, Curing, Finishing. Properties of Concrete: Properties in plastic stage: workability, segregation, bleeding. Properties of hardened concrete: strength, durability. Introduction to standard concrete mixes.

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UNIT 5.

Construction Work Supervision: Roles and responsibilities of construction work supervisor. Record keeping: Muster roll, measurement book, register for material receipt and issue, logbook for construction equipment. Site Registers: site diary, site order book, inspection register, cement register, steel register, register for approval of other materials, material requisition and issue records. Register for scrap material, POL records, register for construction equipment. Check list (Dos and Dont's) for construction work supervision.

Practical

1. Laying of bricks in different layer using English bond.
2. Laying of bricks in different layer using Flemish bond.
3. To determine workability of concrete by slump test.
4. Test for compressive strength of concrete cubes.
5. To make T-joint and dove tail joint in timber.
6. Cutting of plywood in different patterns.
7. Drilling in plywood.
8. T- joint in service pipes.
9. Wiring from MCB to switch board having a three pin socket, switches for fan and tube light.
10. Making entries in the measurement book for small piece of construction work.

(BVBG002) Bridge Workshop

Practical

UNIT I FITTING SHOP

1. Demonstration, function and use of commonly used tools.
2. Care, maintenance of tools and safety measures to be observed in fitting shop.
3. Introduction to common materials used in fitting shop
4. Identification of materials. Such as Steel, Brass, Copper, Aluminium etc.
5. Identification of various sections of steel such as Flat, Angle, Tee, Channel, Bar Girder, Square, Z- Section, etc.
6. Demonstration of various types of work benches, holding devices.

UNIT II WELDING SHOP

1. Demonstration, function and use of commonly used tools.
2. Care, maintenance of tools and safety measures to be observed in welding shop.
3. Introduction to welding and its importance in engineering practice
4. Introduction to welding equipment and safety precautions during hazards of welding and its remedies.
5. Practice in setting current and voltage for striking proper arc. Earthing of welding machine.

UNIT III SHEET METAL SHOP

1. Demonstration, function and use of commonly used tools.
2. Care, maintenance of tools and safety measures to be observed in sheet metal shop.
3. Demonstration of various machines and equipment used in sheet metal shop.
4. Demonstration of various raw materials used in sheet metal.

UNIT IV SMITHY SHOP

1. Demonstration, function and use of commonly used tools.
2. Care, maintenance of tools and safety measures to be observed in smithy shop.
3. Forging operations in smithy shop. Safety measures to be observed in the smithy shop.
4. Demonstration and description of bending operation, upsetting operation.
5. Description and specification of anvils, swage blocks, hammers etc.

6. Demonstration and description of tongs, fullers, swages etc.

References Books:

1 Workshop Technology I,II,III, by S K Hajra, Choudhary and A K Chaoudhary; Media Promoters and Publishers Pvt. Ltd., Bombay
2 Workshop Technology by Manchanda Vol. I,II,III; India Publishing House, Jalandhar.
3 Manual on Workshop Practice by K Venkata Reddy, KL Narayana et al; MacMillan India Ltd. New Delhi
4 Basic Workshop Practice Manual by T Jeyapoovan; Vikas Publishing House (P) Ltd., New Delhi [R5] Workshop Technology by B.S. Raghuwansh;,Dhanpat Rai and Co., New Delh
5 Workshop Technology by HS Bawa; Tata McGraw Hill Publishers, New Delhi

(BVBG003) Information Technology Workshop

Theory & Practical

Note: Explanation of Introductory part and theory should be merged with practical work. Following topics may be explained in the laboratory along with the practical exercises.

UNIT I. Computer Organization & OS: User perspective.

- Concept and scope, applications of IT, ethics and future with information technology
- Impact of computer and IT in society
- Understanding of Hardware.
- Basics of Operating System.

UNIT II. Networking and Internet.

- Practice of Internet surfing and its Applications
- Log-in to internet, introduction to search engine
- Browsing and down loading of information from internet
- Creating e-Mail Account, Log in to e-mail account and Log out from e-mail account
- Managing e-Mail- Creating, Sending, receiving, forwarding, deleting, attaching a file
- Network Security tools and services.
- Cyber Security.
- Safe practices on Social networking.

UNIT III. Office automation tools:

- Spreadsheet.
- Word processing.
- Presentation.

UNIT IV. Antivirus

- Antivirus- installation & scanning of corrupted files
- What is virus and its types
- Problems due to virus
- Installation and updation of antivirus (anyone out of Kaspersky,
- Mcafee, Norton, Quickheal etc).

- How to scan and remove the virus

UNIT V. Introduction to programming

- Introduction to programming- "C/C++
- Development of C, starting with C- alphabets, digits, special symbols
- Constants, variables and special symbols, Instructions
- Study of C- pre-processor features
- Study of structures- case control structures, loops control structures and decision control structures
- Study of input output functions, types of functions
- Study of file concept- opening, reading, closing, writing etc
- Study and use of concept of pointers
- Study the concept of arrays

References Books:

1. Fundamentals of Computer by E. Balagurusamy, Tata McGraw Hill Education Pvt. Ltd, New Delhi
2. Fundamentals of Computer by V Rajaraman; Prentice Hall of India Pvt. Ltd., New Delhi
3. Computer Fundamentals by PK Sinha; BPB Publication, New Delhi
4. MS Office by BPB Publications, New Delhi
5. Internet for Every One by Alexis Leon and Mathews Leon; Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi
6.C by Byron Gottfried, Schaum's outline series, McGraw Hill Education series.
7. Programming in ANSI C by E. Balaguswamy, McGraw Hill Education series

(BVBG004) Basic Engineering Drawing

Theory & Practical

Note: Explanation of Introductory part and theory should be merged with practical work. Following topics may be explained in the laboratory along with the practical exercises.

UNIT 1: Introduction to Engineering Drawing

Principles of Engineering Drawing and their significance, usage of Drawing instruments, Sizes and layout of standard drawing sheets, Sizes of drawing boards, drafting table/board, Different types of Lines and Free Hand Sketching, Different types of lines in engineering drawing as per BIS specifications, Lettering, Conic sections including the Rectangular Hyperbola (General method only); Cycloid, Epicycloid, Hypocycloid and Involute; Scales – Plain, Diagonal and Vernier Scales;

UNIT 2: Orthographic Projections

Principles of Orthographic Projections-Conventions - Projections of Points and lines inclined to both planes; Projections of planes inclined Planes - Auxiliary Planes;

UNIT 3: Projections of Regular Solids

those inclined to both the Planes- Auxiliary Views; Draw simple annotation, dimensioning and scale. Floor plans that include: windows, doors, and fixtures such as WC, bath, sink, shower, etc.

UNIT 4:Sections and Sectional Views of Right Angular Solids

Prism, Cylinder, Pyramid, Cone – Auxiliary Views; Development of surfaces of Right Regular Solids - Prism, Pyramid, Cylinder and Cone; Draw the sectional orthographic views of geometrical solids, objects from industry and dwellings (foundation to slab only).

UNIT 5: Isometric Projections
Principles of Isometric projection – Isometric Scale, Isometric Views, Conventions; Isometric Views of lines, Planes, Simple and compound Solids; Conversion of Isometric Views to Orthographic Views and Vice-versa, Conventions.

References Books:
1. ND Bhatt, V.M. Panchal, Engineering Drawing-Planes & Solid Geometry", Charotar publishing house Principles of Building Drawing by MG Shah and CM Kale, MacMillan, Delhi
2. Zaidi, SKA and Siddiqui, Suhail; "Drawing and Design of Residential and Commercial Buildings", Standard Publishers and Distributors, Delhi.
3. Surjit Singh, "Engineering Drawing: A Text Book of Engineering Drawing, Dhanpat Rai & Co.

(BVBG005) Engineering Drawing with AutoCAD

Theory and Practical

Note: Explanation of Introductory part and theory should be merged with practical work. Following topics may be explained in the laboratory along with the practical exercises.

UNIT 1: Overview of Computer Graphics
Listing the computer technologies that impact on graphical communication, Demonstrating knowledge of the theory of CAD software such as: The Menu System, Toolbars (Standard, Object Properties, Draw, Modify and Dimension), Drawing Area (Background, Crosshairs, Coordinate System), Dialog boxes and windows, Shortcut menus (Button Bars), The Command Line (where applicable), The Status Bar, Different methods of zoom as used in CAD, Select and erase objects.; Isometric Views of lines, Planes, Simple and compound Solids.

UNIT 2: Customisation & CAD Drawing
Set up of the drawing page and the printer, including scale settings, Setting up of units and drawing limits; ISO and ANSI standards for coordinate dimensioning and tolerance; Orthographic constraints, Snap to objects manually and automatically; Producing drawings by using various coordinate input entry methods to draw straight lines, Applying various ways of drawing circles.

UNIT 3: Annotations, layering & other functions
Applying dimensions to objects, applying annotations to drawings; Setting up and use of layers, layers to create drawings, Create, edit and use customized layers; Changing line lengths through modifying existing lines (extend/lengthen); Printing documents to paper using the print command; orthographic projection techniques; Drawing sectional views of composite right regular geometric solids and project the true shape of the sectioned surface; Drawing annotation, Computer-aided design (CAD) software modeling of parts and assemblies. Parametric and non-parametric solid, surface, and wireframe models. Part editing and two-dimensional documentation of models. Planar projection theory, including sketching of perspective, isometric, multiview, auxiliary,

and section views. Spatial visualization exercises. Dimensioning guidelines, tolerancing techniques; dimensioning and scale multi views of dwelling;

UNIT 4: Demonstration of a simple team design project that illustrates
Geometry and topology of engineered components: creation of engineering models and their presentation in standard 2D blueprint form and as 3D wire-frame and shaded solids; meshed topologies for engineering analysis and tool-path generation for component manufacture; geometric dimensioning and tolerancing; Use of solid-modeling software for creating associative models at the component and assembly levels; floor plans that include: windows, doors, and fixtures such as WC, bath, sink, shower, etc. Applying colour coding according to building drawing practice; Drawing sectional elevation showing foundation to ceiling.

References:

1. Bhatt N.D., Panchal V.M. & Ingle P.R., (2014), Engineering Drawing, Charotar Publishing House
2. Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education
3. Agrawal B. & Agrawal C. M. (2012), Engineering Graphics, TMH Publication
4. Narayana, K.L. & P Kannaiah (2008), Text book on Engineering Drawing, Scitech Publishers
5. (Corresponding set of) CAD Software Theory and User Manuals.

Courses - Level-5 (Semester-I)

(BVBCT-101-20) Applied Physics

Theory

UNIT-I Units & Dimensions: M.K.S. fundamentals & derived units, S.I. base units supplementary units and derived units, Dimensions of various physical quantities, uses of dimensional analysis.

Surface Tension and Viscosity: molecular forces, molecular theory of surface tension, surface energy, capillary action, concept of viscosity, coefficient of viscosity, principle and construction of viscometers.

UNIT-II Vibrations: Vibration as simple spring mass system, elementary and qualitative concept of free and forced vibrations, resonance. Effects of vibrations on building bridges and machines members.

Heat: Temperature and its measurement, thermoelectric, platinum resistance thermometers and pyrometers. Conduction through compound media and laws of radiations.

UNIT-III Optics: Nature of light, reflection and refraction of a wave from a plane surface. Overhead projector and Epidiascope.

UNIT-IV Centroid and Moment of Inertia: Centroid for regular lamina, centriod of composite figures. Concept of Moment of Inertia and second moment of area and Radius of gyration, theorems of parallel axes, second moment of area of common geometrical sections: rectangle, triangle, circle (without derivations). Second moment of area for I., T. and I sections,

UNIT-V Friction: Types of friction, Laws of static friction, Limiting friction, Angle of friction, angle of repose; motion on horizontal and inclined planes. Methods of reducing friction,

Text and Reference Books :

1. A text book of Optics – Brij Lal and Subramanyam
2. Perspectives of Modern Physics - Arthur Beiser (TMH)
3. Modern Engineering Physics – A.S. Vasudeva (S. Chand)
4. Engineering Physics by R.K. Gaur and S.L. Gupta
5. Engineering Physics by H.K Malik and A.K. Singh (Tata McGraw Hill).
7. Engineering Physics by S.P. Taneja (Chand Pub.)
8. Introduction to Mechanics - MK Verma, CRC Press Book.

(BVBCT-102-20) Applied Mathematics
Theory

UNIT-I Algebra:

Complex Numbers, Quadratic Equations and Linear inequalities, Principle of Mathematical Induction, Permutations and Combinations, Binomial Theorem.Matrices, Determinants, Inverse and rank of a matrix, introduction of null space and kernel, statement of rank-nullity theorem; System of linear equations; Symmetric, skew-symmetric and orthogonal matrices; Determinants; Eigenvalues and eigenvectors; Similar matrices; Diagonalization of matrices; Cayley-Hamilton Theorem.

UNIT-II Calculus:
Limits and Continuity, Differentiation, Differentiation of Trigonometric functions, Differentiation of Exponential and Logarithmic functions, Application of Derivatives, Partial Differentiation & its Applications: Functions of two or more variables; partial derivatives, Euler's theorem, Taylor's series for functions of two variables, maxima-minima of function of two variables.

Integration, Definite Integrals, Differential Equations, Evaluation of definite and Improper integrals; Applications of Single & Multiple Integration: Applications of single integration to find volume of solids and surface area of solids of revolution. Double integral, change of order of integration, Double integral in polar coordinates, Applications of double integral to find area enclosed by plane curves and volume of solids of revolution.

UNIT-III Partial Differential Equations: First order:

First order partial differential equations, solutions of first order linear and non-linear PDEs. Solution to homogenous and non-homogenous linear partial differential equations second and higher order by complimentary function and particular integral method.

UNIT-IV Co-ordinate Geometry

Cartesian System of Rectangular Co-ordinates, Straight Lines, Circles, Conic Sections

UNIT-V Statistics and Probability
Measures of Dispersion, Random Experiments and Events, Probability

Text and Reference Books:
1. Advanced Engineering Mathematics : F. Kreyszig.
2. Higher Engineering Mathematics : B.S. Grewal.
3. Engineering Mathematics Part-I : S.S. Sastry.
4. Differential and Integral Calculus : Piskunov.
5. Advanced Engineering Mathematics : R.K. Jain and S.R.K.Iyengar
6. Advanced Engg. Mathematics : Michael D. Greenberg

(BVBCT-103-20) Applied Chemistry

Theory:

UNIT-1 Structure of Atom:

Rutherford model of the structure of atom, Bohr's theory of electrons, quantum numbers and their significance, de-Broglie equation and uncertainty principle, electronic configuration of 1 to 30 elements

Periodic Properties of Elements:

Periodic law, periodic table, periodicity in properties like atomic radii and volume, ionic radii, ionization energy and electron affinity, Division of elements into s, p, d and f blocks

UNIT-II Chemical Bonds:

Electrovalent, covalent and coordinate bond and their properties, Metallic bonding (electron cloud mode) and properties (like texture, conductance, luster, ductility and malleability).

UNIT-III Fuel and their Classification:

Definition, characteristics, classification into solid, liquid and gaseous fuel,. Petroleum and brief idea of refining into various factions and their characteristics and uses, Calorific value of fuel, Gaseous fuels-preparation, properties, composition and use of producer gas, water and oil gas, Natural gas: Natural gas treatment processes; Natural gas liquids; Properties of natural gas.

Unit-IV Water:

Impurities in water, methods of their removal, hardness of water, its types, causes and removal, disadvantages of hard water in boilers, pH value and its determination by calorimetric method. alkalinity of water and its determination, water softening

Corrosion: Its meaning, theory of corrosion, prevention of corrosion by various methods using metallic and non-metallic coatings.

UNIT V Plastic and Polymers:

Plastic-thermo-plastic and thermo-setting, Introduction of Polythene. P.V.C. Nylon, synthetic rubber and phenol-formal-dehyde resin, their application in industry. composite materials & their classification, constituents of composites, role of interface in composite performance and durability, fiber –Reinforced composite, advantage and applications of composite

Text and Reference Books:

1. Physical Chemistry, P.W. Atkins (ELBS, Oxford Press).
2. Physical Chemistry, W.J. Moore (Orient-Longman).
3. Instrumental methods of Chemical Analysis, MERITT & WILLARD (East-West Press).
4. Chemistry in Engineering & Tech., Vol.I& II, Rajaram, Kuriacose (TMH)
5. Engineering Chemistry,ShashiChawla (DhanpatRai and co.)
6. Engineering Chemistry, P.C. Jain, Monica Jain (DhanpatRai& Co.).
7. Engineering chemistry, S.S Dara (S.chand&co.)

(BVBCT-104-20) Communication Skills

Theory

UNIT-I

Recognizing and Understanding Communication Styles: What is Communication?, Passive Communication, Aggressive Communication, Passive-Aggressive Communication, Assertive Communication, Verbal and Non Verbal Communication, Barriers and Gateways to Communication.

UNIT-II

Listening Skills: Types of Listening (theory /definition), Tips for Effective Listening Academic Listening- (lecturing), Listening to Talks and Presentations, Basics of Telephone communication

Writing Skills: Standard Business letter, Report writing, Email drafting and Etiquettes, Preparing Agenda and writing minutes for meetings, Making notes on Business conversations, Effective use of SMS, Case writing and Documentation.

UNIT-III

Soft Skills: Empathy (Understanding of someone else point of view), Intrapersonal skills, Interpersonal skills, Negotiation skills, Cultural Aspects of Communication.

UNIT-IV

Group Communication: The Basics of Group Dynamics, Group Interaction and Communication, How to Be Effective in Groups, Handling Miscommunication, Handling Disagreements and Conflicts, Constructive Criticism.

Text and reference Books:

1 Mckay, M., Davis, M. & Fanning, P.(2008). Messages: The Communication Skills Book, New Harbinger Publications

2 Perkins, P.S., & Brown, L. (2008). The Art and Science of Communication: Tools for effective communication in the workplace, John Wiley and Sons

3 Krizan et al (2010). Effective Business Communication, Cengage Learning.

4 Scot, O. (2009). Contemporary Business Communication, Biztantra, New Delhi.

5 Chaney & Martin (2009). Intercultural Business Communication, Pearson Education

6 Penrose et al (2009). Business Communication for Managers, Cengage Learning.

(BVBCT-105-20) Applied Physics Lab

1. To determine the surface tension of a liquid by rise in capillary.
2. To determine the viscosity of a given liquid.
3. To determine the frequency of tuning fork using a sonometer.
4. To determine the frequency of AC main using sonometer.
5. To determine the time period of a cantilever.
6. To find the coefficient of thermal conductivity of a good conductor by Searle's method.
7. To determine the coefficient of thermal conductivity of a bad conductor by Lee and Charlton method.
8. To find the resolving power of a telescope.
9. To find the refractive index and Cauchy's constants of a prism by using spectrometer.
10. To find the wavelength of various colours of white light with the help of a plane transmission diffraction grating.

(BVBCT-106-20) Applied Chemistry Lab

1. Proximate analysis of solid fuel.
2. Experiments based on Bomb Calorimeter.
3. Determination of turbidity in a given sample.
4. To determine the flash and fire point of a given lubricating oil.
5. To determine the viscosity of a given lubricating oil by Redwood viscometer.
6. To determine cloud and pour point of a given oil.
7. Determination of Ca++ and Mg++ hardness of water sample using EDTA solution.
8. Determination of alkalinity of water sample.
9. Determination of strength of HCl solution by titrating it against NaOH solution conductometrically.
10. To determine amount of sodium and potassium in a given water sample byflame photometer

(BVBCT-107-20) Communication Lab

Listening and Speaking
The audio CD shall be played in the lab to get the students familiar with the standard spoken English. The teacher shall help them in the following:
a) With the accent of the speaker if it is unfamiliar to them.
b) The Standard English sounds and pronunciation of words.
c) With the topical vocabulary and the idiomatic expressions which are generally part of colloquial speech.
d) With the implied relationships in larger texts, if they are not stated explicitly.

In addition to the above, extended listening sessions shall be arranged to promote speaking activities among students. The teachers shall play the CDs selectively in the lab and involve the students in the practice work based on them. While taking up lessons, the teacher must promote the use of dictionaries for correct pronunciation and give ample practice on word stress and weak forms.

The students are also supposed to supplement their listening practice by regularly viewing news/knowledge channels on the TV or lecture videos on the internet.

The teacher may use following different classroom techniques to give practice and monitor the progress of the students:
Role play, question-answer discussion, presentation of papers, seminars, Telephonic Conversation, Exchange of Greetings, Interview, Group Discussion, Extempore, Listening Practice Skills

Tools: A set of twin books K. Sadanand and S. Punitha Spoken English Part I and II, A Foundation Course (with audio CD), Orient Blackswan, is prescribed for use.

(BVBCT-108-20) Civil Workshop training

Practical

MASONRY SHOP

1. Demonstration, function and use of commonly used tools.
2. Care, maintenance of tools and safety measures to be observed in Plumbing shop.
3. Preparation of mortar and cement concrete
4. Importance of form work and material used in form work
5. Slab, lintel & sunshade, column & footing and beam reinforcement
6. Differentiate and demonstrate steel reinforcement bars of different diameters (plain bar, ribbed, tor steel etc.)

PLUMBING & SANITATION

1. Demonstration, function and use of commonly used tools. Necessity of plumbing, Technical terms used
2. Care, maintenance of tools and safety measures to be observed in Plumbing shop.
3. GI pipe marking, threading, cutting and jointing
4. PVC pipe marking, cutting, threading and jointing
5. Use of PPR and their jointing
6. Building services, types of valves and uses
7. Water meter connection, water closets, flush tanks
8. Field visit

CARPENTRY SHOP

1. Demonstration, function and use of commonly used hand tools.
2. Care, maintenance of tools and safety measures to be observed in carpentry shop.
3. Introduction to various types of wood such as Deodar, Kail, Partal, Teak, Mango, Sheesham, etc. (Demonstration and their identification).
4. Marking, sawing, planning and chiseling & their practice (size should be mentioned)
5. Introduction to various types of wooden joints, their relative advantages and uses.

PAINTING SHOP

1. Demonstration, function and use of commonly used tools.
2. Care, maintenance of tools and safety measures to be observed in painting shop.
3. Demonstration of various types of paints used
4. Methods of painting walls, wooden items
5. Preparation of walls, wooden surface before painting including primer coating.

ELECTRICAL SHOP

1. Demonstration, function and use of commonly used tools.
2. Care, maintenance of tools and safety measures to be observed in Electrical shop.
3. Familiarization with various electrical tools and safety measures
4. Study of various types of wirings: conduit/concealed/batten etc
5. Study of distribution boards
6. Various types of faults in house wiring

References Books:

1. Workshop Technology I, II,III, by S K Hajra, Choudhary and A K

Chaoudhary; Media Promoters and Publishers Pvt. Ltd., Bombay
2. Workshop Technology by Manchanda Vol. I, II, III; India Publishing House, Jalandhar.
3. Manual on Workshop Practice by K Venkata Reddy, KL Narayana et al; MacMillan India Ltd. New Delhi
4. Basic Workshop Practice Manual by T Jeyapoovan; Vikas Publishing House (P) Ltd., New Delhi
5. Workshop Technology by B.S. Raghuwansh;,Dhanpat Rai and Co., New Delhi
6. Workshop Technology by HS Bawa; Tata McGraw Hill Publishers, New Delhi

Regular courses - Level-5 (Semester-II)

(BVCT-201-20) Construction Material

Theory

UNIT-I:

Building Stones: Classification of Rocks, Geological classification: Igneous, sedimentary and metamorphic rocks. Chemical classification: Calcareous, argillaceous and siliceous rocks. Physical classification: Un-stratified, stratified and foliated rocks; Requirements of good building stones, testing & identification of common building stones and their uses.

Bricks and Tiles: Introduction to bricks, Raw materials for brick manufacturing and properties of good brick making earth, Classification of bricks as per IS: 1077, Testing of common building bricks as per IS: 3495. Compressive strength, water absorption, efflorescence test, Dimensional tolerance test. Types and use of- tiles for wall, roofing & flooring; ceramic tiles; Hollow masonry blocks; Fly ash bricks.

UNIT-II:

Cement: Introduction, raw materials, manufacturing of ordinary Portland cement, flow diagram for wet and dry process. Properties and uses of ordinary Portland cement. Special cements and their uses. Storage of cement.

Lime: Introduction: Lime as one of the cementing materials. Definition of terms; quick lime, fat lime, hydraulic lime, hydrated lime, lump lime. Calcinations and slaking of lime IS classification of lime. Definition- Properties and uses of Mortar. Types of mortar, cement & lime Mortar, Preparation of cement Mortar.

UNIT III

Timber and wood based products: Identification of different types of timber: Teak, Deodar, Shisham, Sal, Mango. Market forms of converted timber as per IS. Seasoning of timber: purpose, methods of seasoning. Defects and decay in timber, Preservation of timber and methods of treatment, Properties and specifications of structural timber. Other wood based products, their brief description of manufacture and uses: Lamina board, Black board, fiber board. Hard board and gypsum board.

Steel: Manufacture of steel, market forms of steel e.g. mild steel and HYSD steel bars, rolled steel sections.

UNIT-IV

Concrete: constituents of concrete, important properties of concrete both in plastic state and hardened state, brief idea about- various stages of preparation of concrete, workability of concrete and Methods to determine workability, Reinforced cement concrete, shotcrete, lightweight & heavyweight concrete, Ready- mixed concrete, fibre reinforced concrete and pre-stressed concrete.

UNIT- V:

Miscellaneous Materials: Paints- Purpose, Types, ingredients, properties and uses of oil paints, water paints and Cement paints. Varnishes- Types, properties and uses of varnishes, Trade name of different products. Metals: - uses of ferrous and non- ferrous metals, Commercial forms of ferrous and non-ferrous metals. Plastics – Introduction and uses of various plastic products in buildings such as doors, water tanks and PVC

pipes. Types uses and application of- Fiber Sheets, sound and heat insulating materials, Materials used in interior decoration works like POP, Water proofing compounds, fire resisting materials.

Text and reference Book(s):

1. Surendra Singh; “Engineering Materials; “New Delhi”. Vikas Publishing House Pvt. Ltd.
2. TTTI, Chandigarh “Civil Engineering Materials; “Tata McGraw Hill.
3. M.L.Gambhir and Neha Jamwal, “Building Materials”, Tata McGraw Hill.
4. Building Materials, P.C.Varghese, PHI Publications
5. Engineering materials S.C. Rangwala, Charotar Publishing House
6. Building Materials, Duggal, New Age Publication
7. Kulkarni, GJ; “Engineering Materials; “Ahmedabad, Ahmedabad Book Depot.

(BVCT- 202-20) Construction planning and scheduling

Unit-1

Introduction to methods of planning and scheduling, Work Break Down Structures.
Bar charts and Milestone Charts – Development of Bar charts – Shortcomings – Remedial measures – Milestone charts.

Unit-2

PERT- Elements of Networks – Event, Activity, and Dummy Activity – Guidelines for the construction of the network – Development of PERT network – Numbering - Fulkerson's rule - Skip numbering.

Unit-3

Time estimates – Optimistic, Pessimistic and Most likely time estimates – Earliest Expected time and Latest Allowable Occurrence time. Critical Path – Slack – Identification of Critical Path – Probability of Completion of projects.

Unit-4

CPM – Construction of network – Earliest Possible Occurrence time and Latest Possible Occurrence time – Start and Finish times of activities – Floats – Identification of Critical Path using floats.
Cost Time Optimization – Direct and Indirect project costs – Total costs – Cost Slopes – Crashing - Cost and Time Optimization.

Unit-5

Updating – Importance of updating – Process of updating – Updating Cycle and Updated networks. Resource allocation – Resources – Usage profiles – Histograms – Resource Smoothing – Resource leveling.

Reference Books

1. PERT and CPM – BC Punmia and KK Khandelwal
2. PERT and CPM – LS Srinath.
3. A management guide to PERT/CPM by Wiest Levy, PHI Publications

4. Feigenbaum .L, Construction Scheduling with Primavera Project Planner, Prentice Hall Inc., 2009. 4. Prasanna Chandra, "Project Planning, Analysis, Selection, Implementation and review", Tata Mcgraw Hill ,2009.
5. Chitkara, K.K "Construction Project Management: Planning Scheduling and control", Tata McGraw-Hill Publishing Company, New Delhi- 2008.

(BVBCT- 202-20**) Estimating and costing**

Theory

UNIT-I

Introduction to quantity surveying/ estimating and its importance. Types of estimates; - Preliminary estimates, Plinth area estimate, Cubic rate estimate and Estimate per unit base. Detailed estimates- Definition- Stages of preparation – details of measurement and calculation of quantities and abstract. Units of measurement for various items of work as per BIS:1200. Rules for measurements. Different methods of taking out quantities – Centre line method and long wall & short wall method. Preparation of detailed estimate complete with detailed reports, specifications, abstract of cost and material requirement statements for a small residential building with flat roof.

UNIT-II:

Analysis of rates: Detailed specifications of different types of building works from excavation to foundations, superstructure and finishing operation.

A. Steps in the analysis of rates for any item of work: Requirement of materials, labour, sundries, water charges and contractor's profit.

B. Calculation of quantities of materials for:

a. Cement mortars of different proportion

b. Cement concrete of different proportion

c. Brick/stone masonry in cement mortar

d. Plastering and pointing

e. White washing, painting

f. R.C.C. work in slab, beams.

C. Analysis of Rates- Steps involved in the analysis of rates. Requirement of material, labour, sundries, contractor's profit and overheads.

D. Running and maintenance cost of construction equipment.

UNIT-III:

Contracting: Meaning of contract, Qualities of a good contractor, Essentials of a contract, Types of contracts, their advantages, disadvantages and suitability, system of payment. Single and two cover-bids; tender, tender forms and documents, tender notice, submission of tender and deposit of earnest money, security deposit, retention money, maintenance period. Types of contracting firms/ construction companies. Introduction to CSR and calculation of cost based on premium on Common Schedule Rates (CSR).

UNIT-IV

Billing: Measurement of work for payment of contractors and suppliers. Type of Measurement book, Maintenance of measurement book. Types of payments: First, running, advance, first & final and final payment.

Valuation: Purpose of valuation, principles of valuation, Definition of various terms related to valuation like depreciation, sinking fund, salvage and scrap value, market value, fair rent, year's purchase etc. Methods of valuation (i) replacement cost method (ii) rental return method .

Text and Reference Books:

1 B. N. Dutta- Estimating and costing in Civil Engg, UPSPD.
2 M .Chakraborty, “Estimating costing and Specifications in Civil Engg”, Jain Book Depot
3 D.S.R. [Detailed Schedule Rates] C.P.W.D
4 PWD Account Code
5 Samuelson and Nardhaus-Economics, Mc Graw Hill
6 ‘Text book of Estimating and Costing’ by G.S.Birdie
7 ‘Civil Engineering Building Drawing’ by Gurucharan Singh

(BVCT-203-20) Principles of construction management

Unit-1

Introduction, History of Construction Management, Functions and Responsibilities of Construction Manager, Future of Construction Management. Major problems in Construction Industry

Unit-2
Decision Making in Construction Industry – Benefit-Cost Analysis, Replacement Analysis, Break Even Analysis.

Unit-3
Project Cost and Value Management – Cost Planning, Cost Budgeting, Cost Controlling. Fundamentals of Value Engineering, Application of Value Engineering to Construction Industry.

Unit-4
Concept and importance of Safety in Construction Industry, Unsafe Conditions and Unsafe Acts, Safety Benefits to Employers, Employees and Customers, Construction Safety Problems, Approaches to improve Construction Safety.

Unit-5

Project Monitoring and Control Systems, Communication Systems, Cost and Progress Control, Fundamentals and Significance of Management Information Systems, Application of Management Information Systems in Construction Industry.

Reference Books

1. Construction Management and Practice. Raina, C.M. Tata McGraw-Hill,
2. Construction Management by Williams, Cengage publishing Pvt Ltd
3. Construction Project Management, K N Jha, Pearson publications

(BVCT-204-20) Construction planning Lab.

EXPERIMENT I-MS EXCEL Quantity takeoff by using MS EXCEL
- Estimation of Quantities stage wise
–Carryout the rate analysis and costing for different stages of work
- Preparation and delivery of the bid or proposal of an engineering construction project.

EXPERIMENT II Preparation of Planning and Scheduling by using MS PROJECT - scheduling for a small construction project
- Allocation of resource
- Tracking of a Project-Cost analysis
- Reports preparation.

EXPERIMENT III Preparation of Planning and Scheduling by using PRIMAVERA - scheduling for a small construction project
- Allocation of resource-
Tracking of a Project-
Cost analysis-
Reports preparation.

LIST OF EQUIPMENTS / SOFTWARES / TOOLS REQUIREMENTS
1. MS OFFICE
2. MS PROJECT
3. PRIMAVERA

(BVBCT-206-20) Estimating and Costing Lab.

List of Activities:

A. Detailed estimate for building taking of quantities for all items of works in the following types of building:

1) A small residential building with two / three rooms with RCC roofs.
2) Two storied building (frame structure) with RCC roofs.
3) Cottages with sloped RCC roofs.
4) Industrial buildings with AC / GI sheet roof with steel trusses.
5) Community hall with columns and T-Beams.
6) Open well with masonry steining.
7) Septic tanks with dispersion trench / soak pit.
8) R.C.C. slab culvert.
9) Pipe culvert
10) Water bound Macadam Road
11) Rain water systems in the buildings

a. Shallow well, b. Percolation Pit with bore.

B. Rate analysis for following item of works.

a. Brick work for super structures.
b. PCC work for footing.
c. RCC work for beam. Column and slabs.
d. Plaster work
e. White/ Colour washing

C. Taking out quantities for embankment and canals

(BVCT-205-20) Construction Materials Lab.

1. Students will do the market survey of below mentioned construction materials and products and prepare a report on types, rates, use, measurement and other specifications, etc.
   - Bricks. Hollow blocks, etc., Tiles- Flooring tiles and clay roofing tiles, Terra Cotta-earthen ware, stone ware, S.W. pipes, water closets gully traps & glazed earthen tiles.
   - Cement - ordinary Portland, quick setting cement & other special cement, Lime: Hydraulic lime, & limes.
   - Stones - Coarse aggregate and fine aggregate, Brick ballast & surkhi, marble, granite, etc
   - Marketable forms of various types timber available in market, Various preservatives of timber available in market, Timber allied products such as plywood, hard board, block board, and sunmica.
   - Hardware - such as screws, nails, bolts & nuts, hinges for door fitting, door closer and stoppers.
   - Sound insulating material available in the local Market, Fire proofing materials available in the local market, Dam proofing materials available in the local market, use of damp proofing chemical.
2. Brick – Stacking of bricks, counting of bricks
3. Field tests of bricks such as for texture, dimensions, water absorption, colour & efflorescence, etc
4. Field tests of cement - texture, touch and feel, colour, etc.
5. Field tests of steel - unit weight, dimensions, visual inspection, etc
6. Field visits for demonstration of application or use of construction materials.

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