

**DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY**



**CIRCULAR NO.SU./B.Sc.CBC & GS/11/2022**

It is hereby inform to all concerned that, on the recommendation of Faculty of Science & Technology Meeting dated 24.08.2022, **the Academic Council at its meeting held on 29 August 2022 has accepted the following Syllabi of B.Sc. Degree under the Choice Based Credit & Grading System along with Rules and Regulation** as appended herewith:-

1.	B.Sc.Computer Science (Optional)	Ist and IInd semester
2.	B.Sc.Computer Application (Optional)	Ist and IInd semester
3.	B.Sc.Computer Application (Degree)	Ist and IInd semester
4.	B.Sc.Computer Science (Degree)	Ist and IInd semester
5.	B.Sc.Horticulture (Optional)	Ist to VIth semester
6.	B.Sc.Botany (Optional)	Ist to VIth semester
7.	B.Sc. Agrochemical & fertilizer (Optional)	Ist to VIth semester
8.	B.Sc.Home Science (Optional)	Ist and IInd semester
9.	B.Sc.Automobile Technology (Degree)	Ist and IInd semester
10.	B.Sc.Workshop Technology (Degree)	Ist and IInd semester
11.	B.Sc.Refrigeration and Air Conditioning (Degree )	Ist and IInd semester
12.	B.Sc.Environmental Science (Optional)	Ist and IInd semester
13.	B.Sc.Biotechnology (Degree )	Ist and IInd semester
14.	B.Sc.Biotechnology (Optional)	Ist and IInd semester
15.	B.Sc.Dairy Sci.& Tech (Optional)	Ist and IInd semester
16.	B.Sc.Zoology (Optional)	Ist to VIth semester
17.	B.Sc.Polymer Chemistry (Optional)	Ist and IInd semester
18.	B.Sc.Fisheries Science (Optional)	Ist and IInd semester
19.	B.Sc.Instrumentation Practice (Optional)	Ist semester
20.	B.Sc.Biochemistry (Optional)	Ist and IInd semester
21.	B.Sc.Non Conventional & Conventional Energy (Degree )	Ist and IInd semester

This is effective from the Academic Year 2022-23 and onwards.

All concerned are requested to note the contents of this circular and bring notice to the students, teachers and staff for their information and necessary action.

University Campus,  
Aurangabad-431 004.  
Ref.No. SU/B.Sc./2022/ 8428-35  
Date:-29.08.2022.

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**Deputy Registrar,  
Academic Section**

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**Copy forwarded with compliments to :-**

- 1] **The Principal, concerned affiliated College,**  
Dr. Babasaheb Ambedkar Marathwada University, Aurangabad.
- 2] **The Director, University Network & Information Centre, UNIC, with a request to upload this Circular on University Website.**

**Copy to :-**

- 1] The Director, Board of Examinations & Evaluation,
- 2] The Section Officer, [B.Sc. Unit] Examination Branch,
- 3] The Programmer [Computer Unit-1] Examinations,
- 4] The Programmer [Computer Unit-2] Examinations,
- 5] The In-charge, [E-Suvidha Kendra],  
Rajarshi Shahu Maharaj Examination Branch,
- 6] The Public Relation Officer,
- 7] The Record Keeper,

**Dr. Babasaheb Ambedkar Marathwada University**

**Aurangabad - 431004 (MS) India**

**Undergraduate Bachelor Degree Program**

**in Science (B. Sc.)**

**Horticulture (Optional Subject)**

**Course Structure and Curriculum**

**(Outcome based Curriculum)**

**Choice Based Credit System**

**(Effective from Academic Year 2022-23)**

**Structure and Curriculum for  
Bachelor of Science (B. Sc.) Horticulture (Optional Subject)  
(Choice Based Credit System)**

**Dr. Babasaheb Ambedkar Marathwada University, Aurangabad**

Choice Based Credit System (CBCS) Curriculum

For

Faculty of Science and Technology

Course Structure and Scheme of Examination

Table 1 to 6

**B.Sc. Horticulture (Three Year Undergraduate Degree Program)  
(Note: Only Core Courses Structure of Horticulture Subject)**

**Semester I**

	Course Code	Paper No	Course Title	Total periods (Teaching periods/week)	Credits	Scheme of Examination			
						Max Marks	CIA	UA	Min Marks
Optional (DSC) Core Courses	HORT-111	I	Elements of Horticulture	45 (3/ weeks)	2	50	10	40	20
	HORT -112	II	Vegetable Growing-I	45 (3/weeks)	2	50	10	40	20
	HORT -121	III	Practical based on I and II	45 (3/ weeks)	1.5	50	10	40	20
				135	5.5	150	30	120	60

**Total Credits for Semester I: 5.5 (Theory: 04; Laboratory: 1.5)**

**Semester II**

	Course Code	Paper No	Course Title	Total periods (Teaching periods/week)	Credits	Scheme of Examination			
						Max Marks	CIA	UA	Min Marks
Optional (DSC) Core Courses	HORT -211	IV	Ornamental Horticulture	45 (3/week)	2	50	10	40	20
	HORT -212	V	Vegetable Growing-II	45 (3/week)	2	50	10	40	20
	HORT -221	VI	Practical based on IV and V	45 (3/week)	1.5	50	10	40	20
				135	5.5	150	30	120	60

**Total Credits for Semester II: 5.5 (Theory: 04; Laboratory: 1.5)**

**Semester III**

	Course	Paper	Course Title	Total periods	Cred	Scheme of Examination
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	Code	No		(Teaching periods/week)	its	Max Marks	CIA	UA	Min Marks
<b>Optional (DSC) Core Courses</b>	HORT -311	VII	Principles and Technology of Fruit gardening	45(3/week)	2	50	10	40	20
	HORT -312	VIII	Orchard Management of Fruit Crops	45(3/week)	2	50	10	40	20
	HORT -321	IX	Practical based on VII	45(3/week)	1.5	50	10	40	20
	HORT -322	X	Practical based on VIII	45(3/week)	1.5	50	10	40	20
				180	07	200	40	160	80

**Total Credits for Semester III: 07 (Theory: 04; Laboratory: 3)**

**Semester IV**

	Course Code	Paper No	Course Title	Total periods (Teaching periods/week)	Credits	Scheme of Examination			
						Max Marks	CIA	UA	Min Marks
<b>Optional (DSC) Core Courses</b>	HORT -411	XI	Cultivation Technology of fruit Crops	45(3/week)	2	50	10	40	20
	HORT -412	XII	Production Technology of Plantation, Spices, Condiments and medicinal and aromatic plants	45(3/week)	2	50	10	40	20
	HORT -421	XIII	Practical based on XI	45(3/week)	1.5	50	10	40	20
	HORT -422	XIV	Practical based on XII	45(3/week)	1.5	50	10	40	20
				180	07	200	40	160	80

**Total Credits for Semester IV: 07 (Theory: 04; Laboratory: 3)**

**Semester V**

	Course Code	Paper No	Course Title	Total periods (Teaching periods/week)	Credits	Scheme of Examination			
						Max Marks	CIA	UA	Min Marks
<b>Optional (DSC) Core</b>	HORT -511	XV	Post-Harvest Management of Fruits and Vegetables	45(3/week)	2	50	10	40	20
	HORT -512	XVI	Mushroom Culture and Apiculture	45(3/week)	2	50	10	40	20

<b>Courses Elective</b>	HORT -521	XVII	Practical based on XV	45(3/week)	1.5	50	10	40	20
	HORT -522	XVIII	Practical based on XVI	45(3/week)	1.5	50	10	40	20
				180	07	200	40	160	80
<b>Total Credits for Semester V: 07 (Theory: 04; Laboratory: 3)</b>									
<b>Semester VI</b>									
	<b>Course Code</b>	<b>Paper No</b>	<b>Course Title</b>	<b>Total periods (Teaching periods/week)</b>	<b>Credits</b>	<b>Scheme of Examination</b>			
						<b>Max Marks</b>	<b>CIA</b>	<b>UA</b>	<b>Min Marks</b>
<b>Optional (DSC) Core Courses</b>	HORT -611	XIX	Preservation of Fruits and Vegetables	45(3/week)	2	50	10	40	20
	HORT -612	XX	Horticulture Business Management	45(3/week)	2	50	10	40	20
	HORT -621	XXI	Practical based on XIX	45(3/week)	1.5	50	10	40	20
	HORT-622	XXII	Practical based on XX	45(3/week)	1.5	50	10	40	20
				180	07	200	40	160	80
<b>Total Credits for Semester VI: 07 (Theory: 04; Laboratory: 3)</b>									
<b>Total Credits for three years: Sem. I (5.5) + Sem. II (5.5) + Sem. III (07) + Sem. IV (07) + Sem V (07) + Sem. VI (07) = 39 Credits</b>									

**Dr. Babasaheb Ambedkar Marathwada  
University, Aurangabad**

**DSC- Discipline Specific Core course**

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**Syllabus of Horticulture**

**B.SC. I<sup>st</sup> Year**

**Semester I and II**

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**Effective from June 2022-23**



# Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

Choice Based Credit System (CBCS) Curriculum

For

Faculty of Science and Technology

Course Structure and Scheme of Examination

**B.Sc. Horticulture (Three Year Undergraduate Degree Program)**

(Note: Only Core Courses Structure of Horticulture Subject)

<b>Semester I</b>									
	Course Code	Paper No	Course Title	Total periods (Teaching periods/week)	Credits	Scheme of Examination			
						Max Marks	CIA	UA	Min Marks
<b>Optional (DSC) Core Courses</b>	HORT-111	I	Elements of Horticulture	45(3/week)	2	50	10	40	20
	HORT -112	II	Vegetable Growing-I	45(3/week)	2	50	10	40	20
	HORT -121	III	Practical based on I and II	45(3/week)	1.5	50	10	40	20
				135	5.5	150	30	120	60
<b>Total Credits for Semester I: 5.5 (Theory: 04; Laboratory: 1.5)</b>									
<b>Semester II</b>									
	Course Code	Paper No	Course Title	Total periods (Teaching periods/week)	Credits	Scheme of Examination			
						Max Marks	CIA	UA	Min Marks
<b>Optional (DSC) Core Courses</b>	HORT -211	IV	Ornamental Horticulture	45(3/week)	2	50	10	40	20
	HORT -212	V	Vegetable Growing-II	45(3/week)	2	50	10	40	20
	HORT -221	VI	Practical based on IV and V	45(3/week)	1.5	50	10	40	20
				135	5.5	150	30	120	60
<b>Total Credits for Semester II: 5.5 (Theory: 04; Laboratory: 1.5)</b>									

**Dr. Babasaheb Ambedkar Marathwada University, Aurangabad**  
**Choice Based Credit System (CBCS) Curriculum for Faculty of Science and Technology**  
**Course Structure and Scheme of Examination**  
**B.Sc. (Three Year Undergraduate Degree Program)**  
**B.SC. First Year Semester-I**  
**Name of Subject: Horticulture Course Code: HORT-111**  
**Paper No: I Name of The Paper: Elements of Horticulture. (Theory)**  
**Total Credit (02) Marks: 50 Marks**  
**Contact Hours: 30 (Clock Hours) Periods- 45 (50 Minutes of Each)**

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**Unit I (10 Periods)**

- 1) Introduction, Definition, Importance, Present status and future scope of Horticulture in Maharashtra / India (05)
- 2) Branches and classification of Horticultural crops. (05)

**Unit II (10 Periods)**

- 3) Nursery arrangement – Planning, General nursery practices, various nursery techniques. (03)
- 4) Plant propagation- Its Principles and Methods-Sexual plant propagation, its merits and demerits, / seed germination, seed dormancy its factors, seed viability and longevity of ornamental crops. (05)
- 5) Vegetative/ Asexual plant propagation, its merits and demerits. (02)

**Unit III (10 Periods)**

- 6) Method: Cutting, Layering, Budding, Grafting and its factors (10)

**Unit IV (10 Periods)**

- 7) Stock Scion relationship- Effect of roots stock on scion, effect of scion on root stock Study of root stock of various crops (03)
- 8) Micro propagation and importance of tissue culture in horticultural crops (04)
- 9) Plant growth regulators, its types and their uses in horticultural crops. (03)

**Unit V (5 Periods) Tutorials, seminars and Assignments (05)**

1. **Internal Test 01 (5 Marks)**
2. **Internal Test 02 (5 Marks)**
3. **Assignment/Tutorial (5 marks)**

**Note:**

- i) **Assessment:** 80% for University Assessment (Semester End Examination) and 20 % for Continuous Internal Assessment (CIA)
- ii) **Continuous Internal Assessment (CIA): Theory** (10 Marks): Internal Test 05 Marks (Two Internal Tests of 05 marks each and average of the two tests will be considered) and 05 Marks for Assignment/tutorials.

**Dr. Babasaheb Ambedkar Marathwada University, Aurangabad**  
**Choice Based Credit System (CBCS) Curriculum for Faculty of Science and Technology**  
**Course Structure and Scheme of Examination**

**B.Sc. (Three Year Undergraduate Degree Program)**

**B.Sc. First Year**

**Semester-I**

**Name of Subject: Horticulture**

**Course Code: HORT-112**

**Paper No: II**

**Name of the Paper: Vegetable Growing I (Theory)**

**Total Credit (02)**

**Marks: 50 Marks**

**Contact Hours: 30 (Clock Hours)**

**Periods- 45 (50 Minutes of Each)**

**Unit-I (10 Periods)**

- 1) Introduction, Definition, importance and scope of vegetable growing in Maharashtra / India (02)
- 2) Introduction to exotic vegetables (02)
- 3) Problems and practices of vegetable production in India (03)
- 4) Maximization of vegetable production (03)

**Unit II (10 Periods)**

- 5) Classification of horticultural crops (05)
- 6) Intercropping, relay cropping, mixed cropping, multiple cropping and companion cropping, rotation cropping & succession cropping. (05)

**Unit III (10 Periods)**

- 7) Types of vegetable gardening - Home /kitchen gardening, Commercial vegetable gardening, Market gardening, Truck gardening, Vegetable gardening for seed production, Floating vegetable gardening, Vegetable gardening for processing (10)

**Unit IV (10 Periods)**

- 8) Hi Tech-Nursery management Practices and transplanting (04)
- 9) Use of growth regulators in vegetables (03)
- 10) Mulching- its various methods and its role in vegetable production (01)
- 11) Vegetables carving. (02)

**Unit V (5 Periods) Tutorials, seminars and Assignments (05)**

**1. Internal Test 01 (5 Marks)**

**2. Internal Test 02 (5 Marks)**

**3. Assignment/Tutorial (5 marks)**

**Note:**

- i. **Assessment:** 80% for University Assessment (Semester End Examination) and 20 % for Continuous Internal Assessment (CIA)
- ii. **Continuous Internal Assessment (CIA): Theory** (10 Marks): Internal Test 05 Marks (Two Internal Tests of 05 marks each and average of the two tests will be considered) and 05 Marks for Assignment/tutorials.

**Dr. Babasaheb Ambedkar Marathwada University, Aurangabad**  
**Choice Based Credit System (CBCS) Curriculum for Faculty of Science and Technology**  
**Course Structure and Scheme of Examination**

**B.Sc. (Three Year Undergraduate Degree Program)**

**B.SC. First Year**

**Semester-I**

**Name of Subject: Horticulture**

**Course Code: HORT-121**

**Paper No: III Name of The Paper: Practical Based on paper No I & II**

**(Elements of Horticulture & vegetable Growing I) (Practical)**

**Total Credit (1.5)**

**Marks: 50 Marks**

**Contact Hours: 30 (Clock Hours)**

**Periods- 45 (50 Minutes of Each)**

- 1) Introduction & Identification of Garden Tools
- 2) Preparation of Potting Mixture, Potting & Repotting
- 3) Growing plants in media like soil, sand, leaf mould, sphagnum moss, vermicompost & soil less culture
- 4) Preparation of nursery beds
- 5) Application & methods of plant growth regulators
- 6) Types of Vegetative plant propagation
  - a) Various methods of cutting
  - b) Various methods of layering
  - c) Various methods of budding
  - d) Various methods of grafting
- 7) Propagation by specialized structure- stem, roots, bulb, corm, tuber, tuberous roots, rhizomes
- 8) Micro-propagation
- 9) Identification and classification of vegetable seeds
- 10) Preparation of raised and flat beds for sowing of vegetable seeds.
- 11) Study of various vegetable cropping methods
- 12) Layout for planting of different vegetables
- 13) Layout for kitchen/ Float vegetable garden
- 14) Preparation of vegetable carving
- 15) Preparation of spawn for mushroom production
- 16) Visit to commercial nurseries.

**Note:**

- i. **Assessment:** 80% for University Assessment (Semester End Examination) and 20 % for Continuous Internal Assessment (CIA)
- ii. **Continuous Internal Assessment (CIA): Practical (10 Marks):** 07 Marks for Internal Practical Examination and 03 Marks for record book/submission of collection and field survey report and excursion report
- iii. **Practical examination:** There shall be annual examination and Student Shall Submit record book, Field note book/Tour Report, Assignment or Project work at the time of exam

**Dr. Babasaheb Ambedkar Marathwada University, Aurangabad**  
**Choice Based Credit System (CBCS) Curriculum for Faculty of Science and Technology**  
**Course Structure and Scheme of Examination**  
**B.Sc. (Three Year Undergraduate Degree Program)**  
**B.Sc. First Year Semester-II**  
**Name of Subject: Horticulture Course Code: HORT-211**  
**Paper No: IV Name of The Paper: Ornamental Horticulture (Theory)**  
**Total Credit (02) Marks: 50 Marks**  
**Contact Hours: 30 (Clock Hours) Periods- 45 (50 Minutes of Each)**

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**Unit-I (10 Periods)**

- 1) Floriculture-Definition, Importance, Scope of ornamental Horticulture (05)
- 2) Classification of ornamental crops. (03)
- 3) Principles of garden designs (02)

**Unit- II (10 Periods)**

- 5) Study of garden features: Flowering and foliage trees, Climbers and creepers, Hedge and edges, Arches and pergolas, Roads, Topiary works, Seating arrangement, Lawn- various methods of plating and its maintenance (05)
- 6) Cultivation of important crops- Roses, Chrysanthemum, Gladiolus, Jasmine, Marigold, (05)

**Unit III (10 Periods)**

- 6) Cultivation of important crops- Gaillardia, Zinnia, Aster, Crossandra, Lilies etc. etc. (05)
- 7) Greenhouses-Definition, importance and scope (02)
- 8) Types of green houses and its construction. (03)

**Unit IV (10 Periods)**

- 9) Protective cultivation of important crops- Rose, Gerbera, Carnation, Anthurium, Orchids etc. (06)
- 10) Terrarium, Bonsai Culture. Flower arrangement, dry decoration. (04)

**Unit V (5 Periods) Tutorials, seminars and Assignments (05)**

1. **Internal Test 01 (5 Marks)**
2. **Internal Test 02 (5 Marks)**
3. **Assignment/Tutorial (5 marks)**

**Note:**

- i. **Assessment:** 80% for University Assessment (Semester End Examination) and 20 % for Continuous Internal Assessment (CIA)
- ii. **Continuous Internal Assessment (CIA): Theory (10 Marks):** Internal Test 05 Marks (Two Internal Tests of 05 marks each and average of the two tests will be considered) and 05 Marks for Assignment/tutorials.

**Dr. Babasaheb Ambedkar Marathwada University, Aurangabad**  
**Choice Based Credit System (CBCS) Curriculum for Faculty of Science and Technology**  
**Course Structure and Scheme of Examination**  
**B.Sc. (Three Year Undergraduate Degree Program)**  
**B.SC. First Year Semester-II**  
**Name of Subject: Horticulture Course Code: HORT-212**  
**Paper No: V Name of the Paper: Vegetable Growing II. (Theory)**  
**Total Credit (02) Marks: 50 Marks**  
**Contact Hours: 30 (Clock Hours) Periods- 45 (50 Minutes of Each)**

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**Unit-I (10 Periods)**

Cultivation/ Raising of vegetables on the basis of history, origin, nutritive value, soil, climate, varieties, planting, manuring, irrigation, interculture, plant protection, use of growth regulators, harvesting and yield, grading, packaging, storage and marketing of following vegetables.

- 1) Fruit vegetables- Tomato, Chili, Bhindi, Brinjal etc. (04)
- 2) Root vegetables: Carrot, Radish, Beet root, Colocasia, Yam etc. (05)
- 3) Bulb, Rhizomes and tubers- onion, (01)

**Unit II (10 Periods)**

- 3) Bulb, Rhizomes and tubers- garlic, turmeric, potato, sweet potato etc. (04)
- 4) Cucurbitaceous vegetables: - Cucumber, water melon, Musk melon, Pumpkin, Ridge gourd, Bitter gourd, Bottle Gourd, Sponge, gourd etc. (04)
- 5) Leafy vegetables: Spinach, Fenugreek, Amaranthus, Coriander, Lettuce etc. (02)

**Unit III (10 Periods)**

- 6) Pod vegetables: Pea, Cluster bean, Cowpea, Sesbania (Hadga), Moringa (Shevga) etc. (02)
- 7) Cole crops- Cabbage, Cauliflower, Knol-Khol, etc. (03)
- 8) Protective Cultivation of exotic vegetable crops. (05)

**Unit IV (10 Periods)**

- 9) Mushroom production technology- Its importance, type and methods of preparation. (05)
- 10) Export management of vegetable crops (05)

**Unit V (5 Periods) Tutorials, seminars and Assignments (05)**

1. **Internal Test 01 (5 Marks)**
2. **Internal Test 02 (5 Marks)**
3. **Assignment/Tutorial (5 marks)**

**Note:**

- i. **Assessment:** 80% for University Assessment (Semester End Examination) and 20 % for Continuous Internal Assessment (CIA)
- ii. **Continuous Internal Assessment (CIA): Theory (10 Marks):** Internal Test 05 Marks (Two Internal Tests of 05 marks each and average of the two tests will be considered) and 05 Marks for Assignment/tutorials.

**Dr. Babasaheb Ambedkar Marathwada University, Aurangabad**  
**Choice Based Credit System (CBCS) Curriculum for Faculty of Science and Technology**  
**Course Structure and Scheme of Examination**

**B.Sc. (Three Year Undergraduate Degree Program)**

**B.SC. First Year**

**Semester-II**

**Name of Subject: Horticulture**

**Course Code: HORT-221**

**Paper No: VI      Name of The Paper: Practical Based on Paper No IV and V**  
**(Ornamental horticulture & Vegetable Growing II.) (Practical)**

**Total Credit (1.5)**

**Marks: 50 Marks**

**Contact Hours: 30 (Clock Hours)**

**Periods- 45 (50 Minutes of Each)**

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- 1) Introduction and identification of ornamental crops and its importance
- 2) Identification & raising of seeds of seasonal in commercial importance
- 3) Layout of garden: - Formal and informal
- 4) Use of greenhouse for nursery plant production.
- 5) Exhibition of cut flowers, Floral arraignment, Garlands & Bouquets.
- 6) Collection & Identification of insects, pests.
- 7) Preparation and maintenance of lawn.
- 8) Preparation of terrarium
- 9) Methods of seedling raising of various vegetables
- 10) Transplanting of vegetable crops.
- 11) Irrigation layout for vegetable crops
- 12) Pruning of vegetable
- 13) Mulching of vegetable
- 14) Harvesting and grading of vegetables
- 15) Packing stocking and bundling of leafy vegetables
- 16) Study of growing vegetable from planting to harvest
- 17) Visit to Important Gardens.

**Note:**

- i. **Assessment:** 80% for University Assessment (Semester End Examination) and 20 % for Continuous Internal Assessment (CIA)
- ii. **Continuous Internal Assessment (CIA): Practical (10 Marks):** 07 Marks for Internal Practical Examination and 03 Marks for record book/submission of collection and field survey report and excursion report
- iii. **Practical examination:** There shall be annual examination and Student Shall Submit record book, Field note book/Tour Report, Assignment or Project work at the time of exam

**Dr. Babasaheb Ambedkar Marathwada  
University, Aurangabad**

**DSC- Discipline Specific Core course**

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**Syllabus of Horticulture**

**B.SC. II<sup>nd</sup> Year**

**Semester III and IV**

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**Effective from June 2023-24**



## Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

Choice Based Credit System (CBCS) Curriculum  
For Faculty of Science and Technology  
Course Structure and Scheme of Examination

**B.Sc. Horticulture (Three Year Undergraduate Degree Program)**  
(Note: Only Core Courses Structure of Horticulture Subject)

Semester III									
	Course Code	Paper No	Course Title	Total periods (Teaching periods/week)	Credits	Scheme of Examination			
						Max Marks	CIA	UA	Min Marks
<b>Optional (DSC) Core Courses</b>	HORT -311	VII	Principles and Technology of Fruit gardening	45(3/week)	2	50	10	40	20
	HORT -312	VIII	Orchard Management of Fruit Crops	45(3/week)	2	50	10	40	20
	HORT -321	IX	Practical based on VII	45(3/week)	1.5	50	10	40	20
	HORT -322	X	Practical based on VIII	45(3/week)	1.5	50	10	40	20
				180	07	200	40	160	80
<b>Total Credits for Semester III: 07 (Theory: 04; Laboratory: 3)</b>									
Semester IV									
	Course Code	Paper No	Course Title	Total periods (Teaching periods/week)	Credits	Scheme of Examination			
						Max Marks	CIA	UA	Min Marks
<b>Optional (DSC) Core Courses</b>	HORT -411	XI	Cultivation Technology of fruit Crops	45(3/week)	2	50	10	40	20
	HORT -412	XII	Production Technology of Plantation, Spices, Condiments and medicinal and aromatic plants	45(3/week)	2	50	10	40	20
	HORT -421	XIII	Practical based on XI	45(3/week)	1.5	50	10	40	20
	HORT -422	XIV	Practical based on XII	45(3/week)	1.5	50	10	40	20
				180	07	200	40	160	80
<b>Total Credits for Semester IV: 07 (Theory: 04; Laboratory: 3)</b>									

**Dr. Babasaheb Ambedkar Marathwada University, Aurangabad**  
**Choice Based Credit System (CBCS) Curriculum for Faculty of Science and Technology**  
**Course Structure and Scheme of Examination**

**B.Sc. (Three Year Undergraduate Degree Program)**

**B.SC. Second Year**

**Semester-III**

**Name of Subject: Horticulture**

**Course Code: HORT-311**

**Paper No: VII Name of the Paper: Principles and Technology of Fruit gardening. (Theory)**  
**Total Credit (02) Marks: 50 Marks**  
**Contact Hours: 30 (Clock Hours) Periods- 45 (50 Minutes of Each)**

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**Unit I (10 Periods)**

- 1) Fruit Gardening- Definition, Importance and scope (02).
- 2) Soil requirement of fruit crops. (02)
- 3) Climatic requirement of fruit crops. (02)
- 4) Climatic zones of Maharashtra/ India. (02)
- 5) Classification of fruit crops. (02)

**Unit II (10 Periods)**

6. Unfruitfulness of fruit crops. (02)
7. Growth and fruiting habit of fruit crops, fruit bud differentiation, Fruit setting and fruit drops. (03)
8. Planning layout and selection of site for establishing an orchard. (02)
9. Methods and Systems of planting material, after care of plating, fencing, role of wind brakes and shelter belts, high- density planting in mango, banana, sapota, grapes etc. (03)

**Unit III (10 Periods)**

- 10) Orchard management practices, Clean cultivation, crop rotation, intercropping , Multistoried cropping (05)
- 11) Role of mulching its merits and demerits (02),
- 12) Inter cultivation operations in fruit crops (03)

**Unit IV (10 Periods)**

- 13) Irrigation- water requirement of fruit crops. Methods of irrigation- Ring of basin furrow sprinkler and drip irrigation, Rain gun irrigation. (03)
- 14) Role of plant growth regulators on fruit crops (Its types) (02)
- 15) Insect pests and diseases management (05).

**Unit V (5 Periods) Tutorials, seminars and Assignments (05)**

1. Internal Test 01 (5 Marks)
2. Internal Test 02 (5 Marks)
3. Assignment/Tutorial (5 marks)

**Note:**

- i. **Assessment:** 80% for University Assessment ( Semester End Examination) and 20 % for Continuous Internal Assessment ( CIA)
- ii. **Continuous Internal Assessment (CIA):** Theory (10 Marks): Internal Test 05 Marks (Two Internal Tests of 05 marks each and average of the two test will be considered) and 05 Marks for Assignment/tutorials.

<b>Dr. Babasaheb Ambedkar Marathwada University, Aurangabad</b>	
<b>Choice Based Credit System (CBCS) Curriculum for Faculty of Science and Technology</b>	
<b>Course Structure and Scheme of Examination</b>	
<b>B.Sc. (Three Year Undergraduate Degree Program)</b>	
<b>B.SC. Second Year</b>	<b>Semester-III</b>
<b>Name of Subject: Horticulture</b>	<b>Course Code: HORT-312</b>
<b>Paper No: VIII</b>	<b>Name of the Paper: Orchard Management of Fruit Crops (Theory)</b>
<b>Total Credit (02)</b>	<b>Marks: 50 Marks</b>
<b>Contact Hours: 30 (Clock Hours)</b>	<b>Periods- 45 (50 Minutes of Each)</b>

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**Unit I (10 Periods)**

- 1) Nutritional requirements of fruit crops and manures in fruit gardening. (05)
- 2) Role of essential nutrients- Macro-micro nutrients. (05)

**Unit II (10 Periods)**

- 3) Basic principles of manuring in fruit crops, (05)
- 4) Manures, Types of manures, Methods of preparation of manures, FYM, Compost, Urban compost, Vermicompost, green manuring and its role in fruit crops. (05)

**Unit III (10 Periods)**

- 5) Methods of application of manures. (02)
- 6) Principles and methods of application of fertilizers. (03)
- 7) Role of Bio-fertilizers and liquid fertilizers in fruit crops (05)

**Unit IV (10 Periods)**

- 8) Training and Pruning-Objects and methods of Training and Pruning (05)
- 9) Special Horticultural practices for inducing Fruiting in fruit crops. (05)
  - 11.1 Bending in Guava
  - 11.2 Notching in fig.
  - 11.3 Girdling in Grape.
  - 11.4 Ringing Mango.
  - 11.5 Root pruning in citrus.

**Unit V (5 Periods) Tutorials, seminars and Assignments (05)**

1. Internal Test 01 (5 Marks)
2. Internal Test 02 (5 Marks)
3. Assignment/Tutorial (5 marks)

**Note:**

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**B.Sc. (Three Year Undergraduate Degree Program)**  
**B.SC. Second Year Semester-III**  
**Name of Subject: Horticulture Course Code: HORT-321**  
**Paper No: IX Name of the Paper: Practical based on VII (Practical)**  
**Principles and Technology of Fruit gardening.**  
**Total Credit (1.5) Marks: 50 Marks**  
**Contact Hours: 30 (Clock Hours) Periods- 45 (50 Minutes of Each)**

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- 1) Layout of system of planting. (02)
- 2) Digging and filling of pits for fruit tree planation. (01)
- 3) Selection of planting material and transplanting of fruit crops. (01) Study of flowering and fruiting habits in fruit trees. (01)
- 4) Intercultural operations in fruit crops. (01)
- 5) Identification, collection of important pest and disease of fruit crops. (02)
- 6) Method of control of pest and disease in fruit crops. (01)
- 7) Preparation and application of plant growth regulators(01)
- 8) Preparation of Bordeaux Mixture and pest. (01)
- 10) Irrigation layout (03)
  - 10.1 Ring and basin.
  - 10.2 Ridges and furrow
  - 10.3 Drip irrigation
  - 10.4 Sprinkler.
- 11) Visit to commercial orchard. (01)

**Note:**

- i. **Assessment:** 80% for University Assessment (Semester End Examination) and 20 % for Continuous Internal Assessment (CIA)
- ii. **Continuous Internal Assessment (CIA): Practical** (10 Marks): 07 Marks for Internal Practical Examination and 03 Marks for record book/submission of collection and field survey report and excursion report
- iii. **Practical examination:** There shall be annual examination and Student Shall Submit record book, Field note book/Tour Report, Assignment or Project work at the time of exam

**Dr. Babasaheb Ambedkar Marathwada University, Aurangabad**  
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**B.Sc. (Three Year Undergraduate Degree Program)**  
**B.SC. Second Year Semester-III**  
**Name of Subject: Horticulture Course Code: HORT-322**  
**Paper No: X Name of The Paper: Practical based on VIII (Practical)**  
**Orchard Management of Fruit Crops**  
**Total Credit (1.5) Marks: 50 Marks**  
**Contact Hours: 30 (Clock Hours) Periods- 45 (50 Minutes of Each)**

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- 1) Methods of preparation of FYM (01)
- 2) Methods of preparation of Compost. (01)
- 3) Methods of preparation of green manure. (01)
- 4) Methods of preparation of Vermicompost. (01)
- 5) Methods of application of Fertilizers. (01)
- 6) Methods of application of Bio-fertilizers. (01)
- 7) Methods of application of Liquid fertilizers. (01)
- 8) Layout methods of preparation of Bio-gas and bio stories. (01)
- 9) Special horticultural practices (05)
  - 1) Bahar treatment
  - 2) Notching in Fig
  - 3) Ringing in Mango
  - 4) Girdling in grape
  - 5) Bending in Guava
  - 6) Root proving in citrus
- 10) Systems of training in Fruit Crops. (01)
- 11) Systems of pruning in Grapes, Ber, Fig and other fruit crops. (01)

**Note:**

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- iii. **Practical examination:** There shall be annual examination and Student Shall Submit record book, Field note book/Tour Report, Assignment or Project work at the time of exam

<b>Dr. Babasaheb Ambedkar Marathwada University, Aurangabad</b>	
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<b>B.Sc. (Three Year Undergraduate Degree Program)</b>	
<b>B.SC. Second Year</b>	<b>Semester-IV</b>
<b>Name of Subject: Horticulture</b>	<b>Course Code: HORT-411</b>
<b>Paper No: XI</b>	<b>Name of the Paper: Cultivation Technology of fruit Crops (Theory)</b>
<b>Total Credit (02)</b>	<b>Marks: 50 Marks</b>
<b>Contact Hours: 30 (Clock Hours)</b>	<b>Periods- 45 (50 Minutes of Each)</b>

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**Methods of cultivation of fruit crops:**

History, origin, Area, Importance, scope, value, varieties, propagation methods, soil, climate, planation, after care, Cultural practices, Nutrition, Water requirement, intercropping, Important pest and diseases, harvesting, yield and marketing of following fruit crops.

**Unit I (10 Periods)**

- |   |      |
|---|------|
| 1) Mango  | (03) |
| 2) Banana   | (03) |
| 3) Citrus (Lemmon, Mandarin Orange, Sweet orange) | (04) |

**Unit II (10 Periods)**

- |           |      |
|-----------|------|
| 4) Guava  | (02) |
| 5) Grapes | (02) |
| 6) Sapota | (02) |
| 7) Papaya | (02) |
| 8) Fig    | (02) |

**Unit III (10 Periods)**

- |                |      |
|----------------|------|
| 9) Pomegranate | (03) |
| 10) Aonla      | (03) |
| 11) Tamarind   | (02) |
| 12) Jamun      | (02) |

**Unit IV (10 Periods)**

- |                              |      |
|------------------------------|------|
| 13) Custard apple            | (03) |
| 14) Ber.                     | (02) |
| 15) Strawberry and Pineapple | (02) |
| 16) Apple                    | (02) |
| 18) Jackfruit, Dragoon fruit | (01) |
| 19) Kiwi ,Pear               | (01) |

**Unit V (5 Periods) Tutorials, seminars and Assignments** (05)

- 1. Internal Test 01 (5 Marks)**
- 2. Internal Test 02 (5 Marks)**
- 3. Assignment/Tutorial (5 marks)**

**Note:**

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- ii. **Continuous Internal Assessment (CIA): Theory (10 Marks):** Internal Test 05 Marks (Two Internal Tests of 05 marks each and average of the two test will be considered) and 05 Marks for Assignment/tutorials.

**Dr. Babasaheb Ambedkar Marathwada University, Aurangabad**  
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**Course Structure and Scheme of Examination**  
**B.Sc. (Three Year Undergraduate Degree Program)**  
**B.SC. Second Year Semester-IV**  
**Name of Subject: Horticulture Course Code: HORT-412**  
**Paper No: XII**  
**Name of the Paper: Production Technology of Plantation, Spices, Condiments and medicinal and aromatic plants (Theory)**

**Total Credit (02) Marks: 50 Marks**  
**Contact Hours: 30 (Clock Hours) Periods- 45 (50 Minutes of Each)**

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**Unit I (10 Periods)**

- 1) Scope and importance of spices and condiments, plantation crops, medicinal and aromatic plants. (02)
- 2) Study of important Spices and condiments (08)  
Ginger, Turmeric, Pepper, Cardamom, Cumin, Cinnamon, Clove, Cumin, Fennel, Nutmeg,

**Unit II (10 Periods)**

- 3) Study of important Plantation Plants (10)  
Coconut, Areca nut, Betel Vine, Cashew, Coffee, Rubber Tree, Oil palm

**Unit III (10 Periods)**

- 1) Study of important Medicinal Plants (10)  
Sarpagandha, Opium, Ocimum, Periwinkle, Aloe Vera, Guggal, Giloy, Ashwagandha  
Senna, Isabgol, Pipali, Rauwolfia, Stevia, Coleus.

**Unit IV (10 Periods)**

- 1) Study of important Aromatic Plants (10)  
Lemongrass, Indian Basil, Citronella, Kewada, Mint, Palmarosa Grass, Rose, Geranium,  
Pachouli, Davana

**Unit V (5 Periods) Tutorials, seminars and Assignments (05)**

1. **Internal Test 01 (5 Marks)**
2. **Internal Test 02 (5 Marks)**
3. **Assignment/Tutorial (5 marks)**

**Note:**

- i) **Assessment:** 80% for University Assessment (Semester End Examination) and 20% for Continuous Internal Assessment (CIA)
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**Course Structure and Scheme of Examination**

**B.Sc. (Three Year Undergraduate Degree Program)**

**B.SC. Second Year**

**Semester-IV**

**Name of Subject: Horticulture**

**Course Code: HORT-421**

**Paper No: XIII**

**Name of the Paper: Practical based on XI (*Practical*)**

**Cultivation Technology of fruit Crops**

**Total Credit (1.5)**

**Marks: 50 Marks**

**Contact Hours: 30 (Clock Hours)**

**Periods- 45 (50 Minutes of Each)**

- 
- 1) Identification of fruit crops and their varieties. (02)
  - 2) Role of Root stocks used in following crops.
    - 2.1 Mango (01)
    - 2.2 Citrus. (01)
    - 2.3 Sapota. (01)
    - 2.4 Grape (01)
    - 2.5 Custard apple. (01)
  - 3) Mango malformation. (01)
  - 4) Paclobutrazol treatment for alternate bearing of mango (01)
  - 5) Banana plantation by rhizome/suckers. (01)
  - 6) Bahar treatment in pomegranate. (01)
  - 7) Plant protection in grape, pomegranate, Ber. (02)
  - 8) Papain extraction from papaya. (01)
  - 9) Visit to various commercial fruit orchard. (01)

**Note:**

- i. **Assessment:** 80% for University Assessment (Semester End Examination) and 20 % for Continuous Internal Assessment (CIA)
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- iii. **Practical examination:** There shall be annual examination and Student Shall Submit record book, Field note book/Tour Report, Assignment or Project work at the time of exam



**Dr. Babasaheb Ambedkar Marathwada University, Aurangabad**  
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**B.Sc. (Three Year Undergraduate Degree Program)**  
**B.SC. Second Year Semester-IV**  
**Name of Subject: Horticulture Course Code: HORT-422**  
**Paper No: XIV Name of the Paper: Practical based on XII (Practical)**  
**Production Technology of Plantation, Spices, Condiments and medicinal and aromatic plants**  
**Total Credit (1.5) Marks: 50 Marks**  
**Contact Hours: 30 (Clock Hours) Periods- 45 (50 Minutes of Each)**

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- 1) Storage of ginger rhizomes (01)
- 2) Processing of turmeric- Curing, Polishing, and coloring. (01)
- 3) Production of Coconut nursery Seedlings. (01)
- 4) Grafting of Cashew nut. (01)
- 5) Training, trailing and lowering of betel vines. (01)
- 6) Training and pruning in coffee. (01)
- 7) Processing of coffee. (01)
- 8) Processing of cashew nuts. (01)
- 9) Preparation of Value-Added Products of Coconut (01)
- 10) Drying of stevia plant leaves. (01)
- 11) Lancing and latex collection of opium crop. (01)
- 12) Propagation of Serpagandha. (01)
- 13) Estimation of Sennosides from senna
- 14) Distillation of Citronella, Lemon grass and Geranium. (01)
- 15) Visit to plantation, aromatic and medicinal nursery. (01)

**Note:**

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- iii. **Practical examination:** There shall be annual examination and Student Shall Submit record book, Field note book/Tour Report, Assignment or Project work at the time of exam

**Dr. Babasaheb Ambedkar Marathwada  
University, Aurangabad**

**DSC- Discipline Specific Core course**

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**Syllabus of Horticulture**

**B.SC. III<sup>rd</sup> Year**

**Semester V and VI**

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**Effective from June 2024-25**

## Dr. Babasaheb Ambedkar Marathwada University, Aurangabad

Choice Based Credit System (CBCS) Curriculum  
For Faculty of Science and Technology  
Course Structure and Scheme of Examination

**B.Sc. Horticulture (Three Year Undergraduate Degree Program)**  
(Note: Only Core Courses Structure of Horticulture Subject)

Semester VI									
	Course Code	Paper No	Course Title	Total periods (Teaching periods/week)	Credits	Scheme of Examination			
						Max Marks	CIA	UA	Min Marks
<b>Optional (DSC) Core Courses</b>	HORT -611	XIX	Preservation of Fruits and Vegetables	45(3/week)	2	50	10	40	20
	HORT -612	XX	Horticulture Business Management	45(3/week)	2	50	10	40	20
	HORT -621	XXI	Practical based on XIX	45(3/week)	1.5	50	10	40	20
	HORT-622	XXII	Practical based on XX	45(3/week)	1.5	50	10	40	20
				180	07	200	40	160	80
<b>Total Credits for Semester VI: 07 (Theory: 04; Laboratory: 3)</b>									
<b>Total Credits for three years: Sem. I (5.5) + Sem. II (5.5) + Sem. III (07) + Sem. IV (07) + Sem V (07) + Sem. VI (07) = 39 Credits</b>									
				180	07	200	40	160	80
<b>Total Credits for Semester VI : 07 ( Theory : 04 ; Laboratory : 3 )</b>									

**Dr. Babasaheb Ambedkar Marathwada University, Aurangabad**  
**Choice Based Credit System (CBCS) Curriculum for Faculty of Science and Technology**  
**Course Structure and Scheme of Examination**  
**B.Sc. (Three Year Undergraduate Degree Program)**  
**B.SC. Third Year Semester-V**

**Name of Subject: Horticulture Course Code: HORT-511**

**Paper No: XV**

**Name of the Paper: Post-Harvest Management of Fruits and Vegetables (Theory)**

**Total Credit (02)**

**Marks: 50 Marks**

**Contact Hours: 30 (Clock Hours)**

**Periods- 45 (50 Minutes of Each)**

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**Unit I (10 Periods)**

- 1) Importance of post-harvest management of fruits and Vegetables. (1)
- 2) Scope of post-harvest management of fruits and Vegetables. (1)
- 3) Future status of post-harvest management of fruits and Vegetables. (1)
- 4) Nutritional value of fruits and Vegetables in human diets. (1)
- 5) Study of maturity standards of fruits and Vegetables (3)
- 6) Harvest techniques of fruits and Vegetables methods stages signs of harvesting. (3)

**Unit II (10 Periods)**

- 1) Careful handling of harvested fruits and Vegetables (1)
- 2) Ripening factors responsible for ripening, pre-harvest & post-harvest factors (3)
- 3) Climacteric and non-climacteric types of fruits and Vegetables. (1)
- 4) Methods of grading and packaging of fruits and vegetables (5)

**Unit III (10 Periods)**

- 1) Methods of storage for prolonging shelf life of harvested fruits and Vegetables. (4)
- 2) Post-harvest disease and pest management of fruits and Vegetables. (3)
- 3) Causes of spoilage of fruits and Vegetables and control measures during storage (3)

**Unit IV (10 Periods)**

- 1) Methods of pre-cooling of fruits and Vegetables (4)
- 2) Byproducts utilizing waste materials (3)
- 3) Transportation, Marketing and Export of fruits and Vegetables. (3)

**Unit V (5 Periods) Tutorials, seminars and Assignments (05)**

- 1. Internal Test 01 (5 Marks)**
- 2. Internal Test 02 (5 Marks)**
- 3. Assignment/Tutorial (5 marks)**

**Note:**

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**Choice Based Credit System (CBCS) Curriculum for Faculty of Science and Technology**  
**Course Structure and Scheme of Examination**  
**B.Sc. (Three Year Undergraduate Degree Program)**  
**B.SC. Third Year Semester-V**  
**Name of Subject: Horticulture Course Code: HORT-512**  
**Paper No: XVI Name of the Paper: Mushroom Culture and Apiculture (Theory)**  
**Total Credit (02) Marks: 50 Marks**  
**Contact Hours: 30 (Clock Hours) Periods- 45 (50 Minutes of Each)**

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**Unit I (10 Periods)**

- 1) Introduction, Scope and Importance, Nutritional Importance of Mushroom (02)
- 2) Classification and types of Mushrooms, Morphology and Identification of life stages mushroom (03)
- 3) Preparation of Culture Media and Spawns. (05)

**Unit II: (10 Periods)**

- 4) Cultivation of Oyster, white button and Paddy straw mushroom. Different method of composting, Filling of trays, Pasteurization and spawning etc. (05)
- 5) Management of pest and disease of mushroom. (05)

**Unit III: (10 Periods)**

- 6) Marketing, Preservation and transportation of mushroom (05)
- 7) Introduction, Importance and Scope. Resource and potential, Bee flora and pollination of crops (02)
- 8) Types of honey bee, Castes of honey bee, Bee keeping accessories, how to acquire Hive bees (03)

**Unit IV (10 Periods)**

- 1) Management of Apiculture: Care and management of bee keeping, Pests and diseases of honey bees, Pesticide poisoning in honey bees, Harvesting and processing of bee products (07)
- 2) Apiculture Industry, Marketing and Economics: Bee keeping industries and marketing of honey, Economics of bee keeping (03)

**Unit V (5 Periods) Tutorials, seminars and Assignments (05)**

1. **Internal Test 01 (5 Marks)**
2. **Internal Test 02 (5 Marks)**
3. **Assignment/Tutorial (5 marks)**

**Note:**

- i) **Assessment:** 80% for University Assessment (Semester End Examination) and 20 % for Continuous Internal Assessment (CIA)
- ii) **Continuous Internal Assessment (CIA): Theory** (10 Marks): Internal Test 05 Marks (Two Internal Tests of 05 marks each and average of the two tests will be considered) and 05 Marks for Assignment/tutorials.

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**Course Structure and Scheme of Examination**  
**B.Sc. (Three Year Undergraduate Degree Program)**  
**B.SC. Third Year Semester-V**  
**Name of Subject: Horticulture Course Code: HORT-521**  
**Paper No: XVII Name of the Paper: Practical based on XV (Practical)**  
**Post-Harvest Management of Fruits and Vegetables**  
**Total Credit (1.5) Marks: 50 Marks**  
**Contact Hours: 30 (Clock Hours) Periods- 45 (50 Minutes of Each)**

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- 1) Maturity Signs and Harvesting of Fruits and Vegetables (01)
- 2) Identification of Different equipment's used in Processing of Fruits and Vegetables (01)
- 3) Pre-cooling of Fruits and Vegetables (01)
- 4) Grading of Fruits and Vegetables (01)
- 5) Packaging and Storage of Fruits and Vegetables (01)
- 6) Identification of Post-Harvest diseases and pests of Fruits and Vegetables. (01)
- 7) Determination of Total Soluble Solid (TSS) (01)
- 8) Determination of Acids (Citric and Acetic Acid) (01)
- 9) Determination of Vitamin C (Ascorbic Acid) by titration. (01)
- 10) Determination of Pigments, Vitamin A (beta – Carotenes) (01)
- 11) Determination of Reducing and Total Sugars from Fruits. (01)
- 12) Determination of total minerals by dry ashing. (01)
- 13) Estimation of starch from potato and sweet potato. (01)
- 14) Preparation of gums from cluster beans. (01)
- 15) Visit to Preservation Units. (01)

**Note:**

- i. **Assessment:** 80% for University Assessment (Semester End Examination) and 20 % for Continuous Internal Assessment (CIA)
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- iii. **Practical examination:** There shall be annual examination and Student Shall Submit record book, Field note book/Tour Report, Assignment or Project work at the time of exam

**Dr. Babasaheb Ambedkar Marathwada University, Aurangabad**  
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**Course Structure and Scheme of Examination**  
**B.Sc. (Three Year Undergraduate Degree Program)**  
**B.SC. Third Year Semester-V**  
**Name of Subject: Horticulture Course Code: HORT-522**  
**Paper No: XVIII Name of the Paper: Practical based on XVI (Practical)**  
**Mushroom Culture and Apiculture**  
**Total Credit (1.5) Marks: 50 Marks**  
**Contact Hours: 30 (Clock Hours) Periods- 45 (50 Minutes of Each)**

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1. Introduction and Classification of Mushrooms.
2. Study of morphology of Mushroom
3. Materials and equipment's used for commercial mushroom cultivation
4. Preparation of culture media.
5. Preparation of master and commercial spawns
6. Cultivation of Oyster, White button and Paddy straw mushroom
7. Different method of composting techniques.
8. Filling the trays, staking, pasteurization and spawning
9. Different recipe of Mushroom
10. Types of honey bee, Castes of honey bee,
11. Bee keeping tools and accessories
12. Pests and diseases of honey bees,
13. Harvesting and processing of bee products (07)
14. Visit to Mushroom culture/ Apiculture
15. Project preparation of Mushroom/Apiculture

**Note:**

- i. **Assessment:** 80% for University Assessment (Semester End Examination) and 20 % for Continuous Internal Assessment (CIA)
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**Course Structure and Scheme of Examination**  
**B.Sc. (Three Year Undergraduate Degree Program)**  
**B.SC. Third Year Semester-VI**  
**Name of Subject: Horticulture Course Code: HORT-611**  
**Paper No: XIX Name of the Paper: Preservation of Fruits and Vegetables (Theory)**  
**Total Credit (02) Marks: 50 Marks**  
**Contact Hours: 30 (Clock Hours) Periods- 45 (50 Minutes of Each)**

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**Unit I (10 Periods)**

- 1) History of preservation of fruits and vegetables. (01)
- 2) Importance and scope of preservation of fruits and vegetables. (02)
- 3) Principles of preservation (02)
- 4) Selection of site, (01)
- 5) Methods of preservation (04)
  - 5.1 Physical methods
  - 5.2 Chemical methods

**Unit II (10 Periods)**

- 6) Methods of preservation (02)
  - 5.3 Fermentation technique
  - 5.4 Other methods
- 7) Role of plastic in fruit industry and its hazards (03)
- 8) Role of preservatives, fruit color, flavors, chemicals, salt, sugar and vinegar. (05)

**Unit III (10 Periods)**

- 9) Study of containers for packaging of preserved products- Tin cans, Glass containers, China clay wares and their advantages and disadvantages. (05)
- 10) Quality control standards, FSSAI certification, ISI, food laws, sanitation etc. (05)

**Unit IV (10 Periods)**

- 11) Testing of preserved products- quality aspects, color, flavor and value addition in fruit products (05)
- 12) Importance of cold storage in preserved vegetable products. (03)
- 13) Packaging, Transportation, and Exportation of preserved products. (02)

**Unit V (5 Periods) Tutorials, seminars and Assignments (05)**

- 1. Internal Test 01 (5 Marks)**
- 2. Internal Test 02 (5 Marks)**
- 3. Assignment/Tutorial (5 marks)**

**Note:**

- i) Assessment:** 80% for University Assessment (Semester End Examination) and 20 % for Continuous Internal Assessment (CIA)
- ii) Continuous Internal Assessment (CIA): Theory (10 Marks):** Internal Test 05 Marks (Two Internal Tests of 05 marks each and average of the two tests will be considered) and 05 Marks for Assignment/tutorials.



**Dr. Babasaheb Ambedkar Marathwada University, Aurangabad**  
**Choice Based Credit System (CBCS) Curriculum for Faculty of Science and Technology**  
**Course Structure and Scheme of Examination**  
**B.Sc. (Three Year Undergraduate Degree Program)**  
**B.SC. Third Year Semester-VI**  
**Name of Subject: Horticulture Course Code: HORT-612**  
**Paper No: XX Name of the Paper: Horticulture Business Management (Theory)**  
**Total Credit (02) Marks: 50 Marks**  
**Contact Hours: 30 (Clock Hours) Periods- 45 (50 Minutes of Each)**

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**Unit-I: (10 Periods) Role of Agencies and Business Management Factors**

1. Role of Finance and other Non-government Institutions, NABARD, CFTRI, ICAR, IARI, NHB, APEDA, Cooperative Bank, Self Help Groups, MAHABANANA, MAHAGRAPE etc. Crop Insurance. (05)
2. Cooperative Farming and Marketing, Group Farming, Carbon Credit, (02)
3. Export and Import policy and Procedure of Horticultural products. (03)

**Unit-II : (10 Periods)**

**Concept of Enter pruner/Business and Entrepreneurship**

4. Preparation of Project report. (02)
5. Definition, Meaning, Role and potential of enter pruner and entrepreneurship in economic development (03).
6. Characteristics of an entrepreneur (02).
7. Classification of entrepreneur (02).
8. Women's entrepreneur (01).

**Unit-III (10 Periods)**

**Entrepreneurship Development Programme:**

9. Meaning and definition of Entrepreneurship. (02)
10. Role of entrepreneurship in economic development. (03)
11. Entrepreneurship development, Process of Entrepreneurship development at community level and individual level (05).

**Unit IV (10 Periods)**

12. Motivation and Motivating factors for Entrepreneurship development. Planning and entrepreneurship Development Programme (02).
13. Objectives, Functions, Phases of Entrepreneurship Development Programme. (02)
14. Managing competition. SWOT analysis. Entrepreneurial behavior-concepts and factors affecting, Characteristic of Indian food processing industries. (03)
15. Government schemes and incentives for promotion of entrepreneurship, Government policy on small and medium enterprises. (03)

**Unit V (5 Periods) Tutorials, seminars and Assignments (05)**

- 1) Internal Test 01 (5 Marks)
- 2) Internal Test 02 (5 Marks)
- 3) Assignment/Tutorial (5 marks)

**Note:**

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- ii) **Continuous Internal Assessment (CIA): Theory** (10 Marks): Internal Test 05 Marks (Two Internal Tests of 05 marks each and average of the two test will be considered) and 05 Marks for Assignment/tutorials.

**Dr. Babasaheb Ambedkar Marathwada University, Aurangabad**

**Choice Based Credit System (CBCS) Curriculum for Faculty of Science and Technology**

**Course Structure and Scheme of Examination**

**B.Sc. (Three Year Undergraduate Degree Program)**

**B.SC. Third Year**

**Semester-VI**

**Name of Subject: Horticulture**

**Course Code: HORT-621**

**Paper No: XXI**

**Name of the Paper: Practical based on XIX (Practical)**

**Preservation of Fruits & Vegetables**

**Total Credit (1.5)**

**Marks: 50 Marks**

**Contact Hours: 30 (Clock Hours)**

**Periods- 45 (50 Minutes of Each)**

1. Canning of fruits and Vegetables (01)
2. Drying and Dehydration of fruits and Vegetables (01)
3. Preparation of Juice from Fruits and Vegetables, Squash & cordial. (01)
4. Preparation of Jam, Jelly and marmalade (01)
5. Preparation of pickles from fruits and Vegetables (01)
  - 5.1 Preservation with salt
  - 5.2 Preservation with vinegar
  - 5.3 Preservation with oil
  - 5.4 Preservation with mixture of salt, oil, spices and vinegar.
6. Preparation of preserve and candy from Fruits and Vegetables (01)
7. Preparation of raisin making in grapes (01)
8. Preparation of vinegar (01)
9. Preparation of unfermented fruit beverages, juice Ready to serve (RTS), nectar, Fruit juice powder, fruit juice concentrate. (01)
10. Preparation and preservation of fermented beverages (Wine making) (01)
11. Preparation of some other valuable products from fruits (Mango slices and amchur) , Mango leather, fruit cheese, fruit butter, fruit toffee, papain form papaya. (01)
12. Preparation of tomato products (01)
  - 3.1 Tomato juice
  - 3.2 Tomato puree and paste
  - 3.3 Tomato sauce and ketchup
  - 3.4 Tomato chutney
  - 3.5 Tomato soup
  - 3.6 Tomato chilli sauce
13. Preparation of potato products (01)
  - 4.1 potato chips/ wafers.
  - 4.2 Potato flour & 4.3 Canned potatoes
14. Preparation of chutneys from vegetables (01)
15. Mushroom processing (01)

**Note:**

- i. **Assessment:** 80% for University Assessment (Semester End Examination) and 20 % for Continuous Internal Assessment (CIA)
- ii. **Continuous Internal Assessment (CIA): Practical** (10 Marks): 07 Marks for Internal Practical Examination and 03 Marks for record book/submission of collection and field survey report and excursion report
- iii. **Practical examination:** There shall be annual examination and Student Shall Submit record book, Field note book/Tour Report, Assignment or Project work at the time of exam

**Dr. Babasaheb Ambedkar Marathwada University, Aurangabad**  
**Choice Based Credit System (CBCS) Curriculum for Faculty of Science and Technology**  
**Course Structure and Scheme of Examination**  
**B.Sc. (Three Year Undergraduate Degree Program)**  
**B.SC. Third Year Semester-VI**  
**Name of Subject: Horticulture Course Code: HORT-621**  
**Paper No: XXII Name of the Paper: Practical based on XX (Practical)**  
**Horticulture Entrepreneurship Development**  
**Total Credit (1.5) Marks: 50 Marks**  
**Contact Hours: 30 (Clock Hours) Periods- 45 (50 Minutes of Each)**

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1. Steps in formulating a project proposal.
2. Selection and identification of enterprise based on local/ regional resources.
3. Case study of successful entrepreneurs.
4. Case study of successful progressive farmers
5. SWOT analysis of selected enterprise
6. Cost of cultivation, production and bear even analysis.
7. Certification procedure of organic products and FSSAI
8. Phytosanitary certification of export-oriented products.
9. Field visit to successful Agri – enterprise.
10. Visit to Agri clinics and Agri business center
11. Visit to commercial, cooperative bank, NABARD etc.
12. Studies of local market survey based on enterprise.
13. Preparation of project report for enterprise or processing unit
14. Preparation of project report for greenhouse.
15. Presentation of Project report

**Note:**

- i. **Assessment:** 80% for University Assessment (Semester End Examination) and 20 % for Continuous Internal Assessment (CIA)
- ii. **Continuous Internal Assessment (CIA): Practical** (10 Marks): 07 Marks for Internal Practical Examination and 03 Marks for record book/submission of collection and field survey report and excursion report
- iii. **Practical examination:** There shall be annual examination and Student Shall Submit record book, Field note book/Tour Report, Assignment or Project work at the time of exam

**Recommended Books & Periodicals:**

1. Mushroom production and processing technology, Pathak V. N.- Aerobics Publication
2. Post-harvest management of horticultural crops, -Saraswathy S.- Agrobios Publication
3. Agarwala, R. K. and C. L. Jandaik, 1986. Mushroom Cultivation in India. Official Publication of Indian Mushroom Growers Association, Solan, H. P.
4. Chadha K. L and O. P. Pareek 1993(Eds.) Advances in Horticulture.Vol1-4. Malhotra Publishing House. New Delhi.
5. Chadha, K. L. and S. R. Sharma (Eds.).1995. Advances in Horticulture.Vol.13. Mushroom. Malhotra Publishing House, New Delhi.
6. Kannaiyan, S. and K. Ramaswamy.1990. A Handbook of Edible Mushroom. Today and Tomorrow Printer and Publishers, New Delhi.
7. Pantastico, Er. B.(Ed.),1975. Postharvest Physiology, Handling and Utilization of Tropical and Subtropical Fruits and Vegetables. AVI Publ. Co, Westport.
8. Ryall, A. L. and W. J. Lipton, 1979. Handling, Transportation and Storage of Fruits and Vegetables, Vol. 1, Vegetables and Melons, AVI Publ. Co, Westport.
9. Ryall, A. L. and W. T. Pentzer,1982. Handling, Transportation and Storage of Fruits and Vegetables. Vol.2, Fruits and Tree Nuts. AVI Publ. Co. Connecticut.
10. Salunkhe, O. K. and B. B. Desai,1984. Postharvest Biotechnology of Fruits,Vol.1.CRC Press, BocaRato

**Periodicals : -**

1. Indian Horticulture
2. Indian Journal of Horticulture
3. South Indian Journal of Horticulture
4. Panjab Horticulture Journal
5. Haryana Horticulture Journal

**Websites:-**

<https://www.foodlicenseportal.org>

<https://www.fssai.gov.in>

<https://fda.maharashtra.gov.in>

## Model Question Paper of Theory Examination

Dr. Babasaheb Ambedkar Marathwada University, Aurangabad  
Choice Based Credit System (CBCS) Curriculum for Faculty of Science and Technology  
B.Sc. (Three Year Undergraduate Degree Program)  
B.Sc. I/II/III Year Semester I/II/III/IV/V/VI

Name of Subject: Horticulture

Course Code:-----

Paper No: -----

Name of The Paper: -----

Time : 2 hr

Marks

40

Q.1. Long Question -----

20

OR

Long question-----

Q.2. Long Question -----

10

OR

Write short notes (any two)

10

a)

b)

c)

d)

e)

f)

Q.3. Multiple Choice

10

Question 1 to 10