

**LEARNING OUTCOME BASED VOCATIONAL CURRICULUM**

**CLASS 11 & 12**

**SECTOR:  
CONSTRUCTION**

**JOB ROLE**

**DRAUGHTSMAN**

**(QUALIFICATION PACK: REF. ID. CON/Q1301)**



**State Council of Educational Research & Training (SCERT) Kerala**  
(Department of General Education, Government of Kerala)  
Vidhya Bhavan, Poojappura, Thiruvananthapuram





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[www.scert.kerala.gov.in](http://www.scert.kerala.gov.in)



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VOCATIONAL CURRICULUM**

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## FOREWORD

A collaborative initiative for developing learning outcome based vocational curriculum and courseware aimed at integrating both vocational and general qualifications has been implemented by the State Council of Educational Research and Training (SCERT) Kerala and the PSSCIVE Bhopal. This is intended to open up pathways of career progression for students and the SCERT Kerala is developing curricula under the project as an integral part of Vocationalisation of Education under Samagra Shiksha, approved by the Government of Kerala. Decisive improvement in the teaching-learning process and working competencies through learning outcomes that have been judiciously embedded in the vocational subject is expected to be the major impact that will be brought about by the learning outcome based vocational curriculum.

It is a matter of great pleasure to introduce this learning outcome based vocational curriculum as part of the vocational training package for the job role of Draughtsman (CON/Q1301). The curriculum has been developed for the higher secondary students of vocational education and is aligned to the National Occupation Standards (NOSs) of a job role identified and approved under the National Skill Qualification Framework (NSQF).

The key aim of the curriculum will be to provide children with employability and vocational skills that would in turn aid occupational mobility and lifelong learning. A major transformation in the teaching process is also aimed at, which will be brought about through interactive sessions in classrooms, practical activities in laboratories and workshops, projects, field visits, and professional experiences.

The curriculum has been meticulously developed and judiciously reviewed by a group of experts and their much-valued contributions are immensely acknowledged. The imminent utility of the curriculum will without doubt, be adjudged by the qualitative improvement that it brings about in teaching-learning. The feedback and suggestions on the content by the teachers and other stakeholders will be of immense value to us in bringing about further enhancement and augmentation to this document.

**Dr. J Prasad**  
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We are extremely thankful to Dr. RVG Menon, Chairperson, High Power Committee for the implementation of NSQF in Kerala, Dr. Sukesh Kumar, Former Principal, Government Engineering College Palakkad and Sri. G S Unnikrishnan Nair, Former Director State Agricultural Management and Extension Training Institute (SAMETI), Thiruvananthapuram for their mentorship in the process of developing this document. The contributions made by Dr. Vinay Swarup Mehrotra, Professor and Head, Curriculum Development and Evaluation Centre (CDEC), PSSCIVE Bhopal in development of the curriculum are duly acknowledged.

We are grateful to the experts for their earnest efforts and contributions in the development of this learning outcome based vocational curriculum. Their names are acknowledged in the list of contributors.

We are grateful to the Vocational Higher Secondary wing of the Directorate of General Education (DGE) Kerala for extending the support to develop this curriculum document on time by providing the service of its teaching staff.



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## **1. COURSE OVERVIEW**

### **COURSE TITLE: DRAUGHTSMAN**

#### **GENERAL OBJECTIVES**

On successful completion of this course, the learners are expected to;

- develop skill in interpreting the technical requirements and produce drawings that are essential for various construction projects.
- develop professional skill in the operation of drafting software used in civil drawings.
- read and interpret topographical maps and contours.
- understand technical terms, symbols and legends used in civil drafting.
- develop skill in computation of dimensions and other details required for drawings.
- plan and organise the work to get the expected outcome.
- develop competency for vertical mobility in professional as well as other streams of higher studies.
- acquire drafting skill for employment both in Government and Private sectors in addition to self employment.

#### **COURSE OUTCOMES**

On completion of the course, students should be able to;

- apply effective oral and written communication skills to interact with people and customers;
- identify the principal components of a computer system;
- demonstrate the basic skills of using computer;
- demonstrate self-management skills;
- demonstrate the ability to provide a self-analysis in context of entrepreneurial skills and abilities;
- demonstrate the knowledge of the importance of green skills in meeting the challenges of sustainable development and environment protection;
- identify the basic concepts of Civil Engineering;
- develop different types of views -plans, section, elevation (solids), orthographic view;
- read and interpret the drawing requirements such as rough sketches, specifications, drawing brief, RFD etc. Provided by designer or architect;
- explain different types of drawings;
- carry out the basic set up and understand the requirements for preparation of drawings;
- explain different types of construction projects;
- prepare two dimensional civil drawings using computer aided design (CAD) system;

- use appropriate methods to save the documents and control virus attack.
- apply safety rules, regulations and security measures at workplace

### COURSE REQUIREMENTS

The learner should have the basic knowledge of science.

### COURSE DURATION: 600 hrs

Class 11	300hrs
Class 12	300hrs
<b>Total</b>	<b>600 hrs</b>

## 2. SCHEME OF UNITS

*The unit-wise distribution of hours and scores for Class 11 is as follows:*

CLASS 11			
	Units	No. of Hours for Theory and Practical = 300	Max. scores for Theory and Practical =100
<b>Part A</b>	<b>Employability Skills</b>		
1.	Communication Skills – III	25	<b>10</b>
2.	Self-management Skills – III	25	
3.	Information and Communication Technology Skills – III	20	
4.	Entrepreneurial Skills – III	25	
5.	Green Skills – III	15	
	<b>Total</b>	<b>110</b>	<b>10</b>
<b>Part B</b>	<b>Vocational Skills</b>		
6.	Basics of Civil Engineering	43	<b>40</b>
7.	Introduction to Drafting	23	
8.	Drafting Inputs	15	
9.	Types of Drawings	34	
10.	Introduction to CAD	50	
	<b>Total</b>	<b>165</b>	<b>40</b>
<b>Part C</b>	<b>Practical Work</b>		
	Practical Examination	06	15
	Written Test	01	10
	Viva Voce	03	10
	<b>Total</b>	<b>10</b>	<b>35</b>
<b>Part D</b>	<b>Project Work/Field Visit/ OJT</b>		
	Practical File/Student Portfolio	10	10
	Viva Voce	05	05
	<b>Total</b>	<b>15</b>	<b>15</b>
	<b>Grand Total</b>	<b>300</b>	<b>100</b>

The unit-wise distribution of hours and scores for Class 12 is as follows:

CLASS 12			
	Units	No. of Hours for Theory and Practical =300	Max. scores for Theory and Practical = 100
<b>Part A</b>	<b>Employability Skills</b>		
1.	Communication Skills – IV	25	<b>10</b>
2.	Self-management Skills – IV	25	
3.	Information and Communication Technology Skills – IV	20	
4.	Entrepreneurial Skills – IV	25	
5.	Green Skills – IV	15	
	<b>Total</b>	<b>110</b>	<b>10</b>
<b>Part B</b>	<b>Vocational Skills</b>		
6.	Types of Construction Projects	46	<b>40</b>
7.	Drafting Using CAD Software	109	
8.	Virus Protection and General Safety	10	
	<b>Total</b>	<b>165</b>	<b>40</b>
<b>Part C</b>	<b>Practical Work</b>		
	Practical Examination	06	15
	Written Test	01	10
	Viva Voce	03	10
	<b>Total</b>	<b>10</b>	<b>35</b>
<b>Part D</b>	<b>Project Work/Field Visit/OJT</b>		
	Practical File/Student Portfolio	10	10
	Viva Voce	05	05
	<b>Total</b>	<b>15</b>	<b>15</b>
	<b>Grand Total</b>	<b>300</b>	<b>100</b>

### 3. LEARNING OUTCOME BASED ACTIVITIES

Classroom, Laboratory/workshop and field are the key spots where teaching and learning take place. Classroom and laboratory-based teaching and learning facilitate knowledge creation whereas field visits open venues for free interaction with experts and also helps acquaint learners with various tools, materials, equipment procedures and operations in the workplace. While considering these intensified ways of knowledge acquisition, emphasis should also be laid on the occupational safety, health and hygiene of the participants.

#### Classroom activities

Classroom activities are mainly interactive lecture sessions, followed by discussions and doubt clarifications. Classes are handled by trained vocational teachers and this is considered as an integral part of the course. The most attractive feature of the class is that the classes are in tune with the outcome-based curriculum. Teaching learning processes are well planned and implemented.

Teaching learning materials such as audio-visual materials, colour slides, charts, diagrams, models, exhibits, handouts, on-line teaching materials etc., have been incorporated in accordance with the topic and this may help the teachers to impart the content in an effective manner.

### **Practical work in Laboratory / Workshop**

Practical work is usually performed to enhance the skills of the learners which are indeed essential for them to become specialized technicians. Practical sessions may include hands on training, simulation training, role-play, case-based studies and exercises. Equipment and other appliances are available for use in abundance. Trained personnel teach and exercise specialized techniques. Practical classes involving laboratory/workshop are well planned with tools, equipment, materials and also other skill acquisition activities. Vocational teachers should submit the plan of laboratory/workshop work in advance to the head of the institution and get it sanctioned prior to use.

### **Field visits/ Educational Tour**

Field visit is one of the ways and means of learning outside the classroom. It promotes knowledge acquisition by giving opportunity to learners to interact with renowned experts and to make observations of the activities performed by them. An observation check list may help the students to ensure the collection of required information and its analysis for further use. This may be developed with the help of vocational teachers who are in charge of outdoor learning activities. All the field visits are well planned by taking into consideration of the learning requirements, distance to travel, time, health and hygiene. The Principal and teachers should plan to implement at least three field visits within a year by making all necessary arrangements.

### **Virtual Field Visits, Expert Interactions and Practical Activities**

With the rapid potentials offered by information technology in digital classrooms, the extent of virtual field visits, online expert interactions and online demonstrations cum practical activities can be worked out. It may be helpful amid the current Covid 19 pandemic scenario. A State level cluster of teachers and experts in the concerned subject can be pooled together for the purpose. The guidelines for such activities can be issued by the concerned SCERTs.

### **Suggested topics for expert interaction**

1. Importance of drafting in Civil Engineering.
2. Preliminary steps of preparation of drawing.
3. Basic concept of surveying and levelling.
4. Building construction.
5. Building bye-laws & Indian and International Codes of practice.

6. Symbols and terms used in civil drawings , fabrication drawings, landscaping , layout drawings and survey maps.
7. Types of drawings.
8. CAD - Introduction to software and basics.
9. Development of two dimensional drawings in CAD software.
10. Types of construction projects and types of drawings required in each.
11. General safety measures and virus protection.

#### **4. ASSESSMENT AND CERTIFICATION**

The National Skill Qualification Framework (NSQF) is based on outcomes rather than inputs referred by the National Occupation Standards (NOSs). Learning outcomes, as per the NSQF level descriptors, include the Process, Professional Knowledge, Professional Skills, Core Skills and Responsibility. Knowledge in the job of a learner shall be the basis of assessment. It would also be considered if the learning program undertaken by the learner has delivered the required output. Certification is based on required standards so that the learner and the employer could come to know about the competency attained in the vocational subject/ course. In order to make the assessment reliable, valid, flexible, convenient, cost effective, fair and transparent standardised assessment tools are to be used. Technology assisted assessment process is in vogue now.

#### **Knowledge Assessment (Theory)**

Knowledge Assessment usually includes two components – Internal Assessment and External Assessment. External assessment includes theory examination conducted by the concerned examination Boards. Tools for assessment contain components for testing the application of knowledge. Knowledge testing can be performed by making use of either objective or short answer type paper-based test. Source of the questions should be the content of the curriculum.

## Written Test

A group, comprising of academicians, experts from existing vocational subject experts / teachers, subject experts from University/ College or from the industry prepare theory question paper for the vocational subjects. A panel of experts for question paper setting and conducting examination should be formed by the respective central / state boards. Written tests allow the learners to demonstrate that they have acquired the necessary knowledge and skill in the given topics.

*The blue print for the question paper may be as follows:*

**Duration: 3 hrs**

**Maximum scores: 50**

	Typology of Question	No. of Questions			Scores
		Very Short Answer (1 Score)	Short Answer (2 Scores)	Long Answer (3 Scores)	
1.	Remembering – (Knowledge based simple recall questions, to know specific facts, terms, concepts, principles, or theories; identify, define or recite, information)	3	3	3	18
2.	Understanding – (Comprehension – to be familiar with meaning and to understand conceptually, interpret, compare, contrast, explain, paraphrase, or interpret information)	2	4	3	19
3.	Application – (Use abstract information in concrete situation, to apply knowledge to new situations: Use given content to interpret a situation, provide an example, or solve a problem)	0	2	1	07
4.	High Order Thinking Skills – (Analysis and Synthesis – Classify, compare, contrast, or differentiate between different pieces of information; Organize and/ or integrate unique pieces of information from a variety of sources)	0	2	0	04
5.	Evaluation – (Appraise, judge, and/or justify the value or worth of a decision or outcome, or to predict outcomes based on values)	0	1	0	02
	<b>Total</b>	<b>5x1=5</b>	<b>12x2=24</b>	<b>7x3=21</b>	<b>50(24 questions)</b>



**Skill Assessment (Practical)**

Skill assessment should be done by considering the practical demonstration of skills by the candidate. It is assessed by making use of a competency checklist prepared by experts. The competency checklist should be developed as per the National Occupation Standards (NOSs). This should be in tune with the qualification pack for the Job Role to ensure necessary consistency in the quality of assessment across different sectors and institutions. As per the performance criteria defined in the National Occupation Standards, the students have to demonstrate their competencies in front of the examiners. Assessment will indicate whether they are competent or incompetent. The assessors assessing the skills of the students should possess enough industrial experience and should have undergone a rigorous training in assessment principles and practices. The Sector Skill Councils (SSCs) should ensure that the assessors are given the required training on the assessment of competencies.

The demonstration of knowledge and skill in performing a task of the learners, is the purpose of the practical examination. This include practical examination where hands on experience will be displayed and a viva voce. A team of two evaluators, one a subject teacher and the other an expert from the relevant industry certified by the relevant Board or SSCs concerned can conduct practical examination as well as viva voce.

**Project Work**

Project is an efficient strategy to assess the practical skills acquired along a certain timeline. Project is chosen and given to candidates only on the basis of their capabilities, because it needs specific skills. It is performed step by step and the first and foremost step is classroom discussion and selection of the topic for the project. After fixing the topic and objectives, the methodology of the project work should be decided during the classroom discussions. Monitoring and evaluation should be done at each stage. Proper feedback shall be provided to the learners for improvement and innovation. Field visits can be organized as part of the project work. The data collected may be used for presentations and report writing. Accuracy of the data is to be ensured. The entire project work is maintained as a practical work file or as student's portfolio.

**Student Portfolio**

It is a document that supports the candidate claim of competencies acquired as a part of the teaching learning process. The student portfolio is a compilation of project reports, articles, photos of products prepared by the student.

## Viva Voce

Viva voce provides chance to each candidate to demonstrate communication skills and content knowledge. It is a way of obtaining feedback on the student's experience, learning, project work and field visit. Audio visual recording of the whole procedure can be done for future reference and documentation. A Board, including external examiners, is constituted as per the norms which in turn should be suitably adapted to the specific requirement of the vocational subjects.

The central/state examination board for secondary education and the respective Sector Skill Councils can certify the competencies of the learner upon the successful completion of the course.

## 5. UNIT CONTENTS

### CLASS 11

#### Part A: Employability Skills

Sl.No.	Units	Duration (hrs)
1.	Communication Skills- III	25
2.	Self-management Skills – III	25
3.	Information and Communication Technology Skills - III	20
4.	Entrepreneurial Skills – III	25
5.	Green Skills – III	15
	<b>Total</b>	<b>110</b>

Unit 1: Communication Skill– III			
Expected Learning Outcome	Theory (10 hrs)	Practical (15 hrs)	Duration (25 hrs)
1. Demonstrate knowledge of various methods of communication	<ul style="list-style-type: none"> <li>➤ Methods of communication</li> <li>• Verbal</li> <li>• Non-verbal</li> <li>• Visual</li> </ul>	<ul style="list-style-type: none"> <li>• Writing pros and cons of written, verbal and non-verbal communication</li> <li>• Listing do's and don'ts for avoiding common body language mistakes</li> </ul>	05
2. Identify specific communication styles	<ul style="list-style-type: none"> <li>➤ Communication styles- assertive, aggressive, passive-aggressive, submissive, etc.</li> </ul>	<ul style="list-style-type: none"> <li>• Observing and sharing communication styles of friends, teachers and family members and adapting the best practices</li> <li>• Roleplays on communication styles.</li> </ul>	10
3. Demonstrate basic writing skills	<ul style="list-style-type: none"> <li>➤ Writing skills to the following:</li> <li>• Sentence</li> <li>• Phrase</li> <li>• Kinds of Sentences</li> <li>• Parts of Sentence</li> <li>• Parts of Speech</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstration and practice of writing sentences and paragraphs on topics related to the subject</li> </ul>	10

	<ul style="list-style-type: none"> <li>Articles</li> <li>Construction of a Paragraph</li> </ul>		
<b>Total</b>			<b>25</b>

<b>Unit 2: Self-Management – III</b>			
<b>Expected Learning Outcome</b>	<b>Theory (10 hrs)</b>	<b>Practical (15 hrs)</b>	<b>Duration (25 hrs)</b>
1. Demonstrate impressive appearance and grooming	<ul style="list-style-type: none"> <li>Describe the importance of dressing appropriately, looking decent and positive body language</li> <li>Describe the term grooming</li> <li>Prepare a personal grooming checklist</li> <li>Describe the techniques of self- exploration</li> </ul>	<ul style="list-style-type: none"> <li>Demonstration of impressive appearance and groomed personality</li> <li>Demonstration of the ability to self-explore</li> </ul>	10
2. Demonstrate team work skills	<ul style="list-style-type: none"> <li>Describe the important factors that influence in team building</li> <li>Describe factors influencing team work</li> </ul>	<ul style="list-style-type: none"> <li>Group discussion on qualities of a good team</li> <li>Group discussion on strategies that are adopted for team building and team work</li> </ul>	10
3. Apply time management strategies and techniques	<ul style="list-style-type: none"> <li>Meaning and importance of time management – setting and prioritizing goals, creating a schedule, making lists of tasks, balancing work and leisure, using different optimization tools to break large tasks into smaller tasks.</li> </ul>	<ul style="list-style-type: none"> <li>Game on time management</li> <li>Checklist preparation</li> <li>To-do-list preparation</li> </ul>	05
<b>Total</b>			<b>25</b>

<b>Unit 3: Information and Communication Technology - III</b>			
<b>Expected Learning Outcome</b>	<b>Theory (08 hrs)</b>	<b>Practical (12 hrs)</b>	<b>Duration (20 hrs)</b>
1. Create a document on word processor	<ul style="list-style-type: none"> <li>Introduction to word processing.</li> <li>Software packages for word processing.</li> <li>Opening and exiting the word processor.</li> <li>Creating a document</li> </ul>	<ul style="list-style-type: none"> <li>➤ Demonstration and practice of the following: <ul style="list-style-type: none"> <li>Listing the features of word processing</li> <li>Listing the software packages for word</li> </ul> </li> </ul>	10

		<ul style="list-style-type: none"> <li>processing</li> <li>• Opening and exit the word processor</li> <li>• Creating a document</li> </ul>	
2. Edit, save and print a document in word processor	<ul style="list-style-type: none"> <li>• Editing text</li> <li>• Wrapping and aligning the text</li> <li>• Font size, type and face</li> <li>• Header and Footer</li> <li>• Auto correct</li> <li>• Numbering and bullet</li> <li>• Creating table</li> <li>• Find and replace</li> <li>• Page numbering</li> <li>• Printing document</li> <li>• Saving a document in various formats</li> </ul>	<ul style="list-style-type: none"> <li>➤ Demonstration and practising the following: <ul style="list-style-type: none"> <li>• Editing the text</li> <li>• Word wrapping and alignment</li> <li>• Changing font type, size and face</li> <li>• Inserting header and footer</li> <li>• Removing header and footer</li> <li>• Using autocorrect option</li> <li>• Insert page numbers and bullet</li> <li>• Save and print a document</li> </ul> </li> </ul>	10
<b>Total</b>			<b>20</b>

<b>Unit 4: Entrepreneurial Skills – III</b>			
<b>Expected Learning Outcome</b>	<b>Theory (10 hrs)</b>	<b>Practical (15 hrs)</b>	<b>Duration (25 hrs)</b>
1. Describe the significance of entrepreneurial values and attitude	<ul style="list-style-type: none"> <li>• Values in general and entrepreneurial values</li> <li>• Entrepreneurial value orientation with respect to innovativeness, independence, outstanding performance and respect for work</li> </ul>	<ul style="list-style-type: none"> <li>• Listing of entrepreneurial values by the students.</li> <li>• Group work on identification of entrepreneurial values and their roles after listing or reading 2-3 stories of successful entrepreneur</li> <li>• Exhibiting entrepreneurial values in Ice breaking, rapport building, group work and home assignments</li> </ul>	10
2. Demonstrate the knowledge of attitudinal changes required to become	<ul style="list-style-type: none"> <li>• Attitudes in general and entrepreneurial attitudes</li> <li>• Using imagination/</li> </ul>	<ul style="list-style-type: none"> <li>• Preparing a list of factors that influence attitude in</li> </ul>	15

an entrepreneur	intuition <ul style="list-style-type: none"> <li>• Tendency to take moderate risk</li> <li>• Enjoying freedom of expression and action</li> <li>• Looking for economic opportunities</li> <li>• Believing that we can change the environment</li> <li>• Analyzing situation and planning action</li> <li>• Involving in activity</li> </ul>	general and entrepreneurial attitude <ul style="list-style-type: none"> <li>• Demonstrating and identifying own entrepreneurial attitudes during the following micro lab activities like thematic appreciation test</li> <li>• Preparing a short write-up on “who am I”</li> <li>• Take up a product and suggest how its features can be improved</li> <li>• Group activity for suggesting brand names, names of enterprises, etc.</li> </ul>	
<b>Total</b>			<b>25</b>

<b>Unit 5: Green Skills – III</b>			
<b>Expected Learning Outcome</b>	<b>Theory (07 hrs)</b>	<b>Practical (08 hrs)</b>	<b>Duration (15 hrs)</b>
1. Describe importance of main sector of green economy	<ul style="list-style-type: none"> <li>• Main sectors of green economy- E-waste management, green transportation, renewal energy, green construction, water management</li> <li>• Policy initiatives for greening economy in India</li> </ul>	<ul style="list-style-type: none"> <li>• Preparing a poster on any one of the sectors of green economy</li> <li>• Writing a two-page essay on important initiatives taken in India for promoting green economy</li> </ul>	08
2. Describe the major green Sectors/Areas and the role of various stakeholder in green economy	<ul style="list-style-type: none"> <li>• Stakeholders in green economy</li> <li>• Role of government and private agencies in greening cities, buildings, tourism, industry, transport, renewable energy, waste management, agriculture, water, forests and fisheries</li> </ul>	<ul style="list-style-type: none"> <li>• Preparing posters on green Sectors/Areas: cities, buildings, tourism, industry, transport, renewable energy, waste management, agriculture, water, forests and fisheries</li> </ul>	07
<b>Total</b>			<b>15</b>

## PART B: VOCATIONAL SKILLS

Sl.No	Units	Duration (hrs)
1.	Basics of Civil Engineering	43
2.	Introduction to Drafting	23
3.	Drafting Inputs	15
4.	Types of Drawings	34
5.	Introduction to CAD	50
	<b>Total</b>	<b>165</b>

Unit 1: Basics of Civil Engineering			
Expected Learning Outcome	Theory (21 hrs)	Practical (22 hrs)	Duration (43 hrs)
1. List out different types of civil engineering structures and explain important building materials	<ul style="list-style-type: none"> <li>List different types of structures</li> <li>Different building materials and uses (stone, brick, sand, cement, steel, timber, mortar, concrete)</li> </ul>	<ul style="list-style-type: none"> <li>Physical identification of building materials (stone, brick, sand, cement, steel, timber, mortar, concrete)</li> </ul>	7
2. Identify component parts of buildings and their functions	<ul style="list-style-type: none"> <li>Explain Parts of building and their function</li> <li>Types of foundation (mention the types of shallow foundations, pile foundation)</li> <li>Introduction to brick masonry and stone masonry</li> <li>Brick masonry – English bond &amp; Flemish bond</li> <li>Roof &amp; types of roofs</li> <li>Stairs – technical terms &amp; types (straight flight, dog legged, open well, geometrical)</li> </ul>	<ul style="list-style-type: none"> <li>Draw the cross section of a single wall of a residential building with detailing</li> <li>Draw plan and elevation of one brick thick wall in English bond and Flemish bond</li> </ul>	14
3. Perform setting out of buildings	<ul style="list-style-type: none"> <li>Explain setting out of a building by 3-4-5 rule</li> </ul>	<ul style="list-style-type: none"> <li>Perform setting out of a single roomed building using 3-4-5 method</li> </ul>	7
4. Explain basic concepts in surveying and levelling	<ul style="list-style-type: none"> <li>Principles of survey, objectives, types of measurement – linear and angular</li> <li>Units of measurement – length, area, volume</li> <li>Levelling – definition of terminologies –</li> </ul>	<ul style="list-style-type: none"> <li>Practising linear measurements-chain/tape</li> <li>Read contour maps and identify features</li> </ul>	15

	Reduced level, Bench Mark, Datum, contours		
<b>Total</b>			<b>43</b>

<b>Unit 2: Introduction to Drafting</b>			
<b>Expected Learning Outcome</b>	<b>Theory (10hrs)</b>	<b>Practical (13 hrs)</b>	<b>Duration (23 hrs)</b>
1. Identify different types and sizes of papers and area of application, scales, RFD and use of scientific calculator	<ul style="list-style-type: none"> <li>Introduction to drawing papers, scales, RFD, use of scientific calculator</li> </ul>	<ul style="list-style-type: none"> <li>Identification of different types of drawing papers and scales</li> <li>Perform basic arithmetic computations using scientific calculator</li> </ul>	3
2. Draw projections and development of surfaces	<ul style="list-style-type: none"> <li>Introduction to projection of solids – cube, cylinder</li> <li>Development of surfaces - cube</li> </ul>	<ul style="list-style-type: none"> <li>Draw different types of drawings including projections (plan, section, elevation of cube)</li> <li>Development of surfaces - cube</li> <li>Orthographic projections - cuboid</li> </ul>	15
3. Develop skill in carrying out necessary calculations to compute dimensions of various components parts of drawings	<ul style="list-style-type: none"> <li>Calculation of scales,</li> <li>Methods of dimensioning and lettering</li> </ul>	<ul style="list-style-type: none"> <li>Dimensioning and lettering including title block</li> </ul>	5
<b>Total</b>			<b>23</b>

<b>Unit 3: Drafting Inputs</b>			
<b>Expected Learning Outcome</b>	<b>Theory (5 hrs)</b>	<b>Practical (10 hrs)</b>	<b>Duration (15 hrs)</b>
1. Organize data and information required for preparation of drawings	<ul style="list-style-type: none"> <li>Discuss inputs required and how to collect data for preparing drawings for following works</li> <li>a) Residential plot (four sided only)</li> <li>b) Residential building</li> </ul>	<ul style="list-style-type: none"> <li>Collection of data for preparing drawings for following works</li> <li>a) Residential plot (four sided only)</li> <li>b) Residential building</li> </ul>	5
2. Prepare rough sketches from the drawing requirements	<ul style="list-style-type: none"> <li>Discuss preparation of rough sketch for following works</li> <li>a) Residential plot (four sided only)</li> <li>b) Residential building</li> </ul>	<ul style="list-style-type: none"> <li>Preparation of rough sketch for following works using collected data</li> <li>a) Residential plot</li> </ul>	8

		(four sided only) b) Residential building	
3. Develop skill in communication with superiors/ concerned authority in case of any confusion or ambiguity in the received drawing requirements or for clarification of any doubts	<ul style="list-style-type: none"> <li>Clarification of doubts and seeking advice from superiors</li> </ul>	<ul style="list-style-type: none"> <li>Clarification and discussion of doubts based on prepared drawings</li> </ul>	2
<b>Total</b>			<b>15</b>

<b>Unit 4: Types of Drawings</b>			
<b>Expected Learning Outcome</b>	<b>Theory (13hrs)</b>	<b>Practical (21hrs)</b>	<b>Duration (34hrs)</b>
1. Identify purpose of preparing drawings and various types of drawings including as built drawings, working drawings, shop drawings, site layout drawings, contours and other survey maps	<ul style="list-style-type: none"> <li>Explain different types of drawings, its purposes and details - built drawings, working drawings, shop drawings, site layout drawings, contours and other survey maps</li> </ul>	<ul style="list-style-type: none"> <li>Read and interpret - built drawings, working drawings, shop drawings, site layout drawings, contours and other survey maps</li> </ul>	9
2. Develop an awareness on various Indian and International codes of practice applicable to drawing	<ul style="list-style-type: none"> <li>Familiarise relevant provision of IS 962 (building drawing) &amp; IS 7973 (working Drawing)</li> <li>Introduction to KMBR and KPBR 2019 , NBC (set backs, minimum room sizes, room height, sill , plinth area, floor area, carpet area, circulation area, FSI, coverage)</li> </ul>	<ul style="list-style-type: none"> <li>Area calculation – plinth area, floor area, carpet area, FSI and coverage</li> <li>Set out a building within a given plot according to code provisions</li> </ul>	13
3. Use different symbols and terms used in civil drawings, fabrication drawings, landscaping and layout drawings	<ul style="list-style-type: none"> <li>Familiarise different symbols and terms used in drawing – building plan, service plan, site plan, fabrication drawings, layout drawings using IS 962,</li> </ul>	<ul style="list-style-type: none"> <li>Draw different symbols used in drawing – building plan, service plan, site plan, fabrication drawings, layout drawings</li> </ul>	9



	7973 etc		
4. Identify and select legends in the drawing sheet as per requirements	<ul style="list-style-type: none"> <li>Introduce legends in the drawing sheet as per requirements</li> </ul>	<ul style="list-style-type: none"> <li>Prepare legends in the drawing sheet as per requirements</li> </ul>	3
<b>Total</b>			<b>34</b>

<b>Unit 5: Introduction to CAD</b>			
<b>Expected Learning Outcome</b>	<b>Theory (17hrs)</b>	<b>Practical (33hrs)</b>	<b>Duration (50hrs)</b>
1. Perform basic computer operations	<ul style="list-style-type: none"> <li>Explain connection of computer and peripheral devices</li> <li>Explain basic computer operations</li> <li>Different types of plotters and printers and their operations.</li> </ul>	<ul style="list-style-type: none"> <li>Practice connection of computer and peripheral devices</li> <li>Practice basic computer operations</li> <li>Practice operation of printers</li> </ul>	5
2. Develop skill in prior drawing preparations using CAD software	<ul style="list-style-type: none"> <li>Explain starting up of the software and adjusting page size, scale, measurement units and plot area</li> <li>Explain the preparation of the title block for the drawing</li> </ul>	<ul style="list-style-type: none"> <li>Perform starting up of the software and adjusting page size, scale, measurement units and plot area - practice drawing of simple closed 2D figures using CAD software</li> </ul>	17
3. Demonstrate drawing parameters and drawing requirements such as types of projections, types of views etc	<ul style="list-style-type: none"> <li>Explain drawing parameters like colour, layer, line type, line weight, text font etc</li> </ul>	<ul style="list-style-type: none"> <li>Practice setting of drawing parameters like colour, layer, line type, line weight, text font etc</li> <li>Preparation of the title block for the drawing</li> </ul>	28
<b>Total</b>			<b>50</b>

## CLASS 12

### Part A: Employability Skills

<b>Sl.No.</b>	<b>Units</b>	<b>Duration (hrs)</b>
1.	Communication Skills- IV	25
2.	Self-management Skills - IV	25
3.	Information and Communication Technology Skills - IV	20
4.	Entrepreneurial Skills - IV	25
5.	Green Skills - IV	15
	<b>Total</b>	<b>110</b>

<b>Unit 1: Communication Skills - IV</b>			
<b>Expected Learning Outcome</b>	<b>Theory (10 hrs)</b>	<b>Practical (15 hrs)</b>	<b>Duration (25 hrs)</b>
1. Describe the steps to active listening skills	<ul style="list-style-type: none"> <li>• Importance of active listening at workplace</li> <li>• Steps to active listening</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstration of the key aspects of becoming active listener</li> <li>• Preparing posters of steps for active listening</li> </ul>	10
2. Demonstrate basic writing skills	<ul style="list-style-type: none"> <li>➤ Writing skills to the following:               <ul style="list-style-type: none"> <li>• Sentence</li> <li>• Phrase</li> <li>• Kinds of Sentences</li> <li>• Parts of Sentence</li> <li>• Parts of Speech</li> <li>• Articles</li> <li>• Construction of a Paragraph</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Demonstration and practice of writing sentences and paragraphs on topics related to the subject</li> </ul>	15
<b>Total</b>			<b>25</b>

<b>Unit 2: Self-Management Skills – IV</b>			
<b>Expected Learning Outcome</b>	<b>Theory (10 hrs)</b>	<b>Practical (15 hrs)</b>	<b>Duration (25 hrs)</b>
1. Describe the various factors influencing self-motivation	<ul style="list-style-type: none"> <li>• Finding and listing motives (needs and desires);</li> <li>• Finding sources of motivation and inspiration (music, books, activities); expansive thoughts; living fully in the present moment; dreaming big</li> </ul>	<ul style="list-style-type: none"> <li>• Group discussion on identifying needs and desire</li> <li>• Discussion on sources of motivation and inspiration</li> </ul>	10
2. Describe the basic personality traits, types and disorders	<ul style="list-style-type: none"> <li>• Describe the meaning of personality</li> <li>• Describe how personality influence others</li> <li>• Describe basic personality traits</li> <li>• Describe common personality disorders- paranoid, antisocial, schizoid, borderline, narcissistic, avoidant, dependent and obsessive</li> </ul>	<ul style="list-style-type: none"> <li>• Demonstrate the knowledge of different personality types</li> </ul>	15
<b>Total</b>			<b>25</b>

<b>Unit 3: Information and Communication Technology Skills - IV</b>			
<b>Expected Learning Outcome</b>	<b>Theory (06 hrs)</b>	<b>Practical (14 hrs)</b>	<b>Duration (20 hrs)</b>
1. Perform tabulation using spreadsheet application	<ul style="list-style-type: none"> <li>• Introduction to spreadsheet application</li> <li>• Spreadsheet applications</li> <li>• Creating a new worksheet</li> <li>• Opening workbook and entering text</li> <li>• Resizing fonts and styles</li> <li>• Copying and moving</li> <li>• Filter and sorting</li> <li>• Formulas and functions</li> <li>• Password protection.</li> <li>• Printing a spreadsheet.</li> <li>• Saving a spreadsheet in various formats.</li> </ul>	<p>- Demonstration and practice on the following:</p> <ul style="list-style-type: none"> <li>• Introduction to the spreadsheet application</li> <li>• Listing the spreadsheet applications</li> <li>• Creating a new worksheet</li> <li>• Opening the workbook and enter text</li> <li>• Resizing fonts and styles</li> <li>• Copying and move the cell data</li> <li>• Sorting and Filter the data</li> <li>• Applying elementary formulas and functions</li> <li>• Protecting the spreadsheet with password</li> <li>• Printing a spreadsheet</li> <li>• Saving the spreadsheet in various formats.</li> </ul>	<b>10</b>
2. Prepare presentation using presentation application	<ul style="list-style-type: none"> <li>• Introduction to presentation</li> <li>• Software packages for presentation</li> <li>• Creating a new presentation</li> <li>• Adding a slide</li> <li>• Deleting a slide</li> <li>• Entering and editing text</li> <li>• Formatting text</li> <li>• Inserting clipart and images</li> <li>• Slide layout</li> <li>• Saving a presentation</li> <li>• Printing a presentation document.</li> </ul>	<p>- Demonstration and practice on the following:</p> <ul style="list-style-type: none"> <li>• Listing the software packages for presentation</li> <li>• Explaining the features of presentation</li> <li>• Creating a new presentation</li> <li>• Adding a slide to presentation.</li> <li>• Deleting a slide</li> <li>• Entering and edit text</li> <li>• Formatting text</li> <li>• Inserting clipart and images</li> <li>• Sliding layout</li> <li>• Saving a presentation</li> <li>• Printing a presentation document</li> </ul>	<b>10</b>
<b>Total</b>			<b>20</b>

<b>Unit 4: Entrepreneurial Skills - IV</b>			
<b>Expected Learning Outcome</b>	<b>Theory (10 hrs)</b>	<b>Practical (15 hrs)</b>	<b>Duration (25 hrs)</b>
1. Identify the general and entrepreneurial behavioural competencies	<ul style="list-style-type: none"> <li>Barriers to becoming entrepreneur</li> <li>Behavioural and entrepreneurial competencies – adaptability/decisiveness, initiative/perseverance, interpersonal skills, organizational skills, stress management, valuing service and diversity</li> </ul>	<ul style="list-style-type: none"> <li>Administering self-rating questionnaire and score responses on each of the competencies</li> <li>Collect small story/ anecdote of prominent successful entrepreneurs</li> <li>Identify entrepreneurial competencies reflected in each story and connect it to the definition of behavioural competencies</li> <li>Preparation of competencies profile of students</li> </ul>	10
2. Demonstrate the knowledge of self-assessment of behavioural competencies	<ul style="list-style-type: none"> <li>Entrepreneurial competencies in particular: self-confidence, initiative, seeing and acting on opportunities, concern for quality, goal setting and risk taking, problem solving and creativity, systematic planning and efficiency, information seeking, persistence, influencing and negotiating, team building</li> </ul>	<ul style="list-style-type: none"> <li>Games and exercises on changing entrepreneurial behaviour and development of competencies for enhancing self-confidence, problem solving, goal setting, information seeking, team building and creativity</li> </ul>	15
<b>Total</b>			<b>25</b>

<b>Unit 5: Green Skills - IV</b>			
<b>Expected Learning Outcome</b>	<b>Theory (05 hrs)</b>	<b>Practical (10 hrs)</b>	<b>Duration (15 hrs)</b>
1. Identify the role and importance of green jobs in different sectors	<ul style="list-style-type: none"> <li>Role of green jobs in toxin-free homes,</li> <li>Green organic gardening, public transport and energy conservation,</li> <li>Green jobs in water conservation</li> <li>Green jobs in solar and wind power, waste reduction, reuse and recycling of wastes,</li> <li>Green jobs in green tourism</li> <li>Green jobs in building and</li> </ul>	<ul style="list-style-type: none"> <li>Listing of green jobs and preparation of posters on green job profiles</li> <li>Prepare posters on green jobs.</li> </ul>	15

	construction <ul style="list-style-type: none"> <li>• Green jobs in appropriate technology</li> <li>• Role of green jobs in Improving energy and raw materials use</li> <li>• Role of green jobs in limiting greenhouse gas emissions</li> <li>• Role of green jobs minimizing waste and pollution</li> <li>• Role of green jobs in protecting and restoring ecosystems</li> <li>• Role of green jobs in support adaptation to the effects of climate change</li> </ul>		
<b>Total</b>			<b>15</b>

### Part B–Vocational Skills

Sl.No.	Units	Duration (hrs)
1.	Types of Construction Projects	46
2.	Drafting Using CAD Software	109
3.	Virus Protection and General Safety	10
Total		165

Unit 1: Types of Construction Projects			
Expected Learning Outcome	Theory (18 hrs)	Practical (28 hrs)	Duration (46 hrs)
1. Identify different types of construction projects, their scope, types of drawings required in each	<ul style="list-style-type: none"> <li>• List out Types of construction projects &amp; their scope</li> <li>• Types of drawings required in different types of construction projects - residential (single storied &amp; multi storied), septic tank and rain water harvesting</li> </ul>	<ul style="list-style-type: none"> <li>• Familiarise different types of construction projects and types of drawings required in each - residential buildings and culverts</li> </ul>	10
2. Interpret and represent technical drawings, data and design parameters	<ul style="list-style-type: none"> <li>• Explain how to interpret and represent technical drawings, data and design parameters, structural drawings and architectural drawings- single and multi storied residential buildings only</li> </ul>	<ul style="list-style-type: none"> <li>• Practice interpretation of technical drawings, data and design parameters, structural drawings and architectural drawings- single and multi storied residential buildings only</li> <li>• Develop plan of a single storied residential building from line sketch</li> </ul>	23

3. Explain details to be covered as per site requirements	<ul style="list-style-type: none"> <li>Discuss details to be covered as per site requirements based on KMBR and KPBR</li> </ul>	<ul style="list-style-type: none"> <li>Practice of providing details as per site requirements based on KMBR and KPBR</li> </ul>	13
<b>Total</b>			<b>46</b>

<b>Unit 2: Drafting Using CAD Software</b>			
<b>Expected Learning Outcome</b>	<b>Theory (43 hrs)</b>	<b>Practical (66 hrs)</b>	<b>Duration (109 hrs)</b>
1. Develop skill in the operation of recommended software including method to improve productivity of self (shortcuts, libraries)	<ul style="list-style-type: none"> <li>Tool icons and set of tool bars</li> <li>Shortcuts, libraries</li> <li>Preparation of sanction plan</li> </ul>	<ul style="list-style-type: none"> <li>Practice CAD drawings of residential buildings</li> </ul>	82
2. Demonstrate standard procedure for storing and maintaining documents, importance and need for document controlling	<ul style="list-style-type: none"> <li>Need for document control</li> <li>Maintain documents for completion of work and approval</li> <li>Store drawings in appropriate partitions</li> </ul>	<ul style="list-style-type: none"> <li>Practice standard procedure for storing and maintaining documents</li> </ul>	8
3. Develop skill in consultation and information transfer	<ul style="list-style-type: none"> <li>Explain the procedure for</li> <li>Coordination with seniors for approval of drawing from design team and client as applicable</li> <li>Correct/ remake the drawing in case of any correction observed by superiors</li> <li>Communicate to concerned authority for informing completion and approval of prepared drawings</li> <li>Draft reports and forward the prepared drawings to concerned authority for approval</li> </ul>	<ul style="list-style-type: none"> <li>Practice the procedure for</li> <li>Coordinate with seniors for approval of drawing from design team and client as applicable</li> <li>Correct/ remake the drawing in case of any correction observed by superiors</li> <li>Communicate to concerned authority for informing completion and approval of prepared drawings</li> <li>Draft mails and forward the prepared drawings to concerned authority for approval</li> </ul>	15
4. Demonstrate different types of plotters and printers and their operation	<ul style="list-style-type: none"> <li>Explain how to print drawings with plotters/ printers</li> </ul>	<ul style="list-style-type: none"> <li>Operate printers and plotters to obtain prints of the drawings in required numbers</li> </ul>	4
<b>Total</b>			<b>109</b>

<b>Unit 3: Virus Protection and General Safety</b>			
<b>Expected Learning Outcome</b>	<b>Theory ( 5 hrs)</b>	<b>Practical ( 5 hrs)</b>	<b>Duration ( 10 hrs)</b>
1. Develop skill in methods and procedures used to minimise the chances of infecting a computer with virus	<ul style="list-style-type: none"> <li>• Introduce computer viruses and types of viruses</li> <li>• Introduce practices that make systems vulnerable to corruption and damage</li> <li>• Procedures used to minimise the chances of infecting computer with viruses</li> </ul>	<ul style="list-style-type: none"> <li>• Practice procedures used to minimise the chances of infecting computer with viruses.</li> </ul>	3
2. Explain the Procedure to follow in case there are corruptions or virus attack	<ul style="list-style-type: none"> <li>• Discuss the procedure to remove virus from computer</li> </ul>	<ul style="list-style-type: none"> <li>• Develop skill in removing virus from computer using any antivirus software</li> </ul>	2
3. Identify safe working practices and security measures to be observed	<ul style="list-style-type: none"> <li>• Importance of safety and general security measures to be observed for personal safety, infrastructure safety, occupational safety, electrical safety, road safety and fire safety</li> </ul>	<ul style="list-style-type: none"> <li>• Practice safety precautions to be observed in lab and construction sites.</li> <li>• Demonstrate safety signs for danger, warning, caution, and personal safety messages</li> <li>• Demonstrate First Aid methods</li> </ul>	5
<b>Total</b>			<b>10</b>

## 6. ORGANISATION OF FIELD VISITS/ON-THE-JOB TRAINING

In a year, at least 3 field visits/educational tours should be organized for the students to expose them to the activities in the workplace. Teachers and students should visit Drafting Departments of construction firms / Civil Engineering Organizations to observe and practice various aspects of Drafting. During the visit students should collect the following information.

1. Name and nature of the project
2. Expectations of the client
3. Data required for drafting
4. Details of preliminary field visits involved
5. Details of Reconnaissance survey

6. Details of software involved in drafting
7. Communications with superiors
8. Finalization of drawings
9. Documentation and printing of drawings
10. Details involved in the submission of drawings to the local authority for approval

On-the-job training of at least 80 hours is to be organized by the institution to provide hands-on training to the students.

## **7. LIST OF EQUIPMENT AND MATERIALS**

The list given below is suggestive and an exhaustive list should be prepared by the vocational teacher. Only basic tools, equipment and accessories should be procured by the institution so that the routine tasks can be performed by the students regularly for practice and acquiring adequate practical experience.

### **Lab Requirements**

1. Laptops with accessories and sufficient configuration to work with heavy software
2. CAD software
3. Printer
4. Projector/LED Monitor
5. Internet facilities
6. Microphone / voice system for lecture and class activities
7. Scientific calculator
8. Black/White board
9. Computer Registers



## 8. LIST OF CONTRIBUTORS

1. **Sri. Hari Krishnan S**  
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