DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY,
CHHATRAPATI SAMBHAJINAGAR.

CIRCULAR NO.SU/B.Sc./CBC&GS/87/2024

It is hereby inform to all concerned that, the Revised syllabi prepared by the Board of Studies/Ad-hoc Boards and recommended by the Dean, Faculty of Science & Technology, **Academic Council at its meeting held on 08 April 2024 has accepted** the following Syllabi under the Faculty of Science & Technology **as per Norms of Choiced Based Credit Grading System** run at the Affiliated Colleges, Dr.Babasaheb Ambedkar Marathwada University as appended herewith.

Sr.No.	Courses	Semester
1.	BA./B.Sc.Mathematics (Optional)	Vth and VIth semester
2.	B.Sc.Statistics (Optional)	Vth and VIth semester
3.	B.Sc.Horticuluture (Optional)	Vth and VIth semester
4.	B.Sc.Industrial Chemistry(Optional)	Vth and VIth semester

This is effective from the Academic Year 2024-25 and onwards.

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

University Campus,
Aurangabad-431 004.
REF.NO.SU/2024/26158-66
Date:- 03.05.2024.

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Deputy Registrar,
Academic Section

Copy forwarded with compliments to :-

1] **The Principal of all concerned Colleges,**
Dr. Babasaheb Ambedkar Marathwada University,

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,** Dr.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar.

2] The Section Officer,[B.Sc.Unit] Examination Branch, Dr.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar.

3] The Programmer [Computer Unit-1] Examinations, Dr.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar.

4] The Programmer [Computer Unit-2] Examinations, Dr.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar.

5] The In charge,[E-Suvidha Kendra], Rajarshi Shahu Maharaj Pariksha Bhavan, Dr.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar.

6] The Public Relation Officer, Dr.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar.

7] The Record Keeper, Dr.Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar.

Dr. Babasaheb Ambedkar Marathwada University

Chatrapati Sambhajinagar - 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 2024-25)

Dr. M. A. Sakhare
Chairman
Ad-hoc Board in Agrochemicals
& Fertilizers and Horticulture
Dr.Babasaheb Ambedkar Marathwada
University, Chha.Sambhajinagar

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

Dr. Babasaheb Ambedkar Marathwada University, Chatrapati Sambhajinagar

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 V

	Course Code	Paper No	Course Title	Total periods (Teaching periods/week)	Credits	Scheme of Examination			
						Max Marks	CIA	UA	Min Marks
Optional (DSE-1 A) Core Courses Elective	HORT -511	XVII	Post-Harvest Management of Fruits and Vegetables	45(3/week)	2	50	10	40	20
	HORT -512	XVIII	Mushroom Culture and Apiculture	45(3/week)	2	50	10	40	20
	HORT -521	XIX	Practical based on XV	45(3/week)	1.5	50	10	40	20
	HORT -522	XX	Practical based on XVI	45(3/week)	1.5	50	10	40	20
Skill Enhancement course (SEC-3)	HORT-613	XXI	SEC-3 Any one skill to be chosen out of two SEC-3(E) , SEC-3 (F) SEC-3(E): **Turf Grass Management** SEC-3 (F): **Farm Power and Machinery**	45(3/week)	2	50	10	40	20
				225	09	250	50	200	100

Total Credits for Semester V : 09 (Theory : 06 ; Laboratory : 03)

Semester VI

	Course Code	Paper No	Course Title	Total periods (Teaching periods/week)	Credits	Scheme of Examination			
						Max Marks	CIA	UA	Min Marks
Optional (DSE-1 B)	HORT -611	XXII	Preservation of Fruits and Vegetables	45(3/week)	2	50	10	40	20
	HORT -612	XXIII	Horticulture Business Management	45(3/week)	2	50	10	40	20

Core Courses Elective	HORT -621	XXIV	Practical based on XIX	45(3/week)	1.5	50	10	40	20
	HORT-622	XXV	Practical based on XX	45(3/week)	1.5	50	10	40	20
Skill Enhancement course (SEC-4)	HORT-613	XXIV	SEC-4 Any one skill to be chosen out of two SEC-4(G) , SEC-4 (H) SEC-4(G): **Serriculture** SEC-4 (H): **Soil and Plant Analysis**	45(3/week)	2	50	10	40	20
				225	09	250	50	200	100
Total Credits for Semester VI : 09 (Theory : 06 ; Laboratory : 03)									
Total Credits for three years: Sem. I (11.5) + Sem. II (11.5) + Sem. III (15) + Sem. IV (15) + Sem V (09) + Sem. VI (09) = 71 Credits									

Dr. Babasaheb Ambedkar Marathwada University, Chatrapati Sambhajinagar

DSC- Discipline Specific Core course

Syllabus of Horticulture

B.SC. IIIrd Year

Semester V and VI

Effective from June 2024-25

Dr. Babasaheb Ambedkar Marathwada University, Chatrapati Sambhajinagar

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 V

	Course Code	Paper No	Course Title	Total periods (Teaching periods/week)	Credits	Scheme of Examination			
						Max Marks	CIA	UA	Min Marks
Optional (DSE-1 A) Core Courses Elective	HORT -511	XVII	Post-Harvest Management of Fruits and Vegetables	45(3/week)	2	50	10	40	20
	HORT -512	XVIII	Mushroom Culture and Apiculture	45(3/week)	2	50	10	40	20
	HORT -521	XIX	Practical based on XV	45(3/week)	1.5	50	10	40	20
	HORT -522	XX	Practical based on XVI	45(3/week)	1.5	50	10	40	20
Skill Enhancement course (SEC-3)	HORT-613	XXI	SEC-3 Any one skill to be chosen out of two SEC-3(E) , SEC-3 (F) SEC-3(E): **Turf Grass Management** SEC-3 (F): **Farm Power and Machinery**	45(3/week)	2	50	10	40	20
				225	09	250	50	200	100

Total Credits for Semester V : 09 (Theory : 06 ; Laboratory : 03)

Dr. Babasaheb Ambedkar Marathwada University, Chatrapati Sambhajinagar
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: XVII

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)**

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 (03)
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:

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.

Dr. Babasaheb Ambedkar Marathwada University, Chatrapati Sambhajinagar
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: XVIII
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)**

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 and 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.

Dr. Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajinagar
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-521**

Paper No: XIX **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)

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, Chatrapati Sambhajinagar
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-522**

Paper No: XX **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 and 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)

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, Chatrapati Sambhajinagar
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)
Name of Subject: Horticulture
Course Code: HORT-621
SEC-3 Course Course Code: HORTSEC-513
Paper No: XXI (HORTSEC-3(E))
Name of The Paper: Turf Grass Management (Theory +Practical)
Total Credit (02) Marks: 50 Marks
Contact Hours: 30 (Clock Hours) Periods- 45 (50 Minutes of Each)

Unit I: **10**

1. History, present status and prospects of turf industry;
2. Basic requirements, site selection and evaluation,
3. concepts of quality of soil pertaining to turf grass establishment,
4. criteria for evaluation of turf quality.

Unit II: **10**

5. Types of turf grasses: Types, species, varieties, important breeders, grasses for different locations and conditions and their compatible groupings as per climatic conditions; Turfing for roof gardens.
6. Preparatory operations; Turf establishment methods such as seeding, sprigging/ dibbling, plugging, sodding/ turfing, turf plastering, instant turfing (portable), hydroseeding, synthetic turfing.
7. Turf management – Irrigation, drainage, nutrition, special practices like aerating, rolling, coring, dethatching, verticutting, soil top dressing, use of plant growth regulators and micronutrients,

Unit III: **10**

8. Turf mowing – mowing equipment's, techniques to minimize wear and compaction,
9. weed control, biotic and abiotic stress management in turfs,
10. standards for turf, use of recycled water, etc.

Unit IV: **10**

11. Making of different sports arenas: Establishment and maintenance of turfs for playgrounds, viz., golf, football, hockey, cricket, tennis, rugby, residential and public parks, turfing of Govt. and Corporate office gardens,
12. Event specific preparation, turf colourants.
13. Automation: Exposure to different tools, gadgets, machinery used in turf industry.
14. Rejuvenation of lawns

Turf economics

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:

1. **Assessment**: 80% for University Assessment (Semester End Examination) and 20 % for Continuous Internal Assessment (CIA)

2. **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.

Practical:

1. Identification of turf grasses, Preparatory operations in turf making,
2. Practices in turf establishment,
3. Layout of macro and micro irrigation systems,
4. Water and nutrient management;
5. Special practices – mowing, raking, rolling, soil top dressing,
6. weed management;
7. Biotic and abiotic stress management;
8. Project preparation for turf establishment,
9. visit to IT parks, model cricket and golf grounds, airports, corporates, Govt. organizations;
10. Renovation of lawns;
11. Turf economics.

Dr. Babasaheb Ambedkar Marathwada University, Chatrapati Sambhajinagar
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)
Name of Subject: Horticulture
Course Code: HORT-621
SEC-3 Course **Course Code: HORTSEC-513**
Paper No: XXI (HORTSEC-3(F))
Name of The Paper: Farm Power and Machinery (Theory +Practical)
Total Credit (02) **Marks: 50 Marks**
Contact Hours: 30 (Clock Hours) **Periods- 45 (50 Minutes of Each)**

Unit I:

1. Farm structures farm site, food grain storage structure,
2. Building materials for farm house, dairy building and poultry housing.
3. Elementary knowledge about the engineering terminology and calculations on piston displacement, compression ratio, HP and efficiencies of engines.

Unit II:

4. Construction and working of four stroke and two stroke cycle I.C. engines,
5. common engine troubles, causes and their remedies.
6. Classification of tractors,
7. Elementary knowledge about main components of tractor and their functions such as steering, clutches, transmission gears, differential and final drive, brakes, belt, pulley PTO, shaft and hydraulic lift.

Unit III:

8. Methods of starting and stopping of tractors. General care and maintenance.
9. Study of simple parts, operation and installation of an electric motor (Induction type only), calculation of HP units consumed.
10. Role of switches, fuses and starter.

Unit IV:

11. Study of construction, working principles, troubles and adjustments of the following machines: M.B. Plough, Disc plough, Disc harrow, cultivator,
12. secondary tillage equipment's, seed drill and planter, reaper and mower, threshers, combine, sprayers and dusters.
13. Calculation of area covered, power requirement and efficiency of above machines. Calibration of seed drill.

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.

Practical:

1. Preparation of layout for farm houses, dairy barn and poultry housing.

2. Study of construction of four stroke and two stroke cycle I.C. engines operating and running of diesel engines.
3. Study of tractor's transmission systems and tractor driving practice.
4 Study of M.B. Plough.
5. Study of Disc Plough.
6. Study of seed drill and planter and its calibration.
7. Study of power thresher.
8. Visit to places of engineering interest.
9. Identification of different work shop tools, farm machines and engine parts.
10. Preparation of practical record

Dr. Babasaheb Ambedkar Marathwada University, Chatrapati Sambhajinagar

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 VI

	Course Code	Paper No	Course Title	Total periods (Teaching periods/week)	Credits	Scheme of Examination			
						Max Marks	CIA	UA	Min Marks
Optional (DSE-1 B) Core Courses Elective	HORT -611	XXII	Preservation of Fruits and Vegetables	45(3/week)	2	50	10	40	20
	HORT -612	XXIII	Horticulture Business Management	45(3/week)	2	50	10	40	20
	HORT -621	XXIV	Practical based on XIX	45(3/week)	1.5	50	10	40	20
	HORT-622	XXV	Practical based on XX	45(3/week)	1.5	50	10	40	20
Skill Enhancement course (SEC-4)	HORT-613	XXIV	SEC-4 Any one skill to be chosen out of two SEC-4(G) , SEC-4 (H) SEC-4(G): **Serriculture** SEC-4 (H): **Soil and Plant Analysis**	45(3/week)	2	50	10	40	20
				225	09	250	50	200	100

Total Credits for Semester VI : 09 (Theory : 06 ; Laboratory : 03)

Total Credits for three years: Sem. I (11.5) + Sem. II (11.5) + Sem. III (15) + Sem. IV (15) + Sem V (09) + Sem. VI (09) = 71 Credits

Dr. Babasaheb Ambedkar Marathwada University, Chatrapati Sambhajinagar
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-611**

Paper No: XXII **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)**

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, (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, 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:

1) **Assessment**: 80% for University Assessment (Semester End Examination) and 20 % for Continuous Internal Assessment (CIA)
2) **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, Chatrapati Sambhajinagar
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: XXIII **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)**

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 enterpureship, 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:

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.

Dr. Babasaheb Ambedkar Marathwada University, Chatrapati Sambhajinagar
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: XXIV **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

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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-VI**

Name of Subject: Horticulture **Course Code: HORT-621**

Paper No: XXV **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.
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

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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)
Name of Subject: Horticulture
Course Code: HORT-621
SEC-4 Course **Course Code: HORTSEC-613**
Paper No: XXVI (HORTSEC-4(G))
Name of The Paper: Sericulture (Theory +Practical))
Total Credit (02) **Marks: 50 Marks**
Contact Hours: 30 (Clock Hours) **Periods- 45 (50 Minutes of Each)**

Unit I:

1. Importance, history and development in India, silk worms – kinds and their hosts distribution, life cycles in brief, silk glands.
2. MORICULTURE – Mulberry varieties, package of practices, pests and diseases and their management
3. Mulberry silkworm – morphological features,

Unit: II

4. rearing house and equipments – rearing stands, ant wells, rearing trays, paraffin paper, chop sticks, feathers, leaf chamber, chopping board, knives and mats, cleaning nets, mountages (chandrikes) disinfection and hygiene.
5. Silk worm rearing – young age / chawki rearing and old age rearing of silk worms – procurement of quality seeds, quality of food, shape and size of leaves, preparation of feed bed, bed cleaning, spacing, mounting, care during cocoon spinning, harvesting of cocoons.
6. Silk worm egg/ seed production (Grainage technology) – mother moth examination, diapause of eggs, artificial breaking of diapause- acid treatment, chilling, packing and transportation of eggs, incubation and black boxing of eggs.

Unit: III

7. Commercial, physical characters of cocoons – colour, shape, hardiness, shell ratio, length of filament, denier, floss and raw silk per cent, reelability for cocoons.
8. Post Harvest processing of cocoons- stifling, cocoon boiling, brushing, reeling, rereeling, finishing, testing.
9. Diseases of silkworm: Protozoa: Pebrine, Fungal: White muscardine, green muscardine, Viral: Grasserie, Bacteria: Flacherie. Natural enemies: Uzi fly, Beetles.

Unit IV:

10. LAC CULTURE: Introduction, history and importance of lac, lac growing areas in India, Lac insect, biology, behaviour, its strains (Kusumi & Rangeeni), Aghani, Tethwi, Katki and Baisakhi crops production.
11. Lac cultivation, food plants, propagation of lac insects, harvesting of lac, pruning of host trees, enemies / predators of lac insects
12. Lac extraction-production of shellac. Other by products: Molemma, Kiri, Passewas

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

2) Internal Test 01 (5 Marks) **2) Internal Test 02 (5 Marks)**
4) Assignment/Tutorial (5 marks)

Note:

1) **Assessment**: 80% for University Assessment (Semester End Examination) and 20 % for Continuous Internal Assessment (CIA)
2) **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.

PRACTICALS:

1. Study of important species of honey bees.
2. Seasonal management and colony maintenance of bees
3. Study of different bee hives and apiculture equipments.
4. Handling of bee hives and honey extraction
5. Study of pests and diseases of honey bees.
6. Establishment of mulberry garden, planting methods under irrigated and rain fed conditions
7. Maintenance of mulberry garden – pruning, fertilization, irrigation and leaf harvest
8. Mulberry pests and diseases and their management and nutritional disorder.
9. Study of different kinds of silk worms
10. Sericulture equipments for silk worm rearing
11. Mulberry silkworm – rearing room requirements
12. Rearing of silkworms – chawki rearing
13. Rearing of silkworms – late age silkworm rearing and study of mountages
14. Study of silk worm pests and diseases and their management.
15. Study of lac insects
16. Lac extraction – production of shellac.

Dr. Babasaheb Ambedkar Marathwada University, Chatrapati Sambhajinagar
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)
Name of Subject: Horticulture
Course Code: HORT-621
SEC-4 Course **Course Code: HORTSEC-613**
Paper No: XXVI (HORTSEC-4 (H))
Name of The Paper: Soil and Plant Analysis (Theory +Practical))
Total Credit (02) **Marks: 50 Marks**
Contact Hours: 30 (Clock Hours) **Periods- 45 (50 Minutes of Each)**

Unit–I : Soil and plant analysis:

1) Collection and processing of soil and plant samples – General principles in analytical chemistry.
2) Instrumental methods of analysis – Principle and practices of potentiometry, conductometry, colorimetry and spectrophotometry.
3) Principles and practices of absorption and emission spectroscopy.

Unit–II : Soil Physical properties

4) Minerals – Definition, abundance and quantification.
5) Soil structure and aggregate analysis.
6) Soil moisture – Theories and estimation of soil moisture – gravimetric, tensiometric, gypsum block, neutron probe and pressure plate methods.
7) Soil air – composition, renewal of gases in soil, diffusion and mass flow. – Methods of estimation of ODR and redox potential.

Unit–III : Soil fertility evaluation

8) Different approaches for soil fertility evaluation.
9) Soil testing – Chemical methods, critical level of different nutrients in soil. Biological methods of soil fertility evaluation.
10) Use of radio trace technique in soil fertility evaluation.
11) Soil micro organism and their importance.

Unit–IV :

12) Saline, alkali, acid, waterlogged and sandy soils – their appraisal and management.
13) Irrigation water – water quality appraisal.
14) Effect of poor quality water on soil and plant growth and management.
15) Chemical and mineral composition of horticultural crops.
16) Leaf analysis–standards, index tissue and interpretation of leaf analysis value.

Unit–V :

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:

1) **Assessment**: 80% for University Assessment (Semester End Examination) and 20 % for Continuous Internal Assessment (CIA)

2) **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.

PRACTICALS

1) Collection of soil sample.
2) Estimation of moisture and water holding capacity.
3) Determination of soil pH and EC.
4) Determination of water-soluble cations and SAR.
5) Determination of water-soluble anions.
6) Determination of exchangeable sodium and ESP.
7) Determination of cations in irrigation water.
8) Determination of anions in irrigation water.
9) Computation of salts and interpretation of results of water analysis.
10) Collection of plant sample.
11) Estimation of moisture and preparation of tri acid extract.
12) Estimation of nitrogen.
13) Estimation of phosphorus.
14) Estimation of potassium.
15) Estimation of secondary nutrients.
16) Estimation of micro nutrients.

Model Question Paper of Theory Examination

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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

Model Question Paper of Practical Examination

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Choice Based Credit System (CBCS) Curriculum for Faculty of Science and Technology
B.Sc. (Three Year Undergraduate Degree Program)
B.Sc. IIIrd year / V & VI Semester Practical Examination

Name of Subject: Horticulture **Course Code:** HORT-521 & 621 **Paper No:** XVII & XXI
Name of The Paper: Post Harvest Management of Fruits and Vegetables & Preservation of Fruits & Vegetables (Practical paper based on paper no XV & XIX)
Batch No: ..... **Date:** / / 20
Time: 3 hrs **Mark :** 80 (Credit-1.5)
Note: Draw neat and well labeled diagrams wherever necessary

Q1)	A) Spotting- 5 spots (Identify and comment on maturity indices) A_____,B_____,C_____, D_____, & E_____	20
	B) Determination of ..... from given sample.....	10
Q2)	A) Preparation of ----------Given Specimen----------	15
	B) Prepare valuable products of ----------from----------	15
Q3)	Prepare dehydrated product/canned product from given Specimen.....	10
Q5)	Viva voice	10

Note:
Following marks are reserved for **Continuous Internal Assessment (CIA)** as per UGC and BAMU university CBCS Guidelines

i. 07+07=14 Marks for Internal Practical Examination
ii. 03+04=06 Marks for record book/submission of collection and field survey report and excursion report

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2. Indian Journal of Horticulture
3. South Indian Journal of Horticulture
4. Panjab Horticulture Journal
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