

UNIVERSITY OF MUMBAI



Syllabus for the S.Y.B.Voc.
Program: B.Voc.
Course : Green House Management
(Sem III & IV)

(Credit Based Semester and Grading System with
effect from the academic year 2015–2016)

University of Mumbai Credit Based & Grading System
SY B.Voc. - Green House Management Syllabus
To be implemented from the Academic year 2015-2016

SEMESTER III


Course Code	UNIT	TOPICS	Credits	L /Wk
UVGHM301 to 304 & UVGHMP301 Skill Component			18	
UVGHM301	<u>CONTAINERS AND MEDIA FOR GREEN HOUSE CROPS</u>		2	2
	I	Containers and Media		
	II	Nitrogen Metabolism		
UVGHM302	<u>NUTRIENTS FOR GREEN HOUSE CROPS</u>		2	2
	I	Availability and Absorption of Nutrients		
	II	Functions and Deficiency Symptoms of Essential Minerals		
UVGHM303	<u>PRODUCTION OF ORGANIC FERTILIZERS</u>		2	2
	I	Naturally Occurring Organic Fertilizers		
	II	Production of Organic Fertilizers		
UVGHM304	<u>IRRIGATION SYSTEMS</u>		2	2
	I	Types & Components of Irrigation Systems		
	II	Irrigation System Design		
UVGHM P301	Practicals based on theory - Skill Component		10	10
UVGHM305-307&UVGHMP302GeneralEducationComponent			12	
UVGHM305	<u>COMMUNICATION SKILLS-III</u>		2	2
	I	General communication Skill I		
	II	General communication Skill II		
UVGHM306	<u>SUSTAINABLE DEVELOPMENT-I</u>		2	2
	I	Sustainable Development –I		
	II	Sustainable Development –II		
UVGHM307	<u>TROPICAL INDOOR PLANTS</u>		2	2
	I	Indoor Plant Culture & Factors for Growing		
	II	Making the Best Use of Indoor Plants		
UVGHMP302	Practicals based on theory of General Education Component		6	6

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SEMESTER IV

Course Code	UNIT	TOPICS	Credits	L / Wk
UVGHM401 to 404& UVGHMP401 Skill Component			18	
UVGHM401	<u>SOILLESS CULTURE (HYDROPONICS) OF GREEN HOUSE CROPS</u>		2	2
	I	Introduction Nutrients, Commercial Aspects and Recent Advancements to Hydroponics		
	II	Techniques and Media for Hydroponics		
UVGHM402	<u>USE OF ORGANIC FERTILIZERS AND ORGANIC CULTIVATION OF GREEN HOUSE CROPS</u>		2	2
	I	Principles & Advantages of Organic cultivation		
	II	Organic Cultivation		
UVGHM403	<u>PROPAGATION, PLANTING AND CARING OF GREEN HOUSE PLANTS-I</u>		2	2
	I	Ornamental ferns and foliage plants		
	II	Cacti		
UVGHM404	<u>PROPAGATION, PLANTING AND CARING OF GREEN HOUSE PLANTS-II</u>		2	2
	I	Flowering Plants and Fruit crops		
	II	Vegetables and exotic vegetable plants		
UVGHM P401	Practicals based on theory of Skill Component		10	10
UVGHM405to407 &UVGHMP402 General Education Component				
UVGHM405	<u>COMMUNICATION SKILLS-IV</u>		2	2
	I	General Communication Skill - III		
	II	General Communication Skill - IV		
UVGHM406	<u>SUSTAINABLE DEVELOPMENT -II</u>		2	2
	I	Sustainable Development –III		
	II	Sustainable Development –IV		
UVGHM407	<u>INTERIOR SCAPING</u>		2	2
	I	Gardening in tubs/urns, Bottle Gardens, Terrariums & Miniature Gardens		
	II	Hanging Baskets, Vertical Gardens, Window Gardens		
UVGHMP402	Practicals based on theory of General Education Component		6	6


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Semester III UVGHM301	L	Cr
<u>Paper I – CONTAINERS AND MEDIA FOR GREEN HOUSE CROPS</u>	30	2
<p><u>UNIT I Containers and Media</u></p> <ul style="list-style-type: none"> • Types of containers • Root medium Properties of root medium for green House, Media Handling, FYM, concentrated organic manures, macro and micronutrient availability, Bulk density of root medium. • Media Components Peat, Bark, sawdust, Coir, Crop-by product, composted Garbage, Perlite, Vermiculite, sand, Rock Wool, Polystyrene foam Making Your Own Media, Commercial Formulations 	15	
<p><u>UNIT II Nitrogen Metabolism</u></p> <ul style="list-style-type: none"> • Nitrogen Nutrition • Amino acids and amides • Choice of Nitrogen fertilizers and time of application • Proteins 	15	
		


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Semester III UVGHM302	L	Cr
<u>Paper II -- NUTRIENTS FOR GREEN HOUSE CROPS</u>	30	2
<u>UNIT I Availability and Absorption of Nutrients</u> <ul style="list-style-type: none"> • Detection, Occurrence and Availability Essential Elements • Mineral Salt absorption and translocation <ul style="list-style-type: none"> ○ Types of Absorption passive and active ; ○ Factors affecting salt absorption ○ Translocation 	15	
<u>UNIT II Functions and Deficiency Symptom of Essential Minerals</u> <ul style="list-style-type: none"> • Major and Minor elements required by plants • Functions and Deficiency Symptoms of the following Essential Minerals <ul style="list-style-type: none"> ○ Nitrogen ○ Phosphorus ○ Calcium ○ Magnesium ○ Potassium ○ Sulphur ○ Iron ○ Manganese ○ Copper ○ Zinc ○ Boron ○ Molybdenum 	15	
		


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Semester III UVGHM303	L	Cr
<u>Paper III -- PRODUCTION OF ORGANIC FERTILIZERS</u>	30	2
<u>UNIT I Naturally occurring organic fertilizers</u> <ul style="list-style-type: none"> • Manures, • Slurry, • Worm castings, • Peat, • Seaweed, • Humic Acid • Guano. • Swage • Sludges 	15	
<u>UNIT II Production of Organic Fertilizers</u> <ul style="list-style-type: none"> • Compost • Bloodmeal • Bone meal • Humic acid • Sea weed extracts • Natural enzyme digested proteins- Fish meal, Feather meal • Decomposing Crop Residue (Green Manure), • Vermicompost • Compost 	15	
		


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Semester III UVGHM304	L	Cr
<u>Paper IV -- IRRIGATION SYSTEMS</u>	30	2
<p><u>UNIT I Types and Components of Irrigation Systems:</u></p> <ul style="list-style-type: none"> • Types of irrigation systems <ul style="list-style-type: none"> ○ large field systems (center pivot and wheel line), ○ turf, ○ vegetable and orchards (flood, spray ,stake and pop-up, drip) ○ greenhouse flood beds and floors, mechanized booms, hanging basket conveyors, mist, and fog systems. ○ Choosing the appropriate system. • Components of irrigation systems: <ul style="list-style-type: none"> ○ pipes tubes and fittings, nozzles, solenoid valves, controllers (timer, tensiometer, VPD), ○ Components of a drip system ○ drip system lay out ○ operating drip system/ types, ○ wetting patterns ○ Benefits 	15	
<p><u>UNIT II Irrigation System Design</u></p> <ul style="list-style-type: none"> • Irrigation system design: flow and pressure. <ul style="list-style-type: none"> ○ Irrigation system design considerations: filters, backflow prevention. ○ On/off control mechanisms: Principles of general electrical wiring , solenoid valves – installing and maintaining. • Automated irrigations controllers: <ul style="list-style-type: none"> ○ Timers and RH and VPD sensors; • Fertigation systems: Injectors and plumbing; Controlling pH, EC, and pathogens. Determining fertilizer rates. • Chemigation • Water quality: alkalinity and solutes 	15	
		


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Semester III UVGHMP301		Cr
	PRACTICAL Paper I – Skill Component	10
1 to 3	Effect of Mineral Deficiency on plants	
4 to 6	Comparative Study of growth parameters in different media	
7	Preparation of Organic Fertilizers	
8	Analysis of Organic content, pH, WHC of the prepared organic fertilizers	
9	Estimation of NPK in the fertilizers using flame photometer.	
10	Field visits to study different types of irrigation systems and submission of a report on the same.	
		


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Semester III UVGHM305	L	Cr
<u>Paper V -- COMMUNICATION SKILLS-III</u>	30	2
<u>UNIT I General communication Skill I</u> <ul style="list-style-type: none">• Preparing for Group Discussions, debates and conferences• Preparing for Presentations• Preparing for Interviews	15	
<u>UNIT II General communication Skill II</u> <ul style="list-style-type: none">• Making posters, advertisements• Webpage designing• Conducting interviews	15	
		


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Semester I UVGHM306	L	Cr
<u>Paper VI -- SUSTAINABLE DEVELOPMENT-I</u>	30	2
<p><u>UNIT I Sustainable Development I</u></p> <ul style="list-style-type: none"> • Introduction to sustainable development • Key environmental issues • Principles of sustainable development • Ecological degradation <ul style="list-style-type: none"> ○ Agriculture ○ Deforestation 	15	
<p><u>UNIT II Sustainable Development II</u></p> <ul style="list-style-type: none"> • Conservation and control • Climatic change ad development • Sustainable development and sustainability • Environmental conflict • Green orientation 	15	
		


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Semester III UVGHM307	L	Cr
<u>Paper VII -- TROPICAL INDOOR PLANTS</u>	30	2
<u>UNIT I Indoor Plant Culture and Factors for Growing</u> <ul style="list-style-type: none"> • Understanding interior environments, <ul style="list-style-type: none"> ○ plants for different light conditions • Dealing with indoor plants <ul style="list-style-type: none"> ○ Potting Media, ○ Potting up, ○ Container selection, ○ Managing plant nutrition, ○ Pruning indoor plants, ○ Propagation and caring for young indoor plants • Factors for growing indoor plants- <ul style="list-style-type: none"> ○ Light, ○ Temperature, ○ Humidity, ○ Watering, ○ Fresh air 	15	
<u>UNIT II Making The Best Use Of Indoor Plants</u> <ul style="list-style-type: none"> • Deciding the location of the indoor plant • Managing colour • Using mirrors • Plants in baskets • Hydroponics indoors • Miniature gardens 	15	
		


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	Semester III UVGHMP302	Cr
	PRACTICAL PAPER II- General Education Component	6
1	Study of Types of Potting Media, Containers nutritional requirements,	
2	Types and preparation of hanging baskets	
3	Study of pot hydroponics	
4	Miniature gardens and landscapes	
5	Case study on growing Orchids and Palms	
6	Submission: a survey of Tropical Indoor plants.	
		


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Semester IV UVGHM401	L	Cr
<u>Paper I -- SOILLESS CULTURE (HYDROPONICS) OF GREEN HOUSE CROPS</u>	30	2
<p><u>UNIT I Introduction Nutrients, Commercial Aspects and Recent Advancements to Hydroponics</u></p> <ul style="list-style-type: none"> • History and Origin • Soil less Culture, its advantages and Disadvantages • Nutrient Solutions – <ul style="list-style-type: none"> ○ Major and Minor nutrients, ○ role of nutrients. • Commercial Aspects • Advancements 	15	
<p><u>UNIT II Techniques and Media for Hydroponics</u></p> <ul style="list-style-type: none"> • Techniques in Hydroponics – Static solution culture, Continuous – flow Solution culture, Aeroponics, Passive sub-irrigation, Ebb and flow or flood and drain irrigation, Run to waste, Deep water culture, Bubbleponics. • Media used for Hydroponics: Ex-clay, Rock wool, Coir, Perlite, Pumice, Vermiculite, Sand, Gravel, Brick shards, Polystyrene packing peanuts, wood fibre. 	15	
		


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Semester IV UVGHM402	L	Cr
<u>Paper II – USE OF ORGANIC FERTILIZERS AND ORGANIC CULTIVATION OF GREEN HOUSE CROPS</u>	30	2
<u>UNIT I Principles and Advantages of Organic cultivation</u> <ul style="list-style-type: none"> • Principles and practices, • Importance in modern crop production, • Advantages of organic fertilizers • Inconveniences of organic fertilizers • Principles of organic farming 	15	
<u>UNIT II Organic Cultivation</u> <ul style="list-style-type: none"> • Method of Organic Cultivation- <ul style="list-style-type: none"> ○ planting, ○ managing soil quality, ○ soil fertility management, ○ weed management, ○ diseases and pest control, ○ Organic certification procedure 	15	
		


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Semester IV UVGHM403	L	Cr
<u>Paper III -- PROPAGATION, PLANTING AND CARING OF GREEN HOUSE PLANTS –I</u>	30	2
<u>UNIT I Ornamental Ferns And Foliage Plants</u> <ul style="list-style-type: none">• Propagation, Planting and Caring of ornamental ferns and Foliage plants – (five examples)	15	
<u>UNIT II Cacti</u> <ul style="list-style-type: none">• Propagation, Planting and Caring of cacti (Five examples)	15	
		


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Semester IV UVGHM404	L	Cr
<u>Paper IV -- PROPAGATION, PLANTING AND CARING OF GREEN HOUSE PLANTS –II</u>	30	2
<u>UNIT I Flowering Plants and Fruit crops</u> <ul style="list-style-type: none"> • Preparation of soil and cultivation of green house flowering plants and Fruit crops(Five examples) Planting and caring of green house flowering plants and Fruit crops (Five examples)	15	
<u>UNIT II Vegetables and Exotic Vegetables</u> <ul style="list-style-type: none"> • Preparation, planting and caring of vegetables and exotic vegetables (Five examples) 	15	
		


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Semester IV UVGHMP401		Cr
PRACTICAL Paper I – Skill Component		10
1 to 3	Growing any one of the following in Hydroponics solution: A leafy vegetable, a house plant , a medicinal herb	
4 to 7	Growing of Ferns and foliage plants in the green house	
	Growing of Vegetables and exotic vegetables in the green house	
8 to 10	Cacti, grafting of cacti and their monitoring their growth in the green house	
Report Submission of the above		
		


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Semester IV UVGHM405	L	Cr
Paper V -- <u>Communication Skills- IV</u>	30	2
<u>UNIT I General Communication Skill III</u> <ul style="list-style-type: none">• Planning and writing documents• Summary writing	15	
<u>UNIT II General Communication Skills IV</u> <ul style="list-style-type: none">• Understanding Audience speaker relationship• Media Writing	15	
		


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Semester IV UVGHM406	L	Cr
<u>Paper VI -- SUSTAINABLE DEVELOPMENT -II</u>	30	2
<u>UNIT I SUSTAINABLE DEVELOPMENT –III</u> <ul style="list-style-type: none"> • Sustainable organic horticulture <ul style="list-style-type: none"> ○ Energy input/out put ○ Maintaining & building soil fertility ○ Green house gas emission 	15	
<u>UNIT II SUSTAINABLE DEVELOPMENT –IV</u> <ul style="list-style-type: none"> • Maintaining biodiversity • Adverse impact of use of fertilizers, pesticides, irrigation & other industries on environment • Reducing the use of fossil fuel • Water Quality and Conservation 	15	
		

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Semester IV UVGHM407	L	Cr
Paper VII -- INTERIOR SCAPING	30	2
<u>UNIT I Gardening in Tubs or Urns, Bottle Gardens, Terrariums and Miniature Gardens</u> <ul style="list-style-type: none"> • Choice of containers • Choice of media • Making of gardens in tubs, urns, bottles and terrariums • Making of miniature gardens in a dish. • Types and care of plants suitable for growth • Internal environment- humidity, ventilation 	15	
<u>UNIT II Hanging Baskets, Vertical Gardens, Window Gardens</u> <ul style="list-style-type: none"> • Hanging Baskets <ul style="list-style-type: none"> ○ Selecting containers ○ Preparing hanging baskets ○ Growing flowers, vegetables and fruits in hanging baskets • Vertical Gardens <ul style="list-style-type: none"> ○ Green walls and their importance ○ Types of media- Loose media, mat media, structural media ○ Advantages of vertical gardens • Window Gardens <ul style="list-style-type: none"> ○ Window farming ○ Choice of containers and light weight media ○ Importance 	15	
		

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Semester IV UVGHMP402		Cr
PRACTICAL PAPER II- General Education Component		6
	Preparation and maintenance of	
1	Hanging baskets	
2	Miniature gardens	
3	Vertical Gardens	
4	Bottle Garden	
5	Terrarium	
The above are to be submitted at the time of Semester end examination.		
		

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REFERENCES

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- George Acquah. *Horticulture, Principles and Practices* . Eastern Economy Eddition.
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- Hessayon D G . *The Flowering Plant Expert*. Expert Books.
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- Hessayon D G *The House Plant Expert*. Expert Books.
- Iyengar Gopalswamy. *Complete Gardening in India*
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- Randhava, GS and Mukhopadhyay A. *Floriculture in India* Allied Publishers Limited

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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	30 marks
Project/ Internship/ Report Submission	20 marks.
(during External Assessment Examination)	

Note:

1. 30 Lectures/ Sem is equivalent to 2 Lect/week.
2. Practical shall be of 3h duration
3. 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.
4. A candidate will be allowed to appear for the practical examinations only if he/she submits a certified journal of SYBVoc GHM and the Field Report or a certificate from the Head of the Department/Institute to the effect that the candidate has completed the practical course of SYBVoc 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.

