

UNIVERSITY OF MUMBAI



**Syllabus for the T.Y.B.Voc.
Program: B.Voc.
Course : Green House Management**

(Credit Based Semester and Grading System
with effect from the academic year 2016–2017)

University of Mumbai Credit Based & Grading System
T Y B.Voc. - Green House Management Syllabus
To be implemented from the Academic year 2016-2017

SEMESTER V


Course Code	UNIT	TOPICS	Credits	L / Wk
UVGHM501 to 503& UVGHMP501-503 Skill Component			18	
UVGHM501	<u>Propagation and harvesting of Green House Plants</u>		2	2
	I	Vegetable , Exotic Vegetable Crops and Fruits		
	II	Harvesting of green house grown Ornamentals ,Fruits and Vegetables		
UVGHM502	<u>In-vitro techniques for propagating Green-House crops- I</u>		2	2
	I	Basic Principles and Media		
	II	Methodologies for <i>in-vitro</i> propagation.		
UVGHM503	<u>Green House Pests and their Management</u>		2	2
	I	Types of pests in the green house		
	II	Pest Management		
UVGHMP501-503	Practicals based on theory of Skill Component		12	
UVGHM504to506&UVGHMP504-505 General EducationComponent			12	
UVGHM504	<u>Home Gardening-V</u>		2	2
	I	Fresh and Dry flower decoration		
	II	Landscaping -III		
UVGHM505	<u>Collection, Analysis & Presentation of Numerical Data-I</u>		2	2
	I	Basics of Biometry		
	II	Test of Significance		
UVGHM506	<u>Communication Skills-V</u>		2	2
	I	Public speaking skills		
	II	ICT in communication		
UVGHMP504-505	Practicals based on theory of General Education Component		6	6

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SEMESTER VI


Course Code	UNIT	TOPICS	Credits	L/Wk
UVGHM601 to 603& UVGHMP601-603 Skill Component			18	
UVGHM601	<u>In Vitro Techniques Propagation of Green House Crops-II,</u>		2	2
	I	Case Studies		
	II	Applications		
UVGHM602	<u>Greenhouse Management</u>		2	2
	I	Greenhouse maintenance		
	II	Application of greenhouse Technology		
UVGHM603	<u>Post Harvest Handling of Ornamentals</u>		2	2
	I	Handling of Cut Flowers, Other Ornamentals ,Fruits & Vegetables		
	II	Storage and Transport		
UVGHMP601 -603	Internship based on Skill Component		12	
UVGHM604 to 606 &UVGHMP604-605 General Education Component			12	
UVGHM604	<u>Market Availability and Marketing of Green House Produce</u>		2	2
	I	Availability of Green House produce in the market and its Marketing		
	II	Methods of Marketing, Green house produce Challenges and opportunities		
UVGHM605	<u>Entrepreneurship and Management Skills</u>		2	2
	I	Entrepreneurship Skills I		
	II	Management Skills		
UVGHM606	<u>ICT in Green House Managemant</u>		2	2
	I	ICT in Green House Management-I		
	II	ICT in Green House Management- II		
UVGHMP604 -605	Internship based on General Component		6	6

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Semester V UVGHM501	L	Cr
PAPER- I. <u>Propagation and harvesting of Green House Plants</u>	30	2
<u>UNIT I Vegetables, Exotic Vegetables and fruits</u>	15	
<ul style="list-style-type: none"> • Natural and artificial methods of propagation of minimum three vegetable crops and two exotic vegetables grown in green House • Methods of planting and caring of minimum three vegetable crops and two exotic vegetables grown in green House (Examples: <ul style="list-style-type: none"> ○ Capsicum, Tomato, Cucumber or any other ○ Parsley, Red Cabbage, Broccoli, Leek, , Lettuce <p><u>Fruits</u></p> <ul style="list-style-type: none"> • Natural and artificial methods of propagation of minimum three fruit crops grown in green House • Methods of planting and caring of minimum three fruit crops grown in green House (Examples: Strawberry, Zucchini, Gooseberries, Cherry tomato) 		
<u>UNIT II Harvesting of green house grown Ornamentals</u>	15	
<ul style="list-style-type: none"> • Techniques of harvesting and Implements used for harvesting. • Scope of cut flowers in global trade, Global Scenario of cut flower production, Enhancing and delaying period of bloom by special methods • Flower forcing and year round flowering through physiological interventions • Chemical regulation, environmental manipulation • Cut flower standards and grades • Techniques of harvesting, • Implements used for harvesting • Crops: <i>Anthurium</i>, <i>Gerbera</i>, <i>Rose</i>, <i>Chrysanthemum</i>, Marigold, Tuberose. <p><u>Harvesting of green house grown Fruits and Vegetables</u></p> <ul style="list-style-type: none"> • Factors responsible for maturity & ripening . • Methods used for delaying ripening. • Harvest <ul style="list-style-type: none"> ○ Time of harvest, Techniques of harvesting, Handling of harvested products 		
		


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Semester V UVGHM502	L	Cr
Paper II -- <u>In-Vitro Techniques For Propagating Green-House Crops- I</u>	30	2
<u>UNIT I Basic Principles and Media</u> <ul style="list-style-type: none"> • Basic principles and concepts of plant tissue-culture; commercial exploitation in Green house crops & Commercial application using green house technology. • Media: types of media, media components, preparation of media, role of plant growth regulators in propagation of green house plants 	15	
<u>UNIT II Methodologies for in-vitro Propagation</u> <ul style="list-style-type: none"> • Virus elimination, organogenesis • Somatic embryogenesis, synthetic seeds • Micropropagation • Embryo rescue • Somaclonal variation 	15	
		


Semester V UVGHM503	L	Cr
Paper III – <u>Green House Pests And Their Management</u>	30	2
<u>UNIT I Types of Pests in the Green House</u> <ul style="list-style-type: none"> ○ Insects- aphids, thrips, bores- beetles, weevils, soil dwellers- caterpillars, grubs , white flies, Mealy bugs, Red spider mites ○ Snails ○ Nematodes ○ Algae 	15	
<u>UNIT II Pest Management</u> <ul style="list-style-type: none"> • Pest carriers—Human being, Plant material, soil ○ Mechanical control ○ Use of Insecticides – Chemical and Bio Pesticides <ul style="list-style-type: none"> ○ Biological Control of Pests ○ Physical,Chemical Control of Pests ○ Production of Insect Resistant Plants by conventional breeding and Biotechnological Methods ○ IPM <ul style="list-style-type: none"> ○ Cultural ○ Legal ○ IDM ○ IPM ○ ICM, 	15	
		

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Semester V UVGHM504	L	Cr
Paper IV <u>Floral decoration</u>	30	2
<u>UNIT I Fresh Flower and Dry flower decoration:</u> <ul style="list-style-type: none"> • Indian, Japanese and western style of arrangements • Harvesting (flower and plant parts) • Drying techniques • Arrangement Methods • Dry flower products • Future Areas of research in dry flower technology. 	15	
<u>UNIT II Landscaping-III</u> <ul style="list-style-type: none"> • Use of softwares for Landscape designing • Colour schemes 	15	
		


Semester V UVGHM505	L	Cr
Paper V -- <u>Collection, Analysis and Presentation of Numerical Data-I</u>	30	2
<u>UNIT I Basics of Biometry</u> <ul style="list-style-type: none"> • Use of Analytical tools correctly and appropriately to analyse the data. • Measurement of Central Tendency and Dispersion - Mean, Median, mode from grouped data. .The differences between and uses of mean, median and mode . Dispersion: mean deviation, Variance, Standard deviation, Coefficient of Variation, Standard Error. • Graphical Representation of Data: Construction of Simple Bar Graph, Histogram, Frequency polygon and Pie chart.. Calculation of the above using Excel worksheet and Statistical Soft ware. 	15	
<u>UNIT II Test of Significance</u> <ul style="list-style-type: none"> • Testing of Hypothesis • Student's t-test- paired and unpaired, Chi square test 	15	
		

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Semester V UVGHM506	L	Cr
Paper VI -- Communication Skills-V	30	2
<u>UNIT I Public Speaking Skills</u>	15	
Communication Skills <ul style="list-style-type: none"> • Barriers to effective communication • Improving communication • Fundamentals of Public Speaking • Leadership studies • Voice articulation • Communication skills in Labour Management 		
<u>UNIT II ICT in Communication</u>	15	
<ul style="list-style-type: none"> • Interpretation of technical data(interpretation of charts, graphs, maps) • e- marketing- <ul style="list-style-type: none"> ○ Introduction ○ Objectives ○ Benefits • IoTs in greenhouse Management 		
		

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Semester VI UVGHM601	L	Cr
Paper I : <i>In vitro</i> Techniques: Propagation of Green House Crops II	30	2
<u>UNIT I: Case Studies</u>	15	
<ul style="list-style-type: none"> • Commercial application of plants tissue culture with major emphasis on <ul style="list-style-type: none"> ○ Ornamentals ○ Fruit and vegetable crops (case study 4 examples each)-Kumar biotech, Pune 		
<u>UNIT II: Applications</u>	15	
<ul style="list-style-type: none"> • Packing and transport of micro-propagules, • <i>In vitro</i> propagation as a small scale industry • Methods of germplasm conservation 		

Semester VI UVGHM602	L	Cr
PAPER- II GREENHOUSE MANAGEMENT	30	2
<u>UNIT I Greenhouse maintenance</u>	15	
<ul style="list-style-type: none"> • Standard construction & laws of green house • Bad management of green house <ul style="list-style-type: none"> • Causes • Effects 		
<u>UNIT II Application of greenhouse Technology</u>	15	
<ul style="list-style-type: none"> • Enhancement of secondary metabolites using green house technology <ul style="list-style-type: none"> • Introduction • Types of secondary metabolites • Stress as a factor to production of secondary metabolites • Application of secondary metabolites 		
		


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Semester VI UVGHM603	L	Cr
Paper III – Post Harvest Handling of Ornamentals	30	2
<u>UNIT I Handling of ornamentals and cut flowers</u> <ul style="list-style-type: none"> • post-harvest handling of cut flowers, fruits and vegetables Methods of grading and Transport • Methods of storage and treatment • Methods of packing and transport of cut flowers to markets Methods of prolonging the vase life of cut flowers, 	15	
<u>UNIT II Storage and Transport</u> <ul style="list-style-type: none"> • Methods of storing and treatment, • Methods of packing and transport of fruits and vegetables to markets • Methods of improving the shelf life of fruits and vegetables • Adulterants/chemicals used for promoting the shelf life and attractive colours of fruits and vegetables 	15	
		

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Semester V UVGHM604	L	Cr
Paper IV -- <u>Market availability & Marketing of Green House Produce</u>	30	2
<u>UNIT I Availability of Green House produce in the market & its Marketing</u> <ul style="list-style-type: none"> • Availability of green house crops in the market • Elements in marketing- Packing, storage, transportation, distribution, financing • Types of marketing <ul style="list-style-type: none"> ○ direct(pick your own, road side sale, farmers market,) ○ indirect(terminal market firms, brokers, processors, cooperatives) ○ Retail outlets ○ Online marketing ○ QMS-Quality Management System 	15	
<u>UNIT II Methods of Marketing, Green house produce Challenges and opportunities</u> <ul style="list-style-type: none"> • Methods of marketing and sales <ul style="list-style-type: none"> ○ Methods of payment, Advertising and sales bullets, Economics and business plan • Challenges and Opportunities <ul style="list-style-type: none"> ○ Volumes and varieties ○ Industry Dynamics ○ Merchandising and promotion 	15	
		

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Semester VI UVGHM605	L	Cr
Paper V -- Entrepreneurship and Management Skills	30	2
<u>UNIT I Entrepreneurship Skills</u> <ul style="list-style-type: none"> • Concept of Entrepreneurship • Functions and clarifications of entrepreneurs • Characteristics of entrepreneurs • Nature and importance of entrepreneurs • Policies governing entrepreneurs • Case studies of successful entrepreneurs 	15	
<u>UNIT II Management Skills</u> <ul style="list-style-type: none"> • Introduction to General Management , • Organization and Management of the office, • Basic Management of Meetings , • Representing before various Governmental and Other Agencies, • Art of Negotiation 	15	
		

Semester VI UVGHM606	L	Cr
Paper VI -- ICT in Green House Management	30	2
<u>UNIT I ICT in Green House Management-I</u> <ul style="list-style-type: none"> • Automated or computer controlled greenhouse – • Software and Hardware for ICT • The role of computers in controlling various parameters • the role of the sensors, interface box and control program <ul style="list-style-type: none"> ○ air conditioning and central heating systems ○ security systems and burglar alarms ○ manufacturing processes 	15	
<u>UNIT II ICT in Green House Management-II</u> <ul style="list-style-type: none"> • Feedback cycle for water level maintenance • Stages of the feedback cycle • Risks and implications of ICT • IoTs in Greenhouse Management 	15	
		


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Semester V UVGHMP501	Cr
PRACTICAL Paper I – Skill Component	4
Natural methods of propagation of Capsicum, Tomato, Leafy vegetables.	
Artificial method of propagation_ <i>In vitro</i> propagation (Exotic)	
Natural method of propagation of fruit crops.	
Identification of harvesting implements	
Project - Designing of humidity chamber for propagation of seedlings.	
Semester V UVGHMP502	
PRACTICAL Paper II – Skill Component	4
Sterilization techniques	
Preparation of stock solutions(Demonstration)	
Preparation of medium	
Initiation of callus	
Micropropagation	
Hardening in Green House	
Synthetic seeds- cucumber, castor, ground nut, maize	
Methods of testing seed dormancy	
Effect of IAA/ GA on germination.	
Project on PTC - growing of any one ornamental by micropropagation. To be submitted at the time of practical examination	
Semester V UVGHMP503	
PRACTICAL Paper III – Skill Component	4
Pest and Disease of Green House crops	
Identification of pests (soil borne / Aerial) i. Identification of Insect, Fungal and viral pests	
Identification of biopesticide/ bioinsecticide	
Collection of pest samples in green house	
Collection of diseases samples in water	
	


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Semester V UVGHMP504		Cr
PRACTICAL PAPER V- General Education Component		3
	Fresh flower arrangement-Indian	
	Ikebana	
	Western style of flower arrangement	
	Dry flower arrangement-Method of making dry flowers	
	Dryflower arrangement	
	Potpuri	
Semester V UVGHMP505		
PRACTICAL PAPER VI- General Education Component		3
	Graphical representation of data- Frequency table, frequency histogram, frequency polygon, pie chart	
	Calculation of mean, median ,mode and standard deviation from grouped data.	
	Chi square test	
	Randomized blocks	
	Latin square	
	Submission of solved problems on Biostatistics	

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Semester VI UVGHMP601		Cr
PRACTICAL Paper I – Skill Component		4
Chemical test for Eugenol from plant subjected to stress and control plant of <i>Oscimum</i>		
Aloin test from sap and gel of <i>Aloe vera</i> – physical variation		
Internship/Industry training		
Semester VI UVGHMP602		4
PRACTICAL Paper II – Skill Component		
Identification of bacterial, fungal and viral disease of green house plants		
Preparation of biopesticide/ bioinsecticide		
Collection and preservation of pests		
Semester VI UVGHMP603		4
PRACTICAL Paper III – Skill Component		
Identification of Adulterants/chemicals used for promoting the shelf life and attractive colours of fruits and vegetables		
Test of adulteration – paraffin test, sucrose test by reducing & non reducing sugar test		
Barcoding of herbal products		
Designing of cold chamber		
Packaging of given material (rose, gerbera, carnation, any fruit)		
Ripening of fruits using natural & artificial method using ethylene as a tool		
		

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Semester VI UVGHMP604		Cr
PRACTICAL PAPER II- General Education Component		3
Internship / Projects		
1-2	Survey on Automated or computer controlled greenhouses in Maharashtra/India/ Global Scenario	
3-4	Survey-Availability of Green House crops in Markets and its marketing	
5	Methods of marketing Green House crops	
6	Project with Economics and Exhibition on Post Harvest Technology <ul style="list-style-type: none"> • Grapes, Amla, Tamarind, Methi, Akarkara 	
PRACTICAL PAPER II- General Education Component		3
Semester VI UVGHMP605		
Internship and Report submission		
		

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