

## Department of Botany

List of Skill Enhancement Courses Papers (SEC) with Semester Wise Titles for 'Botany'					
Year	Semester	Course	Paper Title	Theory/ Practical	Credits
<b>Undergraduate Certificate in Botany</b>					
<b>FIRST YEAR</b>	I	BOTSEC-MC-1	Mushroom Cultivation-I	Theory	1
		BOTSEC-MC-1P	Practical/Lab Course BOTSEC-MC-1P	Practical	1
	II	BOTSEC-MC-2	Mushroom Cultivation-II	Theory	1
		BOTSEC-MC-2P	Practical/Lab Course BOTSEC-MC-2P	Practical	1
<b>Undergraduate Diploma in Botany</b>					
<b>SECOND YEAR</b>	III	BOTSEC-MC-3	Mushroom Cultivation-III	Theory	1
		BOTSEC-MC-3P	Practical/Lab Course BOTSEC-MC-3P	Practical	1
	IV	BOTSEC-MC-4	Mushroom Cultivation-IV	Theory	1
		BOTSEC-MC-4P	Practical/Lab Course BOTSEC-MC-4P	Practical	1
<b>Bachelor in Botany</b>					
<b>THIRD YEAR</b>	V	BOTSEC-MC-5	Mushroom Cultivation-V	Theory	1
		BOTSEC-MC-5P	Practical/Lab Course BOTSEC-MC-5P	Practical	1
	VI	BOTSEC-MC-6	Mushroom Cultivation-VI	Theory	1
		BOTSEC-MC-6P	Practical/Lab Course BOTSEC-MC-6P	Practical	1

<b>List of Skill Enhancement Courses Papers (SEC) with Semester Wise Titles for 'Botany'</b>					
<b>Year</b>	<b>Semester</b>	<b>Course</b>	<b>Paper Title</b>	<b>Theory/ Practical</b>	<b>Credits</b>
<b>Undergraduate Certificate in Botany</b>					
<b>FIRST YEAR</b>	I	BOTSEC-H-1	Hydroponics-I	Theory	1
		BOTSEC-H-1P	Practical/Lab Course BOTSEC-H-1P	Practical	1
	II	BOTSEC-H-2	Hydroponics -II	Theory	1
		BOTSEC-H-2P	Practical/Lab Course BOTSEC-H-2P	Practical	1
<b>Undergraduate Diploma in Botany</b>					
<b>SECOND YEAR</b>	III	BOTSEC-H-3	Hydroponics-III	Theory	1
		BOTSEC-H-3P	Practical/Lab Course BOTSEC-H-3P	Practical	1
	IV	BOTSEC-H-4	Hydroponics-IV	Theory	1
		BOTSEC-H-4P	Practical/Lab Course BOTSEC-H-4P	Practical	1
<b>Bachelor in Botany</b>					
<b>THIRD YEAR</b>	V	BOTSEC-H-5	Hydroponics-V	Theory	1
		BOTSEC-H-5P	Practical/Lab Course BOTSEC-H-5P	Practical	1
	VI	BOTSEC-H-6	Hydroponics -VI	Theory	1
		BOTSEC-H-6P	Practical/Lab Course BOTSEC-H-6P	Practical	1

<b>List of Skill Enhancement Courses Papers (SEC) with Semester Wise Titles for 'Botany'</b>					
<b>Year</b>	<b>Semester</b>	<b>Course</b>	<b>Paper Title</b>	<b>Theory/ Practical</b>	<b>Credits</b>
<b>Undergraduate Certificate in Botany</b>					
<b>FIRST YEAR</b>	I	BOTSEC-NF-1	Nursery Development and Floriculture-I	Theory	1
		BOTSEC-NF-1P	Practical/Lab Course BOTSEC-NF-1P	Practical	1
	II	BOTSEC-NF-2	Nursery Development and Floriculture-II	Theory	1
		BOTSEC-NF-2P	Practical/Lab Course BOTSEC-NF-2P	Practical	1
<b>Undergraduate Diploma in Botany</b>					
<b>SECOND YEAR</b>	III	BOTSEC-NF-3	Nursery Development and Floriculture -III	Theory	1
		BOTSEC-NF-3P	Practical/Lab Course BOTSEC-NF-3P	Practical	1
	IV	BOTSEC-NF-4	Nursery Development and Floriculture-IV	Theory	1
		BOTSEC-NF-4P	Practical/Lab Course BOTSEC-NF-4P	Practical	1
<b>Bachelor in Botany</b>					
<b>THIRD YEAR</b>	V	BOTSEC-NF-5	Nursery Development and Floriculture -V	Theory	1
		BOTSEC-NF-5P	Practical/Lab Course BOTSEC-NF-5P	Practical	1
	VI	BOTSEC-NF-6	Nursery Development and Floriculture -VI	Theory	1
		BOTSEC-NF-6P	Practical/Lab Course BOTSEC-NF-6P	Practical	1

**Skill Enhancement Course: Mushroom Cultivation I**

**No. of Hours- 45**

**CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE**

Course Title	Credits	Credit distribution of the Course			Eligibility criteria	Pre-requisite of the Course (if any)
		Lecture	Tutorial	Practical/Practice		
Mushroom Cultivation I	2	1	0	1	Passed class XII	Nil

**Skill Enhancement Courses in Botany**

<b>Programme : Skill Enhancement Courses in Botany</b>		<b>Year: I</b>	<b>Semester: I</b>
<b>Subject: Botany</b>			
<b>Course: BOT SEC MC1</b>	<b>Mushroom Cultivation I</b>		
<p><b>Course Outcomes:</b> The successful students will be able to:</p> <ol style="list-style-type: none"> <li>1. Understand the economic importance of mushroom cultivation.</li> <li>2. To learn the basic tools and techniques used in mushroom cultivation.</li> <li>3. To learn the skills for developing commercial enterprise of mushroom cultivation.</li> </ol>			

<b>Credits: 2</b>	<b>Skill Enhancement Course</b>
<b>Max. Marks: As per Univ. rules</b>	<b>Min. Passing Marks: Asper Univ. rules</b>

Unit	Topic	No. of Hours (15)
<b>1</b>	Introduction to mushrooms and their economic importance Scope of mushroom cultivation in India Nutritional and medicinal value of mushrooms Important edible and medicinal mushrooms	<b>15</b>

**Practical/Lab Course BOT SEC MC 1P**

Unit	Topic	No. of Hours (30)
<b>1</b>	Field visit to the nearby area for identification of naturally growing mushroom species Collection techniques and preservation of mushrooms Introduction to laboratory equipment for mushroom cultivation Visit to mushroom cultivation laboratory/farm	<b>30</b>

**Skill Enhancement Course: Mushroom Cultivation II**

**No. of Hours- 45**

**CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE**

Course Title	Credits	Credit distribution of the Course			Eligibility criteria	Pre-requisite of the Course (if any)
		Lecture	Tutorial	Practical/Practice		
<b>Mushroom Cultivation II</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>1</b>		<b>Nil</b>

<b>Skill Enhancement Courses in Botany</b>		
<b>Programme : Skill Enhancement Courses in Botany</b>	<b>Year: I</b>	<b>Semester: II</b>
<b>Subject: Botany</b>		
<b>Course: BOT SEC MC2</b>	<b>Mushroom Cultivation II</b>	

<b>Credits: 2</b>	<b>Skill Enhancement Course</b>
<b>Max. Marks: As per Univ. rules</b>	<b>Min. Passing Marks: As per Univ. rules</b>

<b>Unit</b>	<b>Topic</b>	<b>No. of Hours (15)</b>
<b>1</b>	Spawn and the methods of spawn production Selection and preparation of substrates (compost) for mushroom cultivation Sterilization and pasteurization techniques Storage and transportation of spawn and substrates	<b>15</b>

**Practical/Lab Course BOT SEC MC 2P**

<b>Unit</b>	<b>Topic</b>	<b>No. of Hours (30)</b>
<b>1</b>	Preparation and multiplication of spawn Procedure for testing the spawn quality Methods and equipment used in sterilization and pasteurization of compost Methods of substrate preparation for different mushroom species	<b>30</b>

**Skill Enhancement Course: Mushroom Cultivation III**

**No. of Hours- 45**

**CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE**

Course Title	Credits	Credit distribution of the Course			Eligibility criteria	Pre-requisite of the Course (if any)
		Lecture	Tutorial	Practical/Practice		
Mushroom Cultivation III	2	1	0	1		Nil

**Skill Enhancement Courses in Botany**

<b>Programme : Skill Enhancement Courses in Botany</b>		<b>Year: II</b>	<b>Semester: III</b>
<b>Subject: Botany</b>			
<b>Course: BOT SEC MC3</b>	<b>Mushroom Cultivation III</b>		

<b>Credits: 2</b>	<b>Skill Enhancement Course</b>
<b>Max. Marks: As per Univ. rules</b>	<b>Min. Passing Marks: As per Univ. rules</b>

<b>Unit</b>	<b>Topic</b>	<b>No. of Hours (15)</b>
<b>1</b>	Cultivation of Button mushroom Cultivation of Oyster mushroom Cultivation of Shiitake mushroom Cultivation of medicinal mushrooms ( <i>Cordyceps</i> and <i>Ganoderma</i> )	<b>15</b>

**Practical/Lab Course BOT SEC MC 3P**

<b>Unit</b>	<b>Topic</b>	<b>No. of Hours (30)</b>
<b>1</b>	Inoculation and Incubation techniques of spawn. Monitoring of growth in cultivation rooms Methods of harvesting and quality assessment techniques Yield estimation in different cultivation methods	<b>30</b>

**Skill Enhancement Course: Mushroom Cultivation IV**

**No. of Hours- 45**

**CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE**

<b>Course Title</b>	<b>Credits</b>	<b>Credit distribution of the Course</b>			<b>Eligibility criteria</b>	<b>Pre-requisite of the Course (if any)</b>
		<b>Lecture</b>	<b>Tutorial</b>	<b>Practical/Practice</b>		
<b>Mushroom Cultivation IV</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>1</b>		<b>Nil</b>

**Skill Enhancement Courses in Botany**

<b>Programme : Skill Enhancement Courses in Botany</b>		<b>Year: II</b>	<b>Semester: IV</b>
<b>Subject: Botany</b>			
<b>Course: BOT SEC MC4</b>	<b>Mushroom Cultivation III</b>		

<b>Credits: 2</b>	<b>Skill Enhancement Course</b>
<b>Max. Marks: As per Univ. rules</b>	<b>Min. Passing Marks: As per Univ. rules</b>

<b>Unit</b>	<b>Topic</b>	<b>No. of Hours (15)</b>
<b>1</b>	Common diseases impacting the cultivation of mushrooms Methods for controlling disease during mushroom cultivation Pest management during mushroom cultivation Hygiene and sanitation of cultivation rooms	<b>15</b>

**Practical/Lab Course BOT SEC MC 4P**

<b>Unit</b>	<b>Topic</b>	<b>No. of Hours (30)</b>
<b>1</b>	Identification of common diseases in mushrooms Isolation of pathogens from mushrooms Study of bio-control agents used to protect mushrooms Training on integrated pest management	<b>30</b>

**Skill Enhancement Course: Mushroom Cultivation V**

**No. of Hours- 45**

**CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE**

Course Title	Credits	Credit distribution of the Course			Eligibility criteria	Pre-requisite of the Course (if any)
		Lecture	Tutorial	Practical/Practice		
<b>Mushroom Cultivation V</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>1</b>		<b>Nil</b>

**Skill Enhancement Courses in Botany**

<b>Programme : Skill Enhancement Courses in Botany</b>	<b>Year: III</b>	<b>Semester: V</b>
<b>Subject: Botany</b>		
<b>Course: BOT SEC MC5</b>	<b>Mushroom Cultivation V</b>	

<b>Credits: 2</b>	<b>Skill Enhancement Course</b>
<b>Max. Marks: As per Univ. rules</b>	<b>Min. Passing Marks: As per Univ. rules</b>

<b>Unit</b>	<b>Topic</b>	<b>No. of Hours (15)</b>
<b>1</b>	Methods for storage of mushrooms Value added products from mushrooms Nutraceutical from the mushrooms Safety standards in mushroom products	<b>15</b>

**Practical/Lab Course BOT SEC MC 5P**

<b>Unit</b>	<b>Topic</b>	<b>No. of Hours (30)</b>
<b>1</b>	Techniques of drying and preservation of mushrooms Development of value added products from mushrooms Quality testing of mushroom products Visit to mushroom processing unit	<b>30</b>

**Skill Enhancement Course: Mushroom Cultivation VI**

**No. of Hours- 45**

**CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE**

<b>Course Title</b>	<b>Credits</b>	<b>Credit distribution of the Course</b>			<b>Eligibility criteria</b>	<b>Pre-requisite of the Course (if any)</b>
		<b>Lecture</b>	<b>Tutorial</b>	<b>Practical/Practice</b>		
<b>Mushroom Cultivation 6</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>1</b>		<b>Nil</b>

**Skill Enhancement Courses in Botany**

<b>Programme : Skill Enhancement Courses in Botany</b>		<b>Year: III</b>	<b>Semester: VI</b>
<b>Subject: Botany</b>			
<b>Course: BOT SEC MC6</b>	<b>Mushroom Cultivation VI</b>		

<b>Credits: 2</b>	<b>Skill Enhancement Course</b>
<b>Max. Marks: As per Univ. rules</b>	<b>Min. Passing Marks: As per Univ. rules</b>

<b>Unit</b>	<b>Topic</b>	<b>No. of Hours (15)</b>
<b>1</b>	Government schemes and subsidies in mushroom cultivation Cost-benefit analysis for setting a mushroom cultivation unit Marketing strategies for mushrooms Supply chain management for mushrooms	<b>15</b>

**Practical/Lab Course BOT SEC MC 6P**

<b>Unit</b>	<b>Topic</b>	<b>No. of Hours (30)</b>
<b>1</b>	Preparation of a business plan for mushroom farm Market survey on the demand of mushrooms Liaising with the mushroom's sellers/users (hostels, restaurants, vegetable sellers) Interactions with successful mushroom entrepreneurs	<b>30</b>

**Suggested Readings**

- Bahl, N. (2000). Hand book of Mushrooms. Oxford & Ibh Publishing Co. Pvt Ltd.
- Marimuthu, T. Krishnamoorthy, A.S. Sivaprakasam, K. and Jayarajan. R. (1991). Oyster Mushrooms, Department of Plant Pathology, Tamil Nadu Agricultural University, Coimbatore.
- Swaminathan, M. (1990). Food and Nutrition. Bappco, The Bangalore Printing and Publishing Co. Ltd., No. 88, Mysore Road, Bangalore - 560018.
- Tewari, P. and Kapoor, S.C. (1988). Mushroom cultivation, Mittal Publications, Delhi.

**Skill Enhancement Course: Hydroponics I**

**No. of Hours- 45**

**CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE**

Course Title	Credits	Credit distribution of the Course			Eligibility criteria	Pre-requisite of the Course (if any)
		Lecture	Tutorial	Practical/Practice		
Hydroponics I	2	1	0	1		Nil

**Skill Enhancement Courses in Botany**

<b>Programme : Skill Enhancement Courses in Botany</b>	<b>Year: I</b>	<b>Semester: I</b>
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**Subject: Botany**

<b>Course: BOT SEC H1</b>	<b>Hydroponics I</b>
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**Course Outcomes:**

The successful students will be able to:

1. Develop a thorough understanding of the concepts of Hydroponics
2. Students will be trained in establishing hydroponic facility.
3. Students will understand various government policies in marketing of hydroponic produce.

<b>Credits: 2</b>	<b>Skill Enhancement Course</b>
<b>Max. Marks: As per Univ. rules</b>	<b>Min. Passing Marks: As per Univ. rules</b>

Unit	Topic	No. of Hours (15)
1	Introduction, Basic principles of hydroponics Importance and scope of hydroponic system Types of hydroponic systems: Nutrient Film Technique (NFT), Deep Water Culture (DWC), ebb and flow, drip irrigation and wick system Advantages and disadvantages of hydroponics over traditional farming	15

**Practical/Lab Course BOT SEC H 1P**

Unit	Topic	No. of Hours (30)
1	Setting up a basic hydroponic system  Identifying different hydroponic setups and their components  Introduction to different growing media for hydroponic system.	30

**Skill Enhancement Course: Hydroponics II**

No. of Hours- 45

**CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE**

Course Title	Credits	Credit distribution of the Course			Eligibility criteria	Pre-requisite of the Course (if any)
		Lecture	Tutorial	Practical/Practice		
Hydroponics II	2	1	0	1	Skill Enhancement Courses in Botany	Nil

<b>Skill Enhancement Courses in Botany</b>		
<b>Programme : Skill Enhancement Courses in Botany</b>		<b>Year: I</b>
<b>Semester: II</b>		
<b>Subject: Botany</b>		
<b>Course: BOT SEC H 2</b>	<b>Hydroponics II</b>	

<b>Credits: 2</b>	<b>Skill Enhancement Course</b>
<b>Max. Marks: As per Univ. rules</b>	<b>Min. Passing Marks: As per Univ. rules</b>

<b>Unit</b>	<b>Topic</b>	<b>No. of Hours (15)</b>
<b>1</b>	Basic plant physiology relevant to hydroponics  Essential nutrients and their role in plant growth  Nutrient solutions: Preparation and management  pH and EC balancing in hydroponic systems  Water quality management and filtration techniques in hydroponic system	<b>15</b>

**Practical/Lab Course BOT SEC H 2P**

<b>Unit</b>	<b>Topic</b>	<b>No. of Hours (30)</b>
<b>1</b>	Preparing and adjusting nutrient solutions for hydroponic farming	<b>30</b>

	Testing and adjusting pH and EC levels	
	Identifying nutrient deficiencies and toxicities	
	To know about setup preparation of different hydroponic system	

**Skill Enhancement Course: Hydroponics III**

**No. of Hours- 45**

**CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE**

Course Title	Credits	Credit distribution of the Course			Eligibility criteria	Pre-requisite of the Course (if any)
		Lecture	Tutorial	Practical/Practice		
<b>Hydroponics III</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>1</b>		<b>Nil</b>

**Skill Enhancement Courses in Botany**

<b>Programme : Skill Enhancement Courses in Botany</b>		<b>Year: II</b>	<b>Semester: III</b>
<b>Subject: Botany</b>			
<b>Course: BOT SEC H 3</b>	<b>Hydroponics III</b>		

<b>Credits: 2</b>	<b>Skill Enhancement Course</b>
<b>Max. Marks: As per Univ. rules</b>	<b>Min. Passing Marks: Asper Univ. rules</b>

<b>Unit</b>	<b>Topic</b>	<b>No. of Hours (15)</b>
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<b>1</b>	Designing small-scale and commercial hydroponic farms  Management of environmental factors: Light, temperature, humidity, and CO2 management  Water and nutrient recirculation techniques  Common pests and diseases in hydroponics and their management	<b>15</b>
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**Practical/Lab Course BOT SEC H 3P**

Unit	Topic	No. of Hours (30)
<b>1</b>	Designing and assembling a hydroponic system  Installing and maintaining environmental control systems  System maintenance and troubleshooting  Pest and disease identification and their management	<b>30</b>

**Skill Enhancement Course: Hydroponics IV**

No. of Hours- 45

**CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE**

Course Title	Credits	Credit distribution of the Course			Eligibility criteria	Pre-requisite of the Course (if any)
		Lecture	Tutorial	Practical/Practice		
<b>Hydroponics IV</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>1</b>		<b>Nil</b>

<b>Skill Enhancement Courses in Botany</b>		
<b>Programme : Skill Enhancement Courses in Botany</b>	<b>Year: II</b>	<b>Semester: IV</b>
<b>Subject: Botany</b>		
<b>Course: BOT SEC H 4</b>	<b>Hydroponics IV</b>	

<b>Credits: 2</b>	<b>Skill Enhancement Course</b>
<b>Max. Marks: As per Univ. rules</b>	<b>Min. Passing Marks: As per Univ. rules</b>

<b>Unit</b>	<b>Topic</b>	<b>No. of Hours (15)</b>
<b>1</b>	Selection of crops suitable for hydroponic cultivation  Propagation and transplanting techniques in hydroponic system.  Growth cycles and yield optimization  Vertical farming techniques and urban hydroponics  Organic hydroponics and sustainable practices	<b>15</b>

**Practical/Lab Course BOT SEC H 4P**

<b>Unit</b>	<b>Topic</b>	<b>No. of Hours (30)</b>
<b>1</b>	Growing leafy green vegetables, herbs, and fruiting plants in hydroponic systems  Implementing vertical farming techniques  Experiments related to organic hydroponic solutions	<b>30</b>

	Intercropping and mixed cropping in hydroponics	
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**Skill Enhancement Course: Hydroponics V**

**No. of Hours- 45**

**CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE**

Course Title	Credits	Credit distribution of the Course			Eligibility criteria	Pre-requisite of the Course (if any)
		Lecture	Tutorial	Practical/Practice		
Hydroponics V	2	1	0	1		Nil

<b>Skill Enhancement Courses in Botany</b>				
<b>Programme : Skill Enhancement Courses in Botany</b>			<b>Year: III</b>	<b>Semester: V</b>
<b>Subject: Botany</b>				
<b>Course: BOT SEC H 5</b>	<b>Hydroponics V</b>			

<b>Credits: 2</b>	<b>Skill Enhancement Course</b>
<b>Max. Marks: As per Univ. rules</b>	<b>Min. Passing Marks: As per Univ. rules</b>

<b>Unit</b>	<b>Topic</b>	<b>No. of Hours (15)</b>
<b>1</b>	Market value of hydroponic farming Market analysis and business planning Cost-benefit analysis for setting a Hydroponic system Branding, marketing, and selling hydroponic produce Certification and regulatory guidelines for hydroponic produce	<b>15</b>

**Practical/Lab Course BOT SEC H 5P**

<b>Unit</b>	<b>Topic</b>	<b>No. of Hours (30)</b>
<b>1</b>	Creating a business plan for a hydroponic farm Market research and analysis - Packaging, labeling, and pricing strategies Visit to a commercial hydroponic farm	<b>30</b>

**Skill Enhancement Course: Hydroponics VI**

**No. of Hours- 45**

**CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE**

<b>Course Title</b>	<b>Credits</b>	<b>Credit distribution of the Course</b>			<b>Eligibility criteria</b>	<b>Pre-requisite of the Course (if any)</b>
		<b>Lecture</b>	<b>Tutorial</b>	<b>Practical/Practice</b>		

<b>Hydroponics 6</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>1</b>		<b>Nil</b>
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<b>Skill Enhancement Courses in Botany</b>		
<b>Programme : Skill Enhancement Courses in Botany</b>	<b>Year: III</b>	<b>Semester: VI</b>
<b>Subject: Botany</b>		
<b>Course: BOT SEC H 6</b>	<b>Hydroponics VI</b>	

<b>Credits: 2</b>	<b>Skill Enhancement Course</b>
<b>Max. Marks: As per Univ. rules</b>	<b>Min. Passing Marks: As per Univ. rules</b>

<b>Unit</b>	<b>Topic</b>	<b>No. of Hours (15)</b>
<b>1</b>	Government schemes and subsidies in Hydroponic farming Recent trends and innovations in hydroponics Research methodologies in hydroponic agriculture Climate-resilient hydroponic farming techniques Policy and future prospects of hydroponics	<b>15</b>

**Practical/Lab Course BOT SEC H 6P**

<b>Unit</b>	<b>Topic</b>	<b>No. of Hours (30)</b>
<b>1</b>	Preparation of a business plan for Hydroponic farming system Interactions with successful Hydroponic farmers Developing a prototype hydroponic system	<b>30</b>

	Internship/industrial training in hydroponics	
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### Suggested Readings

- Jr. Jones, J.B. (2014). Complete guide for growing plants hydroponically, CRC Press, London.
- Hasan, M., Sabir, N., Singh, A.K., Singh, M.C., Patel, N., Khanna, M., Rai, T., Pragnya, P. (2018). Hydroponics Technology for Horticultural Crops, Tech. Bull. TB-ICN 188/2018. Publ. by I.A.R.I., New Delhi-110012 INDIA.

### Skill Enhancement Course: Nursery Development and Floriculture-I

No. of Hours- 45

### CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

Course Title	Credits	Credit distribution of the Course			Eligibility criteria	Pre-requisite of the Course (if any)
		Lecture	Tutorial	Practical/Practice		
Nursery Development and Floriculture-I	2	1	0	1		Nil

### Skill Enhancement Courses in Botany

Programme : Skill Enhancement Courses in Botany	Year: I	Semester: I
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<b>Subject: Botany</b>	
<b>Course: BOT SEC NF1</b>	<b>Nursery Development and Floriculture-I</b>
<b>Course Outcomes:</b> The successful students will be able to: <ol style="list-style-type: none"> <li>1. Develop conceptual of nursery and gardening.</li> <li>2. Gain knowledge about developing commercial enterprise of nursery.</li> <li>3. Develop conceptual skill about floriculture.</li> <li>4. Gain knowledge about developing commercial enterprise of commercial floriculture.</li> </ol>	

<b>Credits: 2</b>	<b>Skill Enhancement Course</b>
<b>Max. Marks: As per Univ. rules</b>	<b>Min. Passing Marks: As per Univ. rules</b>

<b>Unit</b>	<b>Topic</b>	<b>No. of Hours (15)</b>
<b>1</b>	Introduction to Nursery & Floriculture Types of Nurseries Basic plant Classification & Nomenclature Importance of Soil & Water in Nursery Management Common Nursery Tools & Equipment	<b>15</b>

**Practical/Lab Course BOT SEC NF 1P**

<b>Unit</b>	<b>Topic</b>	<b>No. of Hours (30)</b>
<b>1</b>	Site Selection and Layout Planning for nursery development	<b>30</b>

	Soil Preparation and Bed Making Seed Sowing and Germination Techniques Identification & Use of Tools used in Nursery Basic Watering & Irrigation Methods	
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**Skill Enhancement Course: Nursery Development and Floriculture-II**

**No. of Hours- 45**

**CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE**

Course Title	Credits	Credit distribution of the Course			Eligibility criteria	Pre-requisite of the Course (if any)
		Lecture	Tutorial	Practical/Practice		
Nursery Development and Floriculture-II	2	1	0	1		Nil

**Skill Enhancement Courses in Botany**

<b>Programme : Skill Enhancement Courses in Botany</b>		<b>Year: I</b>	<b>Semester: II</b>
<b>Subject: Botany</b>			
<b>Course: BOT SEC NF 2</b>	<b>Nursery Development and Floriculture-II</b>		

<b>Credits: 2</b>	<b>Skill Enhancement Course</b>
<b>Max. Marks: As per Univ. rules</b>	<b>Min. Passing Marks: As per Univ. rules</b>

<b>Unit</b>	<b>Topic</b>	<b>No. of Hours</b>
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		(15)
<b>1</b>	Methods of Plant Propagation Seed Propagation & Its Importance Vegetative Propagation (Cutting, Grafting, Layering) Micropropagation (Tissue Culture Basics) Role of Plant Growth Regulators Factors Affecting Plant Growth Hardening of plants in glass house, mist chamber etc.	<b>15</b>

**Practical/Lab Course BOT NF 2P**

<b>Unit</b>	<b>Topic</b>	<b>No. of Hours (30)</b>
<b>1</b>	Hands-on Seed Propagation in nursery Grafting & Cutting Techniques Layering & Rooting Media Preparation Use of plant Growth Regulators Hardening & Acclimatization Nursery Hygiene & Sanitation	<b>30</b>

**Skill Enhancement Course: Nursery Development and Floriculture- III**

**No. of Hours- 45**

**CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE**

<b>Course Title</b>	<b>Credits</b>	<b>Credit distribution of the Course</b>			<b>Eligibility criteria</b>	<b>Pre-requisite of the Course (if any)</b>
		<b>Lecture</b>	<b>Tutorial</b>	<b>Practical/Practice</b>		
<b>Nursery Development and Floriculture-III</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>1</b>		<b>Nil</b>

<b>Skill Enhancement Courses in Botany</b>		
<b>Programme : Skill Enhancement Courses in Botany</b>	<b>Year: II</b>	<b>Semester: III</b>
<b>Subject: Botany</b>		
<b>Course: BOT SEC NF 3</b>	<b>Nursery Development and Floriculture-III</b>	

<b>Credits: 2</b>	<b>Skill Enhancement Course</b>
<b>Max. Marks: As per Univ. rules</b>	<b>Min. Passing Marks: As per Univ. rules</b>

<b>Unit</b>	<b>Topic</b>	<b>No. of Hours (15)</b>
<b>1</b>	Nursery Layout Planning & Design Watering, Fertilization & Pest Control in nursery Selection of Planting Material Nursery Commercialization & Market Trends Certification & Quality Control Legal Aspects & Policies in nursery	<b>15</b>

**Practical/Lab Course BOT SEC NF 3P**

<b>Unit</b>	<b>Topic</b>	<b>No. of Hours (30)</b>
<b>1</b>	Setting Up a Small Nursery Drip Irrigation & Fertilization Pest & Disease Control of plants Maintenance & Pruning, Labeling & Packaging of Plants Visit to a local commercial Nursery	<b>30</b>

**Skill Enhancement Course: Nursery Development and Floriculture- IV**

**No. of Hours- 45**

**CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE**

Course Title	Credits	Credit distribution of the Course			Eligibility criteria	Pre-requisite of the Course (if any)
		Lecture	Tutorial	Practical/Practice		
Nursery Development and Floriculture-IV	2	1	0	1		Nil

**Skill Enhancement Courses in Botany**

<b>Programme : Skill Enhancement Courses in Botany</b>		<b>Year: II</b>	<b>Semester: IV</b>
<b>Subject: Botany</b>			
<b>Course: BOT SEC H 4</b>	<b>Nursery Development and Floriculture-IV</b>		

<b>Credits: 2</b>	<b>Skill Enhancement Course</b>
<b>Max. Marks: As per Univ. rules</b>	<b>Min. Passing Marks: Asper Univ. rules</b>

Unit	Topic	No. of Hours (15)
<b>1</b>	Introduction to Floriculture Importance and scope of floriculture Classification of Ornamental Plants	<b>15</b>

Cultivation Techniques for some Important Flowers Landscape Designing Principles used in floriculture Greenhouse & Polyhouse Technology	
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**Practical/Lab Course BOT SEC NF 4P**

<b>Unit</b>	<b>Topic</b>	<b>No. of Hours (30)</b>
<b>1</b>	Growing Flowers in Open & Protected Conditions Designing Flower Beds & Lawns Flower Arrangement & Bouquet Making Greenhouse/Play house Setup for flower production Pest management Visit to a Floriculture Farm	<b>30</b>

**Skill Enhancement Course: Nursery Development and Floriculture-V**

**No. of Hours- 45**

**CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE**

<b>Course Title</b>	<b>Credits</b>	<b>Credit distribution of the Course</b>			<b>Eligibility criteria</b>	<b>Pre-requisite of the Course (if any)</b>
		<b>Lecture</b>	<b>Tutorial</b>	<b>Practical/Practice</b>		
<b>Nursery Development and Floriculture- V</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>1</b>		<b>Nil</b>

<b>Skill Enhancement Courses in Botany</b>		
<b>Programme : Skill Enhancement Courses in Botany</b>	<b>Year: III</b>	<b>Semester: V</b>
<b>Subject: Botany</b>		
<b>Course: BOT SEC NF 5</b>	<b>Nursery Development and Floriculture- V</b>	

<b>Credits: 2</b>	<b>Skill Enhancement Course</b>
<b>Max. Marks: As per Univ. rules</b>	<b>Min. Passing Marks: As per Univ. rules</b>

<b>Unit</b>	<b>Topic</b>	<b>No. of Hours (15)</b>
<b>1</b>	Harvesting & Post-Harvest Handling of Flowers Storage & Transportation Techniques Dry Flower Technology & Preservation Essential Oils & Their Extraction from flowers Value-Added Products from Flowers	<b>15</b>

**Practical/Lab Course BOT SEC NF 5P**

<b>Unit</b>	<b>Topic</b>	<b>No. of Hours (30)</b>
<b>1</b>	Post-Harvest Handling Techniques Techniques of flower Drying & Preservation Development of value added products from flowers Packaging & Marketing Training in a Floriculture Industry	<b>30</b>

**Skill Enhancement Course: Nursery Development and Floriculture- VI**

**No. of Hours- 45**

**CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE**

Course Title	Credits	Credit distribution of the Course			Eligibility criteria	Pre-requisite of the Course (if any)
		Lecture	Tutorial	Practical/Practice		
Nursery Development and Floriculture- 6	2	1	0	1		Nil

**Skill Enhancement Courses in Botany**

<b>Programme : Skill Enhancement Courses in Botany</b>		<b>Year: III</b>	<b>Semester: VI</b>
<b>Subject: Botany</b>			
<b>Course: BOT SEC NF 6</b>	<b>Nursery Development and Floriculture- VI</b>		

<b>Credits: 2</b>	<b>Skill Enhancement Course</b>
<b>Max. Marks: As per Univ. rules</b>	<b>Min. Passing Marks: Asper Univ. rules</b>

<b>Unit</b>	<b>Topic</b>	<b>No. of Hours (15)</b>
<b>1</b>	Marketing strategies for nursery development and flower production Government schemes and subsidies in nursery development and floriculture Cost-benefit analysis for setting a nursery	<b>15</b>

**Practical/Lab Course BOT NF 6P**

Unit	Topic	No. of Hours (30)
1	Preparation of Small Nursery Business Plan Market survey on the demand of flowers Liaising with the flower sellers/users Training in a Nursery/Floriculture Startup	30

### Suggested Readings

- Agrawal, P.K. (1993). Hand Book of Seed Technology, Dept. of Agriculture and Cooperation, National Seed Corporation Ltd., New Delhi.
- Bose T.K. and Mukherjee, D. (1972). Gardening in India, Oxford and IBH PublishingCo., New Delhi.
- Jules J. (1979). Horticultural Science. (3rd Ed.), W.H. Freeman and Co., San Francisco, USA.
- Kumar, N. (1997). Introduction to Horticulture, Rajalakshmi Publications, Nagercoil.
- Sandhu, M.K. (1989). Plant Propagation, Wile Eastern Ltd., Bangalore, Madras.
- Randhawa, G.S. and Mukhopadhyay, A. (1986). Floriculture in India. Allied Publishers.



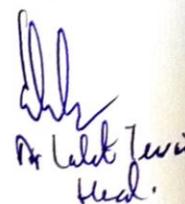
(Prof. P.L. Uniyal)



(Prof. S.C. Garkoti)



(Prof. P. Chaturvedi)



Mr Lalit Jaiswal  
Head.



(Prof. Anilk. Bishr)

Prof SS Bargali, Prof Kisan Bargali  
Prof Sushma Tanti and Prof Meera Chellid ] Present  
on line  
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