

# **LEARNING OUTCOME BASED VOCATIONAL CURRICULUM**

**JOB ROLE: Floriculturist (Protected Cultivation)**

**(QUALIFICATION PACK: Ref. Id.AGR/Q0702)**

**SECTOR: Agriculture**

**Classes 11 and 12**

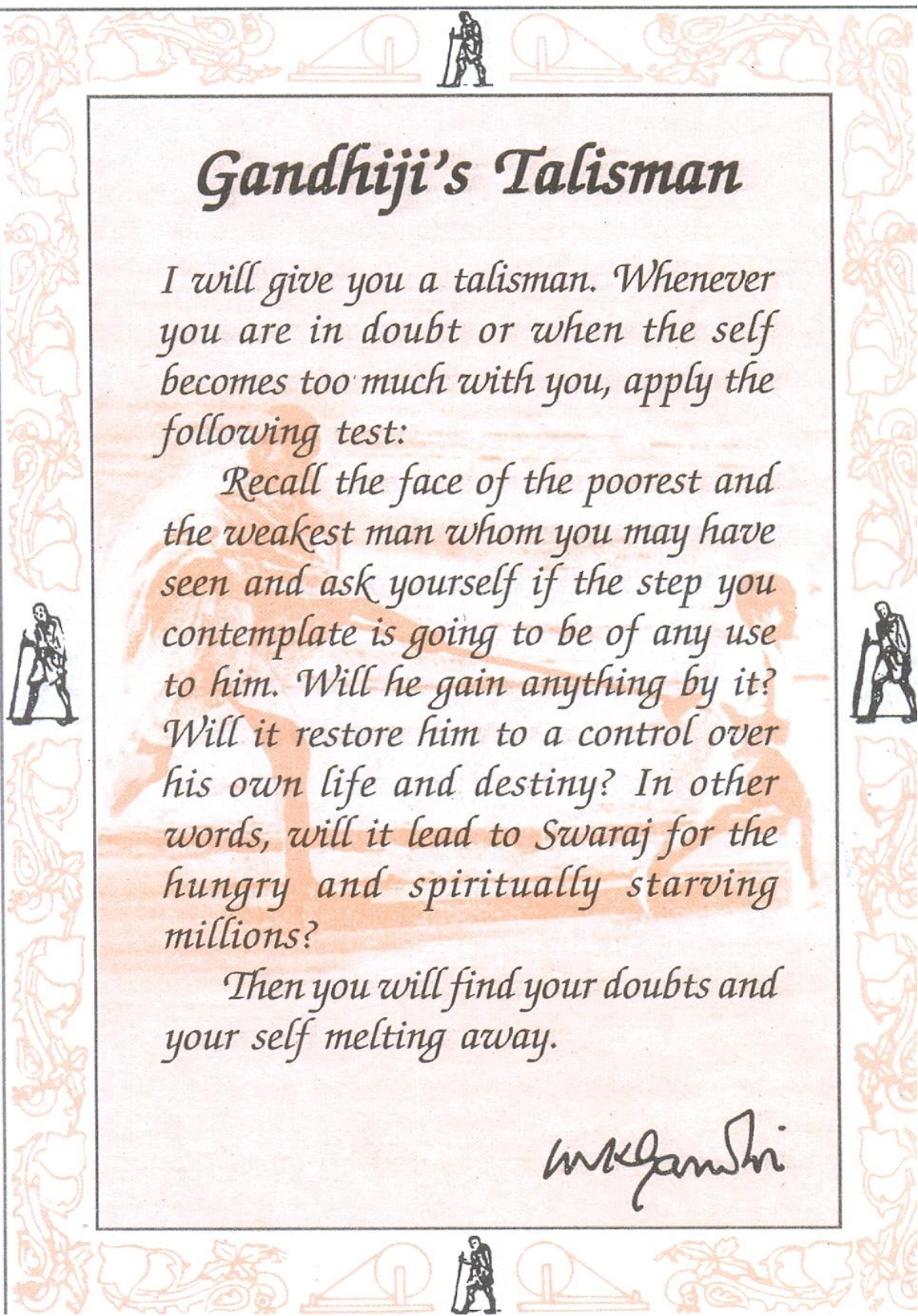


**PSS CENTRAL INSTITUTE OF VOCATIONAL EDUCATION**

**(a constituent unit of NCERT, under MHRD, Government of India)**

**Shyamla Hills, Bhopal- 462 013, M.P., India**

**<http://www.psscive.ac.in>**



## Gandhiji's Talisman

*I will give you a talisman. Whenever you are in doubt or when the self becomes too much with you, apply the following test:*

*Recall the face of the poorest and the weakest man whom you may have seen and ask yourself if the step you contemplate is going to be of any use to him. Will he gain anything by it? Will it restore him to a control over his own life and destiny? In other words, will it lead to Swaraj for the hungry and spiritually starving millions?*

*Then you will find your doubts and your self melting away.*

*M. Gandhi*

# **LEARNING OUTCOME BASED VOCATIONAL CURRICULUM**

**JOB ROLE: Floriculturist (Protected Cultivation)**

**(QUALIFICATION PACK: Ref. Id.AGR/Q0702)**

**SECTOR: Agriculture**

**Classes 11 and 12**



**PSS CENTRAL INSTITUTE OF VOCATIONAL EDUCATION**  
**Shyamla Hills, Bhopal- 462 013, M.P., India**

---

**LEARNING OUTCOME BASED VOCATIONAL  
CURRICULUM**

**Agriculture- Floriculturist (Protected  
Cultivation)**

**June, 2017**

**© PSSCIVE, 2017**

**<http://www.psscive.ac.in>**

No part of this work may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, microfilming, recording or otherwise, without written permission from the Publisher, with the exception of any material supplied specifically for the purpose of being used by the purchaser of the work.

The views and opinions expressed in this publication are those of the contributors/authors and do not necessarily reflect the views and policies of PSS Central Institute of Vocational Education, Bhopal. The PSSCIVE does not guarantee the accuracy of the data included in this publication and accepts no responsibility for any consequence of their use.

**Published by:**

Joint Director

PSS Central Institute of Vocational  
Education, NCERT, Shyamla Hills, Bhopal



**PATRONS**

Prof. Hrushikesh Senapaty, Ph.D.,  
Director, National Council of Educational  
Research and Training (NCERT),  
New Delhi

Prof. Rajesh Khambayat, Ph.D.,  
Joint Director  
PSS Central Institute of Vocational Education,  
Bhopal

**COURSE COORDINATOR**

Prof. Rajiv Kumar Pathak,  
Head  
Dept. of Agriculture & Animal Husbandry,  
PSS Central Institute of Vocational Education  
, Bhopal

## FOREWORD

---

**T**he Pandit Sunderlal Sharma Central Institute of Vocational Education (PSSCIVE) a constituent of the National Council of Educational Research and Training (NCERT) is spearheading the efforts of developing learning outcome based curricula and courseware aimed at integrating both vocational and general qualifications to open pathways of career progression for students. It is a part of Centrally Sponsored Scheme of Vocationalisation of Secondary and Higher Secondary Education (CSSVSHSE) launched by the Ministry of Human Resource Development, Government of India in 2012. The PSS Central Institute of Vocational Education (PSSCIVE) is developing curricula under the project approved by the Project Approval Board (PAB) of Rashtriya Madhyamik Shiksha Abhiyan (RMSA). The main purpose of the competency based curricula is to bring about the improvement in teaching-learning process and working competences through learning outcomes embedded in the vocational subject.

It is a matter of great pleasure to introduce this learning outcome based curriculum as part of the vocational training packages for the job role of -Floriculturist (Protected Cultivation). 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 curriculum aims to provide children with employability and vocational skills to support occupational mobility and lifelong learning. It will help them to acquire specific occupational skills that meet employers' immediate needs. The teaching process is to be performed through the interactive sessions in classrooms, practical activities in laboratories and workshops, projects, field visits, and professional experiences.

The curriculum has been developed and reviewed by a group of experts and their contributions are greatly acknowledged. The utility of the curriculum will 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 improvement in this document.

Hrushikesh Senapaty  
*Director*  
*National Council of Education Research and Training*

## PREFACE

---

India today stands poised at a very exciting juncture in its saga. The potential for achieving inclusive growth are immense and the possibilities are equally exciting. The world is looking at us to deliver sustainable growth and progress. To meet the growing expectations, India will largely depend upon its young workforce. The much-discussed demographic dividend will bring sustaining benefits only if this young workforce is skilled and its potential is channelized in the right direction.

In order to fulfil the growing aspirations of our youth and the demand of skilled human resource, the Ministry of Human Resource Development (MHRD), Government of India introduced the revised Centrally Sponsored Scheme of Vocationalisation of Secondary and Higher Secondary Education that aims to provide for the diversification of educational opportunities so as to enhance individual employability, reduce the mismatch between demand and supply of skilled manpower and provide an alternative for those pursuing higher education. For spearheading the scheme, the PSS Central Institute of Vocational Education (PSSCIVE) was entrusted the responsibility to develop learning outcome based curricula, student workbooks, teacher handbooks and e-learning materials for the job roles in various sectors, with growth potential for employment.

The PSSCIVE firmly believes that the vocationalisation of education in the nation need to be established on a strong footing of philosophical, cultural and sociological traditions and it should aptly address the needs and aspirations of the students besides meeting the skill demands of the industry. The curriculum, therefore, aims at developing the desired professional, managerial and communication skills to fulfil the needs of the society and the world of work. In order to honour its commitment to the nation, the PSSCIVE has initiated the work on developing learning outcome based curricula with the involvement of faculty members and leading experts in respective fields. It is being done through the concerted efforts of leading academicians, professionals, policy makers, partner institutions, Vocational Education and Training experts, industry representatives, and teachers. The expert group through a series of consultations, working group meetings and use of reference materials develops a National Curriculum. Currently, the Institute is working on developing curricula and courseware for over 100 job roles in various sectors.

We extend our gratitude to all the contributors for selflessly sharing their precious knowledge, acclaimed expertise, and valuable time and positively responding to our request for development of curriculum. We are grateful to MHRD and NCERT for the financial support and cooperation in realising the objective of providing learning outcome based modular curricula and courseware to the States and other stakeholders under the PAB (Project Approval Board) approved project of *Rashtriya Madhyamik Shiksha Abhiyan* (RMSA) of MHRD.

Finally, for transforming the proposed curriculum design into a vibrant reality of implementation, all the institutions involved in the delivery system shall have to come together with a firm commitment and they should secure optimal community support. The success of this curriculum depends upon its effective implementation and it is expected that the managers of vocational education and training system, including subject teachers will make efforts to create better facilities, develop linkages with the world of work and foster a conducive environment as per the content of the curriculum document.

The PSSCIVE, Bhopal remains committed in bringing about reforms in the vocational education and training system through the learner-centric curricula and courseware. We hope that this document will prove useful in turning out more competent Indian workforce for the 21<sup>st</sup> Century.

RAJESH P. KHAMBAYAT  
*Joint Director*  
*PSS Central Institute of Vocational Education*

## ACKNOWLEDGEMENTS

---

On behalf of the team at the PSS Central Institute of Vocational Education (PSSCIVE) we are grateful to the members of the Project Approval Board (PAB) of *Rashtriya Madhyamik Shiksha Abhiyan* (RMSA) and the officials of the Ministry of Human Resource Development (MHRD), Government of India for the financial support to the project for development of curricula.

We are grateful to the Director, NCERT for his support and guidance. We also acknowledge the contributions of our colleagues at the Technical Support Group of RMSA, MHRD, RMSA Cell at the National Council of Educational Research and Training (NCERT), National Skill Development Agency (NSDA), National Skill Development Corporation (NSDC) and Agriculture Skill Council of India (ASCI) for their academic support and cooperation.

We are grateful to the contributors for their earnest efforts and contributions in the development of this learning outcome based curriculum. Their names are acknowledged in the list of contributors. The contributions of the course coordinator Rajiv Kumar Pathak, Professor and Head, Department of Agriculture and Animal Husbandry and the reviewer D. L. N. Rao, Emeritus Scientist, Indian Institute of Soil Science, Nabi Bagh, Berasia Road, Bhopal are thankfully acknowledged.

The contributions made by Vinay Swarup Mehrotra, Professor and Head, Curriculum Development and Evaluation Centre (CDEC), Vipin Kumar Jain, Associate Professor and Head, Programme Planning and Monitoring Cell (PPMC) and Dipak Shudhalwar, Associate Professor, Department of Engineering & Technology, PSSCIVE in development of the curriculum for the employability skills are duly acknowledged.

The assistance provided by Durgesh Kumar Satankar, Computer Operator Grade II in typing and composing of the material is duly acknowledged.

PSSCIVE Team



# CONTENTS

S.No.	Title		Page No.
	Foreword		(i)
	Preface		(ii)
	Acknowledgement		(iv)
1.	Course Overview		1
2.	Scheme of Units		2
3.	Teaching/Training Activities		3
4.	Assessment and Certification		4
5.	Unit Content	<b>CLASS 11</b>	
	<b>Part A</b>	<b>Employability Skills</b>	
		Unit 1: Communication Skills - III	7
		Unit 2: Self-management Skills – III	7
		Unit 3: Information and Communication Technology Skills – III	8
		Unit 4: Entrepreneurial Skills – III	8
		Unit 5: Green Skills - III	9
	<b>Part B</b>	<b>Vocational Skills</b>	
		Unit 1: Introduction to Protected Cultivation	10
		Unit 2: Types of Protected Structure and its Components	11
		Unit 3: Preparation of Media and Container for Commercial Cultivation in Greenhouses	11
		Unit 4: Irrigation and Fertigation System	12
		Unit 5: Greenhouse Operations	13
	<b>CLASS 12</b>		
	<b>Part A</b>	<b>Employability Skills</b>	
		Unit 1: Communication Skills – IV	14
		Unit 2: Self-management Skills – IV	14
		Unit 3: Information and Communication Technology Skills – IV	15
		Unit 4: Entrepreneurial Skills – IV	16
		Unit 5: Green Skills – IV	16

	<b>Part B</b>	<b>Vocational Skills</b>	
		Unit 1: Care and Maintenance of Protected Structure	17
		Unit 2: Protected Cultivation of rose, gerbera, carnation, liliun, orchids	18
		Unit 3: Special Horticultural Practices in Protected Cultivation	19
		Unit 4: Control of Insect Pest and Diseases in Flower Crops	19
		Unit 5: Harvesting and Post Harvest Management	20
<b>6.</b>	Organisation of Field Visits		21
<b>7.</b>	List of Equipment and Materials		21
<b>8.</b>	Vocational Teacher's/ Trainer's Qualification and Guidelines		23
<b>9.</b>	List of Contributors		26
<b>10.</b>	List of Reviewers		26

# 1. COURSE OVERVIEW

---

## **COURSE TITLE: Agriculture – Floriculturist (Protected Cultivation)**

**A** Floriculturist (Protected Cultivation) is a person who has under taken the various activities of flower cultivation involving preparatory cultivation, cultivation and post harvest management in green house. He also perform maintenance and care of plant, design and maintenance of green house, preparing media and various other inputs essential for flower crop cultivation. The job is to be performed in efficient manner to allow the production of high quality of flowers, their harvesting and post harvest management towards getting higher return.

**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 & abilities;
- Demonstrate the knowledge of the importance of green skills in meeting the challenges of sustainable development and environment protection;
- Communicate effectively with the client
- Identify the principal components of a computer system
- Identify different types of protected structure
- Prepare media for protected cultivation
- Demonstrate irrigation and fertigation
- Demonstrate green house operations
- Demonstrate irrigation and fertigation
- Demonstrate care and maintenance of protected structure
- Identify and categorise crops for protected cultivation
- Demonstrate special horticultural practices in protected cultivation
- Identify and control of insect-pest and diseases
- Demonstrate the harvest and post harvest practices
- Administer first aid to a casualty with small cuts, grazes, bruises, external bleeding, minor burns and scalds

**COURSE REQUIREMENTS:** The learner should have the basic knowledge of science.

**COURSE LEVEL:** On completion of this course, a student can take up B. Voc. Degree programme in university/ college for course in Horticulture such as floriculture and land scope gardening or green house technology.

**COURSE DURATION:** **600 hrs**

Class 11	:	300 hrs
Class 12	:	300 hrs

---

<b>Total</b>	<b>:</b>	<b>600 hrs</b>
--------------	----------	----------------

---

## 2. SCHEME OF UNITS

This course is a planned sequence of instructions consisting of Units meant for developing employability and vocational competencies of students of Class 11 and 12 opting for vocational subject along with general education subjects. The unit-wise distribution of hours and marks for Class 11 is as follows:

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

<b>CLASS 11</b>			
	<b>Units</b>	<b>No. of Hours for Theory and Practical 160</b>	<b>Max. Marks for Theory and Practical 100</b>
<b>Part A</b>	<b>Employability Skills</b>		
	Unit 1: Communication Skills - III	25	<b>10</b>
	Unit 2: Self-management Skills – III	25	
	Unit 3: Information and Communication Technology Skills – III	20	
	Unit 4: Entrepreneurial Skills – III	25	
	Unit 5: Green Skills – III	15	
	<b>Total</b>	<b>110</b>	<b>10</b>
<b>Part B</b>	<b>Vocational Skills</b>		
	Unit 1: Introduction to Protected Cultivation	20	<b>40</b>
	Unit 2: Types of Protected Structure and its Components	35	
	Unit 3: Preparation of Media and Container for Commercial Cultivation in Greenhouses	35	
	Unit 4: Irrigation and Fertigation System	35	
	Unit 5: Greenhouse Operations	40	
	<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</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 marks for Class 12 is as follows:

<b>CLASS 12</b>			
	<b>Units</b>	<b>No. of Hours for Theory and Practical 200</b>	<b>Max. Marks for Theory and Practical 100</b>
<b>Part A</b>	<b>Employability Skills</b>		
	Unit 1: Communication Skills – IV	25	10
	Unit 2: Self-management Skills – IV	25	
	Unit 3: Information and Communication Technology Skills – IV	20	
	Unit 4: Entrepreneurial Skills – IV	25	
	Unit 5: Green Skills – IV	15	
	<b>Total</b>	<b>110</b>	
<b>Part B</b>	<b>Vocational Skills</b>		
	Unit 1: Care and Maintenance of Protected Structure	30	40
	Unit 2: Protected Cultivation of rose, gerbera, carnation, liliun, orchids	45	
	Unit 3: Special Horticultural Practices in Protected Cultivation	30	
	Unit 4: Control of Insect Pest and Diseases in Flower Crops	25	
	Unit 5: Harvesting and Post Harvest Management	35	
	<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</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. TEACHING/TRAINING ACTIVITIES

The teaching and training activities have to be conducted in classroom, laboratory/ workshops and field visits. Students should be taken to field visits for interaction with experts and to expose them to the various tools, equipment, materials, procedures and operations in the workplace. Special emphasis should be laid on the occupational safety, health and hygiene during the training and field visits.

## **CLASSROOM ACTIVITIES**

Classroom activities are an integral part of this course and interactive lecture sessions, followed by discussions should be conducted by trained vocational teachers. Vocational teachers should make effective use of a variety of instructional aids, such as audio-video materials, colour slides, charts, diagrams, models, exhibits, hand-outs, online teaching materials, etc. to transmit knowledge and impart training to the students.

## **PRACTICAL WORK IN LABORATORY/WORKSHOP**

Practical work may include but not limited to hands-on-training, simulated training, role play, case based studies, exercises, etc. Equipment and supplies should be provided to enhance hands-on learning experience of students. Only trained personnel should teach specialized techniques. A training plan that reflects tools, equipment, materials, skills and activities to be performed by the students should be submitted by the vocational teacher to the Head of the Institution.

## **FIELD VISITS/ EDUCATIONAL TOUR**

In field visits, children will go outside the classroom to obtain specific information from experts or to make observations of the activities. A checklist of observations to be made by the students during the field visits should be developed by the Vocational Teachers for systematic collection of information by the students on the various aspects. Principals and Teachers should identify the different opportunities for field visits within a short distance from the school and make necessary arrangements for the visits. At least three field visits should be conducted in a year.

## **4. ASSESSMENT AND CERTIFICATION**

---

**U**pon successful completion of the course by the candidate, the Central/ State Examination Board for Secondary Education and the respective Sector Skill Council will certify the competencies.

The National Skills Qualifications Framework (NSQF) is based on outcomes referenced to the National Occupation Standards (NOSs), rather than inputs. The NSQF level descriptors, which are the learning outcomes for each level, include the process, professional knowledge, professional skills, core skills and responsibility. The assessment is to be undertaken to verify that individuals have the knowledge and skills needed to perform a particular job and that the learning programme undertaken has delivered education at a given standard. It should be closely linked to certification so that the individual and the employer could come to know the competencies acquired through the vocational subject or course. The assessment should be reliable, valid, flexible, convenient, cost effective and above all it should be fair and transparent. Standardized assessment tools should be used for assessment of knowledge of students. Necessary arrangements should be made for using technology in assessment of students.

### **KNOWLEDGE ASSESSMENT (THEORY)**

**Knowledge Assessment** should include two components: one comprising of internal assessment and second an external examination, including theory examination to be

conducted by the Board. The assessment tools shall contain components for testing the knowledge and application of knowledge. The knowledge test can be objective paper based test or short structured questions based on the content of the curriculum.

### WRITTEN TEST

It allows candidates to demonstrate that they have the knowledge and understanding of a given topic. Theory question paper for the vocational subject should be prepared by the subject experts comprising group of experts of academicians, experts from existing vocational subject experts/teachers, subject experts from university/colleges or industry. The respective Sector Skill Council should be consulted by the Central/State Board for preparing the panel of experts for question paper setting and conducting the examinations.

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

**Duration: 3 hrs**

**Max. Mark: 40**

	Typology of Question	No. of Questions			Marks
		Very Short Answer (1 mark)	Short Answer (2 Marks)	Long Answer (3 Marks)	
1.	Remembering – (Knowledge based simple recall questions, to know specific facts, terms, concepts, principles, or theories; identify, define or recite, information)	3	2	2	13
2.	Understanding – (Comprehension – to be familiar with meaning and to understand conceptually, interpret, compare, contrast, explain, paraphrase, or interpret information)	2	3	2	14
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 & 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>10x2=20</b>	<b>5x3=15</b>	<b>40 (20 questions)</b>

### SKILL ASSESSMENT (PRACTICAL)

Assessment of skills by the students should be done by the assessors/examiners on the basis of practical demonstration of skills by the candidate, using a competency checklist. The competency checklist should be developed as per the National Occupation Standards (NOSs) given in the Qualification Pack for the Job Role to bring about necessary consistency in the quality of assessment across different sectors and Institutions. The student has to demonstrate competency against the performance criteria defined in the National Occupation Standards and the assessment will indicate that they are 'competent', or are 'not yet competent'. The assessors assessing the skills of the students should possess a current

experience in the industry and should have undergone an effective training in assessment principles and practices. The Sector Skill Councils should ensure that the assessors are provided with the training on the assessment of competencies.

Practical examination allows candidates to demonstrate that they have the knowledge and understanding of performing a task. This will include hands-on practical exam and viva voce. For practical, there should be a team of two evaluators – the subject teacher and the expert from the relevant industry certified by the Board or concerned Sector Skill Council. The same team of examiners will conduct the viva voce.

**Project Work** (individual or group project) is a great way to assess the practical skills on a certain time period or timeline. Project work should be given on the basis of the capability of the individual to perform the tasks or activities involved in the project. Projects should be discussed in the class and the teacher should periodically monitor the progress of the project and provide feedback for improvement and innovation. Field visits should be organised as part of the project work. Field visits can be followed by a small-group work/project work. When the class returns from the field visit, each group might be asked to use the information that they have gathered to prepare presentations or reports of their observations. Project work should be assessed on the basis of practical file or student portfolio.

**Student Portfolio** is a compilation of documents that supports the candidate's claim of competence. Documents may include reports, articles, photos of products prepared by students in relation to the unit of competency.

**Viva voce** allows candidates to demonstrate communication skills and content knowledge. Audio or video recording can be done at the time of viva voce. The number of external examiners would be decided as per the existing norms of the Board and these norms should be suitably adopted/adapted as per the specific requirements of the vocational subject. Viva voce should also be conducted to obtain feedback on the student's experiences and learning during the project work/field visits.

## 5. UNIT CONTENTS

### CLASS 11

#### Part A: Employability Skills

S.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>



<b>Unit 1: Communication Skill – III</b>			
<b>Learning Outcome</b>	<b>Theory (10 hrs)</b>	<b>Practical (15 hrs)</b>	<b>Duration (25 Hrs)</b>
1. Demonstrate knowledge of various methods of communication	1. Methods of communication - Verbal - Non-verbal - Visual	1. Writing pros and cons of written, verbal and non-verbal communication 2. Listing do's and don'ts for avoiding common body language mistakes	<b>05</b>
2. Identify specific communication styles	1. Communication styles- assertive, aggressive, passive-aggressive, submissive, etc.	1. Observing and sharing communication styles of friends, teachers and family members and adapting the best practices 2. Role plays on communication styles.	<b>10</b>
3. Demonstrate basic writing skills	1. Writing skills to the following: • Sentence • Phrase • Kinds of Sentences • Parts of Sentence • Parts of Speech • Articles • Construction of a Paragraph	1. Demonstration and practice of writing sentences and paragraphs on topics related to the subject	<b>10</b>
<b>Total</b>			<b>25</b>

<b>Unit 2: Self-management Skills – III</b>			
<b>Learning Outcome</b>	<b>Theory (10 hrs)</b>	<b>Practical (15 hrs)</b>	<b>Duration (25 Hrs)</b>
1. Demonstrate impressive appearance and grooming	1. Describe the importance of dressing appropriately, looking decent and positive body language 2. Describe the term grooming 3. Prepare a personal grooming checklist 4. Describe the techniques of self-exploration	1. Demonstration of impressive appearance and groomed personality 2. Demonstration of the ability to self- explore	<b>10</b>
2. Demonstrate team work skills	1. Describe the important factors that influence in team building 2. Describe factors influencing team work	1. Group discussion on qualities of a good team 2. Group discussion on strategies that are adopted for team building and team work	<b>10</b>

3. Apply time management strategies and techniques	1. 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.	1. Game on time management 2. Checklist preparation 3. To-do-list preparation	<b>05</b>
<b>Total</b>			<b>25</b>

<b>Unit 3: Information and Communication Technology Skills - III</b>			
<b>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	1. Introduction to word processing. 2. Software packages for word processing. 3. Opening and exiting the word processor. 4. Creating a document	1. 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 processing</li> <li>• Opening and exit the word processor</li> <li>• Creating a document</li> </ul>	<b>10</b>
2. Edit, save and print a document in word processor	1. Editing text 2. Wrapping and aligning the text 3. Font size, type and face. 4. Header and Footer 5. Auto correct 6. Numbering and bullet 7. Creating table 8. Find and replace 9. Page numbering. 10. Printing document. 11. Saving a document in various formats.	1. 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> </ul> 1. Using autocorrect option 2. Insert page numbers and bullet 3. Save and print a document	<b>10</b>
<b>Total</b>			<b>20</b>

<b>Unit 4: Entrepreneurial Skills - III</b>			
<b>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	1. Values in general and entrepreneurial values 2. Entrepreneurial value orientation with	1. Listing of entrepreneurial values by the students. 2. Group work on identification of	

	respect to innovativeness, independence, outstanding performance and respect for work	entrepreneurial values and their roles after listing or reading 2-3 stories of successful entrepreneur 3. Exhibiting entrepreneurial values in Ice breaking, rapport building, group work and home assignments	<b>10</b>
2. Demonstrate the knowledge of attitudinal changes required to become an entrepreneur	<ol style="list-style-type: none"> <li>1. Attitudes in general and entrepreneurial attitudes</li> <li>2. Using imagination/ intuition</li> <li>3. Tendency to take moderate risk</li> <li>4. Enjoying freedom of expression and action</li> <li>5. Looking for economic opportunities</li> <li>6. Believing that we can change the environment</li> <li>7. Analyzing situation and planning action</li> <li>8. Involving in activity</li> </ol>	<ol style="list-style-type: none"> <li>1. Preparing a list of factors that influence attitude in general and entrepreneurial attitude</li> <li>2. Demonstrating and identifying own entrepreneurial attitudes during the following micro lab activities like thematic appreciation test</li> <li>3. Preparing a short write-up on "who am I"</li> <li>4. Take up a product and suggest how its features can be improved</li> <li>5. Group activity for suggesting brand names, names of enterprises, etc.</li> </ol>	<b>15</b>
<b>Total</b>			<b>25</b>

<b>Unit 5: Green Skills - III</b>			
<b>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	<ol style="list-style-type: none"> <li>1. Main sectors of green economy- E-waste management, green transportation, renewal energy, green construction, water management</li> <li>2. Policy initiatives for greening economy in India</li> </ol>	<ol style="list-style-type: none"> <li>1. Preparing a poster on any one of the sectors of green economy</li> <li>2. Writing a two-page essay on important initiatives taken in India for promoting green economy</li> </ol>	<b>08</b>

2. Describe the major green Sectors/Areas and the role of various stakeholder in green economy	1. Stakeholders in green economy 2. Role of government and private agencies in greening cities, buildings, tourism, industry, transport, renewable energy, waste management, agriculture, water, forests and fisheries	1. Preparing posters on green Sectors/Areas: cities, buildings, tourism, industry, transport, renewable energy, waste management, agriculture, water, forests and fisheries	<b>07</b>
<b>Total</b>			<b>15</b>

## CLASS 11

### Part B: Vocational Skills

S.No.	Units	Duration (Hrs)
1.	Introduction to Protected Cultivation	20
2.	Types of Protected Structure and its Components	35
3.	Preparation of Media and Container for Commercial Cultivation in Greenhouses	35
4.	Irrigation and Fertigation System	35
5.	Greenhouse Operations	40
	<b>Total</b>	<b>165</b>

<b>Unit 1: Introduction to Protected Cultivation</b>			
Learning Outcome	Theory (15hrs)	Practical (5hrs)	Duration (20 Hrs)
1. Describe protected cultivation and its importance	1. Define protected cultivation 2. Advantages of protected cultivation 3. Define green house effect	1. Enlist advantages of protected cultivation	<b>10</b>
2. Select the site for protected cultivation	1. Criteria to be considered for site selection	1. Enlist factors affecting protected cultivation	<b>05</b>
3. Horticulture crops suitable for protected cultivation	1. Types of horticulture crops suitable for protected cultivation 2. Varieties of Horticulture crops suitable for protected cultivation	1. Enlist and identify different crops suitable for protected cultivation	<b>05</b>
<b>Total</b>			<b>20</b>

<b>Unit 2: Types of Protected Structure and its Components</b>			
<b>Learning Outcome</b>	<b>Theory (20 hrs)</b>	<b>Practical (15 hrs)</b>	<b>Duration (35 Hrs)</b>
1. Types of protected structures	<ol style="list-style-type: none"> <li>Types of protected structures used in cultivation of crops</li> <li>Merits and demerits of different structures</li> <li>Greenhouse</li> <li>Shade house</li> <li>What are walk in and low tunnels</li> <li>What is mist house</li> </ol>	<ol style="list-style-type: none"> <li>Differentiate greenhouse shade house and low tunnels</li> <li>Demonstration of utility of mist house</li> </ol>	<b>12</b>
2. Identify greenhouses	<ol style="list-style-type: none"> <li>Classify greenhouses according to shape</li> <li>Define cladding material</li> <li>Classification according to cladding material</li> </ol>	<ol style="list-style-type: none"> <li>Identify the cladding material used for greenhouse erection</li> </ol>	<b>06</b>
3. Select of greenhouse design	<ol style="list-style-type: none"> <li>What are different factors to be considered for selection of location specific design</li> </ol>	<ol style="list-style-type: none"> <li>Enlist factors affecting selection of greenhouse design</li> </ol>	<b>07</b>
4. Identify components of greenhouse	<ol style="list-style-type: none"> <li>Different components of ideal greenhouse</li> <li>Cooling unit and give its importance</li> <li>Heating unit and where it is required</li> <li>Fertigation unit and its utility</li> <li>Tools and equipments used in greenhouse</li> <li>Measurement of greenhouse environment (light, temperature, RH, CO<sub>2</sub>)</li> </ol>	<ol style="list-style-type: none"> <li>Draw a typical greenhouse and label the parts</li> <li>Collect figures of different components of greenhouse</li> </ol>	<b>10</b>
<b>Total</b>			<b>35</b>

<b>Unit 3: Preparation of Media and Container for Commercial Cultivation in Greenhouse</b>			
<b>Learning Outcome</b>	<b>Theory (15 hrs)</b>	<b>Practical (20 hrs)</b>	<b>Duration (35 Hrs)</b>
1. Identify media and its composition	<ol style="list-style-type: none"> <li>Define media</li> <li>Different types of media</li> <li>Ideal composition of media</li> <li>Soil-less cultivation</li> </ol>	<ol style="list-style-type: none"> <li>Identification of various types of media</li> <li>Differentiate soil and soil-less cultivation in green house</li> </ol>	<b>12</b>
2. Sterilize growing media	<ol style="list-style-type: none"> <li>Soil borne pathogens</li> <li>Soil sterilization</li> <li>Different methods of soil sterilization</li> </ol>	<ol style="list-style-type: none"> <li>Differentiation of chemical and physical methods of soil sterilization</li> </ol>	<b>10</b>

<b>Unit 3: Preparation of Media and Container for Commercial Cultivation in Greenhouse</b>			
<b>Learning Outcome</b>	<b>Theory (15 hrs)</b>	<b>Practical (20 hrs)</b>	<b>Duration (35 Hrs)</b>
3. Prepare of beds	<ol style="list-style-type: none"> <li>1. Prepare raised and flat beds</li> <li>2. Advantages of raised beds</li> </ol>	<ol style="list-style-type: none"> <li>1. Demonstration of raised beds preparation</li> </ol>	<b>05</b>
4. Identify container and its filling	<ol style="list-style-type: none"> <li>1. What types of pots/containers used for growing crops in greenhouses</li> <li>2. Composition of various growing media for filling of containers</li> </ol>	<ol style="list-style-type: none"> <li>1. Demonstration of filling of pots/containers</li> <li>2. Identification of containers</li> <li>3. Enlist different constituents of growing media</li> </ol>	<b>08</b>
<b>Total</b>			<b>35</b>

<b>Unit 4: Irrigation and Fertigation Systems</b>			
<b>Learning Outcome</b>	<b>Theory (12 hrs)</b>	<b>Practical (23 hrs)</b>	<b>Duration (35 Hrs)</b>
1. Water quality and requirement	<ol style="list-style-type: none"> <li>1. Meaning of quality of water</li> <li>2. Water requirement for different crops</li> </ol>	<ol style="list-style-type: none"> <li>1. Demonstration of measuring pH, TDS and EC in water for irrigation</li> </ol>	<b>06</b>
2. Apply irrigation	<ol style="list-style-type: none"> <li>1. Define sprinkler irrigation</li> <li>2. Define drip irrigation</li> <li>3. Time and frequency of irrigation</li> </ol>	<ol style="list-style-type: none"> <li>1. Identification of components of drip irrigation</li> <li>2. Enlist merits and demerits of micro-irrigation</li> </ol>	<b>12</b>
3. Select fertilizers for protected cultivation	<ol style="list-style-type: none"> <li>1. Define fertilizers.</li> <li>2. Straight and complex water soluble fertilizers</li> <li>3. Types of fertilizers suitable for drip irrigation</li> </ol>	<ol style="list-style-type: none"> <li>1. Identification of important water soluble fertilizers used in protected cultivation</li> </ol>	<b>08</b>
4. Demonstrate the application and time of fertigation	<ol style="list-style-type: none"> <li>1. Define fertigation</li> <li>2. Methods of fertilizer application</li> <li>3. Equipment required for fertigation</li> <li>4. Foliar application of fertilizers</li> </ol>	<ol style="list-style-type: none"> <li>1. Enlist advantages of foliar application</li> <li>2. Demonstration of fertigation procedure</li> <li>3. Identification of equipment used in fertigation</li> </ol>	<b>09</b>
<b>Total</b>			<b>35</b>

<b>Unit 5: Greenhouse Operations</b>			
<b>Learning Outcome</b>	<b>Theory (15 hrs)</b>	<b>Practical (25 hrs)</b>	<b>Duration (40 Hrs)</b>
1. Describe greenhouse operations	1. Define greenhouse. 2. Define naturally ventilated polyhouse 3. Different operations in greenhouse 4. Different equipments used in greenhouses	1. Enlist different greenhouse operations 2. Enlist equipment used	<b>08</b>
2. Manage the temperature	1. Importance of temperature in plant growth 2. Procedure of regulation of temperature	1. Demonstration of the regulation of temperature 2. Enlist optimum temperature for important flower and vegetable crops	<b>08</b>
3. Manage Light	1. Importance of light in plant growth 2. Procedure of measured and regulated light	1. Demonstration of the regulation process of light	<b>05</b>
4. Manage Humidity	1. Role of RH in plant growth 2. Measurement of humidity 3. Procedure of regulation of humidity	1. Demonstration of how to regulate the humidity 2. Enlist effect of high and low humidity	<b>06</b>
5. CO <sub>2</sub> (carbon-dioxide) enrichment	1. Importance of CO <sub>2</sub> to increase photosynthesis 2. Process to increased the CO <sub>2</sub> in greenhouse	1. Demonstration of the use of CO <sub>2</sub> enrichment Procedure	<b>05</b>
6. Ventilation of greenhouse	1. Importance of ventilation in naturally ventilated polyhouse 2. Regulate the ventilation	1. Demonstration of the use of ventilation in green house	<b>08</b>
<b>Total</b>			<b>40</b>

## CLASS 12

### Part A-Employability Skills

<b>S.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>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	1. Importance of active listening at workplace 2. Steps to active listening	1. Demonstration of the key aspects of becoming active listener 2. Preparing posters of steps for active listening	<b>10</b>
2. Demonstrate basic writing skills	2. 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>	1. Demonstration and practice of writing sentences and paragraphs on topics related to the subject	<b>15</b>
<b>Total</b>			<b>25</b>

<b>Unit 2: Self-management Skills – IV</b>			
<b>Learning Outcome</b>	<b>Theory (10 hrs)</b>	<b>Practical (15 hrs)</b>	<b>Total Duration (25 Hrs)</b>
1. Describe the various factors influencing self-motivation	1. Finding and listing motives (needs and desires); 2. Finding sources of motivation and inspiration (music, books, activities);expansive thoughts; living fully in the present moment; dreaming big	1.Group discussion on identifying needs and desire 2. Discussion on sources of motivation and inspiration	<b>10</b>
2. Describe the basic personality traits, types and disorders	1. Describe the meaning of personality 2. Describe how personality influence others 3. Describe basic personality traits 4. Describe common personality disorders- paranoid, antisocial, schizoid, borderline, narcissistic, avoidant, dependent and obsessive	1. Demonstrate the knowledge of different personality types	<b>15</b>
<b>Total</b>			<b>25</b>



<b>Unit 3: Information and Communication Technology Skills - IV</b>			
<b>Learning Outcome</b>	<b>Theory (10 hrs)</b>	<b>Practical (15 hrs)</b>	<b>Total Duration (25 Hrs)</b>
1. Perform tabulation using spreadsheet application	<ol style="list-style-type: none"> <li>1. Introduction to spreadsheet application</li> <li>2. Spreadsheet applications</li> <li>3. Creating a new worksheet</li> <li>4. Opening workbook and entering text</li> <li>5. Resizing fonts and styles</li> <li>6. Copying and moving</li> <li>7. Filter and sorting</li> <li>8. Formulas and functions</li> <li>9. Password protection.</li> <li>10. Printing a spreadsheet.</li> <li>11. Saving a spreadsheet in various formats.</li> </ol>	<ol style="list-style-type: none"> <li>1. Demonstration and practice on the following: <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> </li> </ol>	<b>10</b>
2. Prepare presentation using presentation application	<ol style="list-style-type: none"> <li>1. Introduction to presentation</li> <li>2. Software packages for presentation</li> <li>3. Creating a new presentation</li> <li>4. Adding a slide</li> <li>5. Deleting a slide</li> <li>6. Entering and editing text</li> <li>7. Formatting text</li> <li>8. Inserting clipart and images</li> <li>9. Slide layout</li> <li>10. Saving a presentation</li> <li>11. Printing a presentation document.</li> </ol>	<ol style="list-style-type: none"> <li>1. Demonstration and practice on the following: <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> </li> </ol>	<b>15</b>
<b>Total</b>			<b>25</b>

<b>Unit 4: Entrepreneurial Skills - IV</b>			
<b>Learning Outcome</b>	<b>Theory (10 hrs)</b>	<b>Practical (15 hrs)</b>	<b>Total Duration (25 Hrs)</b>
1. Identify the general and entrepreneurial behavioural competencies	<ol style="list-style-type: none"> <li>1. Barriers to becoming entrepreneur</li> <li>2. Behavioural and entrepreneurial competencies – adaptability/decisiveness, initiative/perseverance, interpersonal skills, organizational skills, stress management, valuing service and diversity</li> </ol>	<ol style="list-style-type: none"> <li>1. Administering self-rating questionnaire and score responses on each of the competencies</li> <li>2. Collect small story/ anecdote of prominent successful entrepreneurs</li> <li>3. Identify entrepreneurial competencies reflected in each story and connect it to the definition of behavioural competencies</li> <li>4. Preparation of competencies profile of students</li> </ol>	<b>10</b>
2. Demonstrate the knowledge of self-assessment of behavioural competencies	<ol style="list-style-type: none"> <li>1. 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> </ol>	<ol style="list-style-type: none"> <li>1. 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> </ol>	<b>15</b>
<b>Total</b>			<b>25</b>

<b>Unit 5: Green Skills - IV</b>			
<b>Learning Outcome</b>	<b>Theory (05 hrs)</b>	<b>Practical (10 hrs)</b>	<b>Total Duration (15 Hrs)</b>
1. Identify the role and importance of green jobs in different sectors	<ol style="list-style-type: none"> <li>1. Role of green jobs in toxin-free homes,</li> <li>2. Green organic gardening, public transport and energy conservation,</li> <li>3. Green jobs in water conservation</li> <li>4. Green jobs in solar and wind power, waste reduction, reuse and recycling of wastes,</li> </ol>	<ol style="list-style-type: none"> <li>1. Listing of green jobs and preparation of posters on green job profiles</li> <li>2. Prepare posters on green jobs.</li> </ol>	<b>15</b>

	<ol style="list-style-type: none"> <li>5. Green jobs in green tourism</li> <li>6. Green jobs in building and construction</li> <li>7. Green jobs in appropriate technology</li> <li>8. Role of green jobs in Improving energy and raw materials use</li> <li>9. Role of green jobs in limiting greenhouse gas emissions</li> <li>10. Role of green jobs minimizing waste and pollution</li> <li>11. Role of green jobs in protecting and restoring ecosystems</li> <li>12. Role of green jobs in support adaptation to the effects of climate change</li> </ol>		
<b>Total</b>			<b>15</b>

## CLASS 12

### Part B–Vocational Skills

S.No.	Units	Duration (Hrs)
1.	Care and Maintenance of Protected Structure	30
2.	Protected Cultivation of rose, gerbera, carnation, liliun, orchids	45
3.	Special Horticultural Practices in Protected Cultivation	30
4.	Control of Insect Pest and Diseases in Flower Crops	25
5.	Harvesting and Post Harvest Management	35
	<b>Total</b>	<b>165</b>

#### Unit 1: Care and Maintenance of Protected Structure

Learning Outcome	Theory (10 hrs)	Practical (20 hrs)	Duration (30 Hrs)
1. Care of greenhouse structure	1. Steps taken during care and maintenance of greenhouse	1. Enlist major steps involved in greenhouse maintenance	<b>12</b>
2. Care and maintenance of drip irrigation system	<ol style="list-style-type: none"> <li>1. Causes of blockage in irrigation system</li> <li>2. Cleaning process of drip system</li> </ol>	1. Demonstration of the steps for care of drip irrigation system	<b>06</b>

<b>Unit 1: Care and Maintenance of Protected Structure</b>			
<b>Learning Outcome</b>	<b>Theory (10 hrs)</b>	<b>Practical (20 hrs)</b>	<b>Duration (30 Hrs)</b>
3. Care and maintenance of fogging system	<ol style="list-style-type: none"> <li>1. Define fogging system</li> <li>2. Reasons to block fogging system</li> <li>3. Process of cleaning fogging system</li> </ol>	1. Demonstrate care and maintenance practices for fogging system	<b>06</b>
4. Sanitation practices in greenhouse	<ol style="list-style-type: none"> <li>1. Importance of sanitation in green house.</li> <li>2. Sanitation practices to be followed in greenhouse</li> </ol>	1. Demonstration of sanitation practices in green house	<b>06</b>
<b>Total</b>			<b>30</b>

<b>Unit 2: Protected Cultivation of Rose, Gerbera, Carnation, Lilium and Orchids</b>			
<b>Learning Outcome</b>	<b>Theory (15 hrs)</b>	<b>Practical (30 hrs)</b>	<b>Duration (45 Hrs)</b>
1. Prepare bed/ media for growing crops	<ol style="list-style-type: none"> <li>1. Greenhouse environment required for rose, gerbera, carnation, lilium and orchids</li> <li>2. Composition of media</li> <li>3. Preparation of bed/ pot</li> </ol>	<ol style="list-style-type: none"> <li>1. Enlist favourable climatic factors inside the greenhouse for cultivation of these crops</li> <li>2. Identify media</li> <li>3. Enlist the component of media</li> </ol>	<b>10</b>
2. Select varieties	<ol style="list-style-type: none"> <li>1. Describe the suitable varieties</li> <li>2. Importance of different varieties</li> </ol>	1. Enlist commercial varieties and their characters	<b>06</b>
3. Demonstrate Planting	<ol style="list-style-type: none"> <li>1. Optimum spacing for rose, gerbera, carnation, lilium and orchids</li> <li>2. Method of planting in these crops</li> </ol>	<ol style="list-style-type: none"> <li>1. Demonstration of transplanting</li> <li>2. Enlist the optimum spacing of given crops</li> </ol>	<b>05</b>
4. Demonstrate Special operations	1. Special operations for rose, gerbera, lilium, carnation and orchids cultivation	<ol style="list-style-type: none"> <li>1. Enlist/ demonstration of various special operations in given crops</li> <li>2. Enlist various special operations</li> </ol>	<b>05</b>
5. Apply Irrigation and fertigation	<ol style="list-style-type: none"> <li>1. Water and nutrient requirements of these flower crops</li> <li>2. Requirement of irrigation</li> <li>3. Describe fertigation</li> <li>4. Process of fertigation</li> </ol>	<ol style="list-style-type: none"> <li>1. Depict fertigation system on chart</li> <li>2. Calculate the dose of fertilizer</li> <li>3. Demonstration of the irrigation schedule in given crops</li> </ol>	<b>07</b>

<b>Unit 2: Protected Cultivation of Rose, Gerbera, Carnation, Lilium and Orchids</b>			
<b>Learning Outcome</b>	<b>Theory (15 hrs)</b>	<b>Practical (30 hrs)</b>	<b>Duration (45 Hrs)</b>
6. Apply plant protection	<ol style="list-style-type: none"> <li>1. Major insect pests and diseases in the flower crops</li> <li>2. Management of insect pest and diseases</li> </ol>	<ol style="list-style-type: none"> <li>1. Identification of major pest and diseases in these crops</li> <li>2. Demonstration of plant protection measure</li> </ol>	<b>05</b>
7. Harvest and post harvest management	<ol style="list-style-type: none"> <li>1. Time and method of Harvesting</li> <li>2. Flower yield in per unit area</li> <li>3. Different post harvest practices to be followed? (harvesting, pre-cooling, sorting, grading, packing, storage, transport)</li> </ol>	<ol style="list-style-type: none"> <li>1. Demonstration of method of harvesting.</li> <li>2. Prepare flow charts of post harvest handling.</li> </ol>	<b>07</b>
<b>Total</b>			<b>45</b>

<b>Unit 3: Special Horticultural Practices in Protected Cultivation</b>			
<b>Learning Outcome</b>	<b>Theory (10 hrs)</b>	<b>Practical (20 hrs)</b>	<b>Duration (30 Hrs)</b>
1. Demonstrate special horticultural practices	<ol style="list-style-type: none"> <li>1. Bending in rose, pinching disbudding, staking, deshooting</li> </ol>	<ol style="list-style-type: none"> <li>1. Demonstration of bending, pinching, staking and deshooting</li> </ol>	<b>10</b>
2. Classify plant growth regulators	<ol style="list-style-type: none"> <li>1. Plant growth regulator (PGR)</li> <li>2. Different types of PGR</li> <li>3. Role of different PGR</li> </ol>	<ol style="list-style-type: none"> <li>1. Enlist various PGR used in protected cultivation</li> </ol>	<b>10</b>
3. Apply plant growth regulator	<ol style="list-style-type: none"> <li>1. Methods of application of growth regulator</li> <li>2. Preparation of PGR solutions</li> <li>3. Define stock solution</li> </ol>	<ol style="list-style-type: none"> <li>1. Demonstration of the use of plant growth regulators</li> </ol>	<b>10</b>
<b>Total</b>			<b>30</b>

<b>Unit 4: Control of Insect- Pest and Diseases in Flower Crops</b>			
<b>Learning Outcome</b>	<b>Theory (10 hrs)</b>	<b>Practical (15 hrs)</b>	<b>Duration (25 Hrs)</b>
1. Identify insect, pest, disease and physiological disorders	<ol style="list-style-type: none"> <li>1. Insect, pest, disease and physiological disorders</li> <li>2. What are important sucking pest of flower crops</li> <li>3. Major non-sucking pest</li> <li>4. Common diseases of flower crops</li> <li>5. Physiological disorder</li> </ol>	<ol style="list-style-type: none"> <li>1. Identification of important diseases and insect pest in given flower crops.</li> <li>2. Identification of physiological disorder</li> </ol>	<b>10</b>

<b>Unit 4: Control of Insect- Pest and Diseases in Flower Crops</b>			
<b>Learning Outcome</b>	<b>Theory (10 hrs)</b>	<b>Practical (15 hrs)</b>	<b>Duration (25 Hrs)</b>
	found in flowering crop in protected structure		
2. Manage important insect, diseases and physiological disorders in protected cultivation	<ol style="list-style-type: none"> <li>1. Management of insect pest and diseases</li> <li>2. Precautions you would take to avoid physiological disorders</li> </ol>	<ol style="list-style-type: none"> <li>1. Preparation of solution of given chemicals.</li> <li>2. Demonstration of the use of insecticides fungicides.</li> <li>3. Calculation of the quantity of given pesticides</li> <li>4. Demonstration of the precautions taken during spraying</li> </ol>	<b>15</b>
<b>Total</b>			<b>50</b>

<b>Unit 5: Harvesting and Post Harvest Management</b>			
<b>Learning Outcome</b>	<b>Theory (12 hrs)</b>	<b>Practical (23 hrs)</b>	<b>Duration (35 Hrs)</b>
1. Stage and time of harvesting	<ol style="list-style-type: none"> <li>1. Important stages of harvesting</li> <li>2. Best time and procedure of harvesting</li> </ol>	<ol style="list-style-type: none"> <li>1. Identification of stage of harvesting in different crops</li> <li>2. Demonstration of harvesting practices</li> </ol>	<b>10</b>
2. Explain pre-cooling, sorting and grading	<ol style="list-style-type: none"> <li>1. Define pre-cooling</li> <li>2. Process of pre cooling</li> <li>3. Define sorting</li> <li>4. Importance of cooling and grading</li> </ol>	<ol style="list-style-type: none"> <li>1. Demonstration of sorting</li> <li>2. Demonstration of cooling</li> <li>3. Demonstration of the grading in given crop</li> </ol>	<b>08</b>
3. Apply post harvest treatments	<ol style="list-style-type: none"> <li>1. Define Pulsing</li> <li>2. Importance of pre-conditioning</li> <li>3. Preparation of holding solution</li> <li>4. Important floral preservatives</li> </ol>	<ol style="list-style-type: none"> <li>1. Preparation of holding solutions</li> <li>2. Enlist flower preservatives</li> <li>3. Proper pulsing solution</li> </ol>	<b>07</b>
4. Demonstrate packaging, storage and transportation (cool chain management)	<ol style="list-style-type: none"> <li>1. Define packaging</li> <li>2. Describe types of packaging</li> <li>3. Cold chain and its importance</li> <li>4. Transportation of flowers</li> <li>5. Packaging of flowers</li> <li>6. Process of flower storage</li> </ol>	<ol style="list-style-type: none"> <li>1. Enlist different packaging materials suitable for flowers</li> <li>2. Enlist various means of transportation</li> <li>3. Demonstration of packaging procedure in given crop</li> </ol>	<b>10</b>
<b>Total</b>			<b>35</b>

## 6. ORGANISATION OF FIELD VISITS

---

In a year, at least 3 field visits/educational tours should be organised for the students to expose them to the activities in the workplace.

Visit a Polyhouse/Green house and observe the following: Location, Site , area, types of greenhouse, infrastructure, equipments used, Office building, Store, Pot yard, Packing Yard, Seed bed, Nursery bed, Water tank/Tube well, Gate and fencing. During the visit, students should obtain the following information from the owner or the supervisor of the nursery:

1. Area under polyhouse and its layout
2. Types of plants raised
3. Type of rootstock used
4. Methods of propagation adopted
5. Whether plants raised by micropropagation
6. Number of plants grow annually
7. Number of plants/flowers sold annually
8. Sale procedure
9. Manpower engaged
10. Total expenditure in construction of greenhouse
11. Irrigation unit
12. Fertigation unit
13. Total annual income
14. Profit/Loss (Annual)
15. Any other information

## 7. LIST OF EQUIPMENT AND MATERIALS

---

**T**he 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.

- |                         |                      |
|-------------------------|----------------------|
| 1. Tape                 | 14. Pruning knife    |
| 2. Crow bar             | 15. Super cut        |
| 3. Rope                 | 16. Thinning scissor |
| 4. Khurpi               | 17. Hand cultivator  |
| 5. Wheel hoe            | 18. Hand weeder      |
| 6. Trenching hoe        | 19. Weeding fork     |
| 7. Transplanting trowel | 20. Garden hoe       |
| 8. Dibbler              | 21. Shovel           |
| 9. Planting board       | 22. Digging fork     |
| 10. Secateur            | 23. Garden rake      |
| 11. Garden hatchet      | 24. Spade            |
| 12. Water can           | 25. Small Trowel     |
| 13. Sprinkler           | 26. Rake             |

- |  |  |
|--|--|
| 16. Sprayer                                  | 37. Drip and sprinkler                       |
| 17. Duster                                   | 38. Mobile benches                           |
| 18. Temperature & humidity control system    | 39. Fan                                      |
| 19. Automatic shade system                   | 40. Pad                                      |
| 20. Fogging and blackout                     | 41. Ventilator                               |
| 21. Irrigation system                        | 42. Thermometer                              |
| 22. Mobile benches,                          | 43. Lux meter/Light meter                    |
| 23. Fan                                      | 44. Misting                                  |
| 24. Pad                                      | 45. Digital electronic temperature indicator |
| 25. Ventilator                               | 46. Radiation measuring instrument           |
| 26. Thermometer                              | 47. Sprayer                                  |
| 27. Lux meter/Light meter                    | 48. Hygrometer                               |
| 28. Misting                                  |  |
| 29. Digital electronic temperature indicator | <b>(ii)List of Chemicals</b>                 |
| 30. Radiation measuring instrument           | 49. Dry and liquid fertiliser                |
| 31. Sprayer                                  | 50. Peat                                     |
| 32. Hygrometer.                              | 51. Formalin                                 |
| 33. Temperature & humidity control system    | 52. Bavestin                                 |
| 34. Automatic shade system                   | 53. Sulphur                                  |
| 35. Fogging and blackout                     | 54. Insecticide                              |
| 36. Irrigation system                        | 55. Indofil-45                               |
|  | 56. Neem cake                                |
|  | 57. Plant Growth regulator/hormones          |

## 8. VOCATIONAL TEACHER'S/ TRAINER'S QUALIFICATION AND GUIDELINES

Qualification and other requirements for appointment of vocational teachers/trainers on contractual basis should be decided by the State/UT. The suggestive qualifications and minimum competencies for the vocational teacher should be as follows:

S. No.	Qualification	Minimum Competencies	Age Limit
1.	Post-graduation in Horticulture from a recognized Institute/University, with at least 1 year work experience	<ul style="list-style-type: none"> <li>Effective communication skills (oral and written)</li> <li>Basic computing skills.</li> </ul>	18-37 years (as on Jan. 01 (year))  Age relaxation to be provided as per Govt. rules

Vocational Teachers/Trainers form the backbone of Vocational Education being imparted as an integral part of Rashtriya Madhyamik Shiksha Abhiyan (RMSA). They are directly involved in teaching of vocational subjects and also serve as a link between the industry and the schools for arranging industry visits, On-the-Job Training (OJT) and placement.



These guidelines have been prepared with an aim to help and guide the States in engaging quality Vocational Teachers/Trainers in the schools. Various parameters that need to be looked into while engaging the Vocational Teachers/Trainers are mode and procedure of selection of Vocational Teachers/Trainers, Educational Qualifications, Industry Experience, and Certification/Accreditation.

The State may engage Vocational Teachers/Trainers in schools approved under the component of Vocationalisation of Secondary and Higher Secondary Education under RMSA in the following ways:

- (i) Directly as per the prescribed qualifications and industry experience suggested by the PSS Central Institute of Vocational Education(PSSCIVE), NCERT or the respective Sector Skill Council(SSC)

OR

- (ii) Through accredited Vocational Training Providers accredited under the National Quality Assurance Framework (NQAF\*) approved by the National Skill Qualification Committee on 21.07.2016. If the State is engaging Vocational Teachers/Trainers through the Vocational Training Provider (VTP), it should ensure that VTP should have been accredited at NQAF Level 2 or higher.

\* *The National Quality Assurance Framework (NQAF) provides the benchmarks or quality criteria which the different organisations involved in education and training must meet in order to be accredited by competent bodies to provide government-funded education and training/skills activities. This is applicable to all organizations offering NSQF-compliant qualifications.*

The educational qualifications required for being a Vocational Teacher/Trainer for a particular job role are clearly mentioned in the curriculum for the particular NSQF compliant job role. The State should ensure that teachers / trainers deployed in the schools have relevant technical competencies for the NSQF qualification being delivered. The Vocational Teachers/Trainers preferably should be certified by the concerned Sector Skill Council for the particular Qualification Pack/Job role which he will be teaching. Copies of relevant certificates and/or record of experience of the teacher/trainer in the industry should be kept as record.

To ensure the quality of the Vocational Teachers/Trainers, the State should ensure that a standardized procedure for selection of Vocational Teachers/Trainers is followed. The selection procedure should consist of the following:

- (i) Written test for the technical/domain specific knowledge related to the sector;
- (ii) Interview for assessing the knowledge, interests and aptitude of trainer through a panel of experts from the field and state representatives; and
- (iii) Practical test/mock test in classroom/workshop/laboratory.

In case of appointment through VTPs, the selection may be done based on the above procedure by a committee having representatives of both the State Government and the VTP.

The State should ensure that the Vocational Teachers/Trainers who are recruited should undergo induction training of 20 days for understanding the scheme, NSQF framework and Vocational Pedagogy before being deployed in the schools.

The State should ensure that the existing trainers undergo in-service training of 5 days every year to make them aware of the relevant and new techniques/approaches in their sector and understand the latest trends and policy reforms in vocational education.

The Head Master/Principal of the school where the scheme is being implemented should facilitate and ensure that the Vocational Teachers/Trainers:

- (i) Prepare session plans and deliver sessions which have a clear and relevant purpose and which engage the students;
- (ii) Deliver education and training activities to students, based on the curriculum to achieve the learning outcomes;
- (iii) Make effective use of learning aids and ICT tools during the classroom sessions;
- (iv) Engage students in learning activities, which include a mix of different methodologies, such as project based work, team work, practical and simulation based learning experiences;
- (v) Work with the institution's management to organise skill demonstrations, site visits, on-job trainings, and presentations for students in cooperation with industry, enterprises and other workplaces;
- (vi) Identify the weaknesses of students and assist them in upgradation of competency;
- (vii) Cater to different learning styles and level of ability of students;
- (viii) Assess the learning needs and abilities, when working with students with different abilities
- (ix) Identify any additional support the student may need and help to make special arrangements for that support;
- (x) Provide placement assistance

Assessment and evaluation of Vocational Teachers/Trainers is very critical for making them aware of their performance and for suggesting corrective actions. The States/UTs should ensure that the performance of the Vocational Teachers/Trainers is appraised annually. Performance based appraisal in relation to certain pre-established criteria and objectives should be done periodically to ensure the quality of the Vocational Teachers/Trainers. Following parameters may be considered during the appraisal process:

1. Participation in guidance and counselling activities conducted at Institutional, District and State level;
2. Adoption of innovative teaching and training methods;
3. Improvement in result of vocational students of Class X or Class XII;
4. Continuous upgradation of knowledge and skills related to the vocational pedagogy, communication skills and vocational subject;
5. Membership of professional society at District, State, Regional, National and International level;
6. Development of teaching-learning materials in the subject area;
7. Efforts made in developing linkages with the Industry/Establishments;
8. Efforts made towards involving the local community in Vocational Education
9. Publication of papers in National and International Journals;
10. Organisation of activities for promotion of vocational subjects;
11. Involvement in placement of students/student support services.

## 9. LIST OF CONTRIBUTORS

Sl. No.	Name and address of expert
1.	Dr. Devender S. Dahiya, Professor, Department of Horticulture, CCS Haryana Agricultural University, Hissar, Haryana
2.	Dr. S.K. Sehrawat, Professor, Department of Horticulture, College of Agriculture, CCS Haryana Agricultural University, Hissar, Haryana
3.	Dr. Deepa H. Diwedi, Associate Professor and Head, Department of Floriculture, Dr. B.R. Ambedkar University, Vidhya Vihar, Rae Bareli Road, Lucknow – 226 025, UP
4.	Dr. Balaji Shreedhar Kulkarni, Professor and Head, Department of Floriculture and Landscape Architecture, KRC, College of Horticulture, Arabhavi – 591 218, Tq. Gokak, District Belgaum, Karnataka
5.	Dr. R.K. Jaiswal, Professor, Department of Horticulture, College of Agriculture, Old Sehore Road, Indore
6.	Dr. S.A. Ali, Principal Scientist, Department of Horticulture, RAK College of Agriculture, Sehore, Madhya Pradesh
7.	Shri Rajiv Kumar, Director, Business Development, Oshnic Agro-vision Pvt. Ltd., C-113, Vidhya Nagar, Houshangabad Road, Bhopal
8.	Dr. Y.D. Khan, Full-Time Teacher, Talsa Bai Kawal Junior College, Patur – 444 501, District Akola, Maharashtra
9.	Shri Gajanan D. Mawal, Full-Time Teacher, Late SAU Vijayatai Deshmukh Junior College, Alegaon, Patur – 444 511 District Akola, Maharashtra
10.	Dr. Uadal Singh, Assistant Professor, Department of Agriculture and Animal Husbandry, PSSCIVE, NCERT, Shyamla Hills, Bhopal–462 013, Madhya Pradesh
11.	Dr. Rajiv Kumar Pathak, Professor and Head, Department of Agriculture and Animal Husbandry, PSSCIVE, NCERT, Shyamla Hills, Bhopal–462 013, Madhya Pradesh

## 10. LIST OF REVIEWERS

Dr. D. L. N. Rao  
Emeritus Scientist  
Indian Institute of Soil Science  
Nabi Bagh, Berasia Road, Bhopal



**PSS CENTRAL INSTITUTE OF VOCATIONAL EDUCATION**  
**Shyamla Hills, Bhopal- 462 013, M.P., India**