

UNIVERSITY OF MUMBAI



**Syllabus for the T.Y.B.Voc.
Program: B.Voc.
Course : Green House Management
(Sem V & VI)**

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

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

SEMESTER V


Course Code	UNIT	TOPICS	Credits	L / Wk
UVGHM501 to 504& UVGHMP501 Skill Component			18	
UVGHM501	<u>Propagation, Planting and Caring of Green House Plants –III- Vegetable Crops, Exotic Vegetable Crops and Fruits</u>		2	2
	I	Vegetable & Exotic Vegetable Crops		
	II	Fruits		
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		
UVGHM504	<u>Harvesting of Ornamentals, Fruits and Vegetables of the Green house</u>		2	2
	I	Harvesting of green house grown Ornamentals		
	II	Harvesting of green house grown Fruits and Vegetables		
UVGHMP501	Practicals based on theory of Skill Component		10	10
UVGHM505 to 507 & UVGHMP502 General Education Component				
UVGHM505	<u>Communication Skills-V</u>		2	2
	I	Public speaking skills		
	II	ICT in communication		
UVGHM506	<u>Collection, Analysis & Presentation of Numerical Data-I</u>		2	2
	I	Basics of Biometry		
	II	Correlation and Regression		
UVGHM507	<u>Collection, Analysis and Presentation of Numerical Data-II</u>		2	2
	I	Test of Significance		
	II	Analysis of Variance		
UVGHMP502	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 604& UVGHMP601 Skill Component			18	
UVGHM601	<u>In Vitro Techniques Propagation of Green House Crops-II,</u>		2	2
	I	Case Studies		
	II	Applications		
UVGHM602	<u>Diseases of Green House Plants and their management</u>		2	2
	I	Types of Diseases		
	II	Control Measures		
UVGHM603	<u>Post Harvest Handling of Ornamentals</u>		2	2
	I	Handling of Cut Flowers & Other Ornamentals		
	II	Storage and Transport		
UVGHM604	<u>Post Harvest Handling of Fruits & Vegetables</u>		2	2
	I	Handling of Fruits & Vegetables		
	II	Storage and Transport		
UVGHMP601	Internship based on Skill Component		10	10
UVGHM605 to 607 &UVGHMP602 General Education Component				
UVGHM605	<u>ICT in Green House Management</u>		2	2
	I	Use of ICT in Green House Management I		
	II	Use of ICT in Green House Management II		
UVGHM606	<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		
UVGHM607	<u>Entrepreneurship and Management Skills</u>		2	2
	I	Entrepreneurship Skills		
	II	Management Skills		
UVGHMP602	Internship based on General Component		6	6


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Semester V UVGHM501	L	Cr
<u>PAPER- I. Propagation, Planting And Caring Of Green House Plants – III- Vegetable Crops Exotic Vegetable Crops And Fruits.</u>	30	2
<u>UNIT I Vegetable Crops and Exotic Vegetable Crops</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, Cherry Tomato, Lettuce) 		
<u>UNIT II Fruits</u>	15	
<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, Cherries, Gooseberries, Papaya, Citrus Fruits, peach or any other) 		
		


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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, • Morphogenetic Potential of higher plants, limitations, economics, suitable crops • 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 <i>in-vitro</i> Propagation</u> <ul style="list-style-type: none"> • Virus elimination, organogenesis , • Somatic embryogenesis, synthetic seeds • Micropropagation, mericloneing, • Embryo rescue, • Somaclonal variation 	15	
		


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Semester V UVGHM503	L	Cr
Paper III – Green House Pests And Their Management	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 ○ Molluscs ○ Nematodes ○ Birds ○ Mammals 	15	
<u>UNIT II Pest Management</u> <ul style="list-style-type: none"> ○ Physical Control ○ Use of Insecticides – Chemical and Bio Pesticides ○ Biological Control of Pests ○ Production of Insect Resistant Plants by conventional breeding and Biotechnological Methods 	15	
		


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Semester V UVGHM504	L	Cr
Paper IV- <u>HARVESTING OF ORNAMENTALS, FRUITS AND VEGETABLES OF THE GREEN HOUSE</u>	30	2
<p><u>UNIT I Harvesting of green house grown Ornamentals</u></p> <ul style="list-style-type: none"> • 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>, scented rose, <i>Chrysanthemum</i>, marigold, tuberose, any other. 	15	
<p><u>UNIT II 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 	15	
		


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Semester V UVGHMP501		Cr
PRACTICAL Paper I – Skill Component		10
1 to 3	Sterilization techniques, Preparation of stock solutions, Preparation of medium,	
4 to 6	Initiation of callus, micropropagation- meristem culture, axillary buds, regeneration of callus	
7	Hardening	
8	Pest and Disease of Green House crops	
	<ul style="list-style-type: none"> i. Identification of various pests ii. Identification of , fungal, viral diseases 	
9 to 14	Project on PTC growing of any one ornamental by micropropagation. To be submitted at the time of practical examination	
		


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Semester I UVGHM505	L	Cr
Paper V -- 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 		
		


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Semester V UVGHM506	L	Cr
Paper VI -- <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 Correlation and Regression</u> <ul style="list-style-type: none"> • Coefficient of correlation , Significance and regression analysis • Partial correlation • Multiple correlation 	15	
		


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Semester V UVGHM507	L	Cr
Paper VII <u>Collection, Analysis and Presentation of Numerical Data-II</u>	30	2
<u>UNIT I Test of Significance</u> <ul style="list-style-type: none">• Testing of Hypothesis<ul style="list-style-type: none">○ Student's t-test- paired and unpaired,○ Chi square test	15	
<u>UNIT II Analysis of Variance</u> <ul style="list-style-type: none">○ ANOVA○ Randomized Block○ Latin Square	15	
		


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Semester V UVGHMP502		
PRACTICAL PAPER II- General Education Component		6
1	Graphical representation of data- Frequency table, frequency histogram, frequency polygon, pie chart	
2&3	Calculation of mean, median ,mode and standard deviation from grouped data.	
4	Calculation of coefficient of correlation	
5	Regression analysis	
4	Partial and multiple correlation	
6	Chi square test	
7	ANOVA	
8	Randomized blocks	
9	Latin square	
10	Submission of solved problems on Biostatistics	
		


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Semester VI UVGHM601	L	Cr
<u>Paper I <i>In Vitro</i> Techniques For Propagating Green House Crops-II</u>	30	2
<u>UNIT I: Case Studies</u> <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 4examples each) 	15	
<u>UNIT II:Applications</u> <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 	15	
		


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Semester VI UVGHM602	L	Cr
<u>Paper II Diseases of Green House Plants and their Management</u>	30	2
<u>UNIT I Types of diseases</u> <ul style="list-style-type: none"> ○ Bacterial ○ Fungal ○ Viral ● Vectors responsible for their transmission 	15	
<u>UNIT II Control measures</u> <ul style="list-style-type: none"> ○ Physical ○ Chemical ○ Biological ○ Cultural ○ Legal <p>Production of Diseases Resistant Plants – by conventional breeding and the use of Biotechnological methods</p>	15	
		


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Semester VI UVGHM603	L	Cr
Paper III – Post Harvest Handling of Ornamentals	30	2
<u>UNIT I</u> Handling of Cut Flower & Other Ornamentals <ul style="list-style-type: none">• post-harvest handling of cut flowers• Methods of grading,	15	
<u>UNIT II</u> Storage and Transport <ul style="list-style-type: none">• Methods of storing and treatment• Methods of packing and transport of cut flowers to markets• Methods of prolonging the vase life of cut flowers,	15	
		


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<u>Semester VI</u> UVGHM604	L	Cr
<u>Paper IV – Post Harvest Handling of Fruits & Vegetables</u>	30	2
<u>UNIT I Handling of fruits and vegetables</u> <ul style="list-style-type: none"> • post-harvest handling of fruits and vegetables • Methods of, grading 	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 	15	
		


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	Semester VI UVGHMP601	Cr
	PRACTICAL Paper I – Skill Component	10
	Internship	
		


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Semester VI UVGHM605	L	Cr
Paper V -- ICT in Green House Management	30	2
<p><u>UNIT I Use of ICT in Green House Management-I</u></p> <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	
<p><u>UNIT II Use of ICT in Green House Management-II</u></p> <ul style="list-style-type: none"> • Feedback cycle for water level maintenance • Stages of the feedback cycle • Risks and implications of ICT 	15	
		


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Semester VI UVGHM606	L	Cr
Paper VI -- <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 	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 UVGHM607	L	Cr
Paper VII -- 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"> • <u>Introduction to General Management</u> , • Organization and Management of the office, • Basic Management of Meetings , • Representing before various Governmental and Other Agencies, • Art of Negotiation 	15	
		

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	Semester II UVGHMP602	Cr
	PRACTICAL PAPER II- General Education Component	6
	Internship	
		

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References

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- Mishra A.P., Shailesh Kumar, Sweta Mishra Plant Tissue Culture Theory and techniques Scientific Publishers
- Panse V G and Sukhatme P V (1961) Statistical methods for Agriculture students. Indian Council of Agricultural Research,
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Scheme of Examinations

Theory + Practical Total Marks 800/ Semester

<u>Theory Course:</u>	Per Paper Total 100 Marks
For Internal Assessment / Paper	25 marks
One periodical test on class instructions	20 marks
Active participation in class	05 marks
External Assessment	75 Marks
<u>Practical Course:</u>	Per Practical 50 Marks
External Assessment Semester V)	30 marks
Project / Report Submission	20 marks.
(during External Assessment Examination)	
Semester VI – Internship Report Submission.	50 Marks

Note:

1. 30 Lectures/ Sem is equivalent to 2 Lect/week.
2. Practical shall be of 3h duration

A minimum of four three field excursions(with at least one beyond the limits of Mumbai) for Green house studies are compulsory. Field work of not less than eight hours duration is equivalent to one period per week for a batch of fifteen students.

3. A candidate will be allowed to appear for the practical examinations only if he/she submits a certified journal of TYBVoc GHM and the Field/Project Report or a certificate from the Head of the Department/Institute to the effect that the candidate has completed the practical course of TYBVoc GHM as per the minimum requirements. In case of loss of journal a candidate must produce a certificate from the Head of the Department/ Institute that the practicals for the academic year were completed by the student. However though such a candidate will be allowed to appear for the practical examination, the marks allotted for the journal will not be granted.



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