

**Dr. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY,
CHHATRAPATI SAMBAJINAGAR.**



CIRCULAR NO.SU/ Sci./College/NEP-2020/104/2024

It is hereby inform to all concerned that, In continuation circular No.SU./Revised B.Sc./NEP/72/2024/25588-96 dated 29.04.2024, the revised syllabi prepared by the Board of Studies/Ad-hoc Boards and recommended by the Dean, Faculty of Science & Technolgy, the Academic Council at its meeting held on 08 April 2024 has accepted **the following Revised B.Sc. Course Structure & Curriculum** as per direction by the State Government dated on 13 March 2024 under the Faculty of Science & Technology (as per National Education Policy – 2020) run at the Affiliated Colleges, Dr.Babasaheb Ambedkar Marathwada University as appended herewith.

Sr.No.	Courses	Semester
1	Physics	Ist and IInd semester
2	Instrumentation Practice	Ist and IInd semester
3	Electronics	Ist and IInd semester
4	Mathematics	Ist and IInd semester
5	Industrial Chemistry	Ist and IInd semester
6	Agrochemical Fertilizer	Ist and IInd semester
7	Horticulture	Ist and IInd semester
8	Biochemistry	Ist and IInd semester
9	Botany	Ist and IInd semester
10	Zoology	Ist and IInd semester
11	Biotechnology	Ist and IInd semester
12	bioinformatics	Ist and IInd semester
13	Microbiology	Ist and IInd semester
14	Dairy Science & TEchnology	Ist and IInd semester
15	Statistics	Ist and IInd semester
16	computer Science	Ist and IInd semester
17	Geology	Ist and IInd semester
18	Chemistry	Ist and IInd semester
19	Analytical Chemistry	Ist and IInd semester
20.	Polymer Chemistry	Ist and IInd semester
21.	Environmental Science	Ist and IInd semester
22.	Fishery Science	Ist and IInd 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,
Chhatrapati Sambhajanagar
-431 004.
REF.NO. SU/SCI./2024/27128-35
Date:-27.05.2024.

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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 Sambhajanagar.
- 2] The Section Officer, [B.Sc. Unit] Examination Branch, Dr. Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajanagar.
- 3] The Programmer [Computer Unit-1] Examinations, Dr. Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajanagar.
- 4] The Programmer [Computer Unit-2] Examinations, Dr. Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajanagar.
- 5] The In-charge, [E-Suvidha Kendra], Rajarshi Shahu Maharaj Pariksha Bhavan, Dr. Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajanagar.
- 6] The Public Relation Officer, Dr. Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajanagar.
- 7] The Record Keeper, Dr. Babasaheb Ambedkar Marathwada University, Chhatrapati Sambhajanagar.

Dr. Babasaheb Ambedkar Marathwada University

Chhatrapati Sambhajinagar- 431001



B.Sc. Degree Programme

(Three Year / Four Years (Hons) / Four Years (Hons with Research))

**Course Structure and
Syllabus for B.Sc. Ist year**

(Revised)

(AS PER NEP-2020)

Subject (Major): Horticulture

Effective from 2024-25

of 43

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

Page 1

PREFACE

As we stand on the threshold of a new era in education, the dawn of the National Education Policy 2020 illuminates our path toward a holistic, inclusive, and progressive educational landscape. The Bachelor of Science (B. Sc.) curriculum outlined herein reflects the ethos and aspirations of this transformative policy, aiming to equip learners with the knowledge, skills, and values necessary to thrive in the dynamic world of the 21st century.

At its core, the National Education Policy 2020 envisions an educational framework that is learner-centric, multidisciplinary, and geared towards fostering creativity, critical thinking, and innovation. It emphasizes the integration of knowledge across disciplines, breaking down traditional silos to encourage holistic understanding and application of concepts. The Bachelor of Science (B. Sc.) curriculum embodies these principles by offering a diverse array of courses spanning various scientific domains, while also incorporating interdisciplinary studies to nurture well-rounded graduates capable of addressing complex challenges with agility and insight.

Furthermore, the curriculum is designed to promote experiential learning, research, and hands-on exploration, recognizing the importance of practical engagement in deepening understanding and cultivating real-world skills. Through laboratory work, field experiences, internships, and project-based learning opportunities, students will have the chance to apply theoretical knowledge in practical settings, develop problem-solving abilities, and cultivate a spirit of inquiry and discovery.

Integral to the National Education Policy 2020 is the commitment to inclusivity, equity, and access to quality education for all. The Bachelor of Science (B. Sc.) curriculum reflects this commitment by embracing diversity in perspectives, backgrounds, and experiences, and by fostering an inclusive learning environment where every student feels valued, supported, and empowered to succeed.

Moreover, the curriculum emphasizes the cultivation of ethical values, social responsibility, and global citizenship, instilling in students a sense of accountability towards society and the environment. By integrating courses on ethics, sustainability, and social sciences, the Bachelor of Science (B. Sc.) program aims to produce graduates who are not only proficient in their respective fields but also compassionate, ethical leaders committed to making a positive impact on the world.

As we embark on this journey of educational transformation guided by the National Education Policy 2020, the Bachelor of Science (B. Sc.) curriculum stands as a testament to our collective vision of a more equitable, inclusive, and enlightened society. It is our hope that through rigorous academics, innovative pedagogy, and unwavering dedication to excellence, we can inspire the next generation of scientists, scholars, and change-makers to realize their full potential and contribute meaningfully to the advancement of knowledge and the betterment of humanity.

**Structure of B. Sc. (Three / Four Years Honours / Honours with Research Degree)
Programme with Multiple Entry and Exit Options**

Subject (Major): Horticulture

BSc First Year : 1st Semester

Course Type	Course Code	Course Name	Teaching Scheme Hrs./week		Credit Assigned		Total Credits
			Theory	Practical	Theory	Practical	
Major (Core) M1 Mandatory	HORT/DSC-1/	Elements of Horticulture	2	-	2	-	2+2=04
	HORT/DSC-2	Lab Course-1 (Elements of Horticulture)	-	4	-	2	
Major (Core) M2 Mandatory	DSC-1		2		2		2+2 = 4
	DSC-2	Practical based on DSC-1		4		2	
Major (Core) M3 Mandatory Major (Core) M2 Mandatory	DSC-1		2		2		2+2 = 4
	DSC-2	Practical based on DSC-1	2		2		
Generic / Open Elective (GE/OE) (Choose any one from pool of courses) It should be chosen compulsorily from the faculty other than that of Major	GE/OE-1	To be chosen from other faculty	2	-	2	-	2
SEC (Skill Enhancement Courses) (Choose any one from pool of courses)	HORT/SEC-1	1) Fresh Flower Decoration and Exhibition 2) Dry Flower Decoration and Exhibition	1		1		2
	HORT/SEC-2	Lab Course on 1) Fresh Flower Decoration and Exhibition 2) Dry Flower Decoration and Exhibition		2		1	
AEC,VEC,IKS Ability Enhancement Course	AEC-1	English (Common for all the faculty)	2	-	2	-	2+2=04
	IKS-1	Choose any one from pool of courses	2	-	2	-	
OJT/ FP/CEP/CC/RP	CC-1	Health and Wellness (Common for all the faculty)	-	4	-	2	02
			16	12	16	06	22 Credits

1) GE/OE-1 : Indoor Plants and Interior Scaping (This course will be available for the student of other faculty)

BSc First Year : 2nd Semester

Course Type	Course Code	Course Name	Teaching Scheme Hrs./week		Credit Assigned		Total Credits
			Theory	Practical	Theory	Practical	
Major (Core) M1 Mandatory	HORT/ DSC-3	Basics of Vegetable Growing	2	-	2	-	2+2=04
	HORT/ DSC-4	Lab Course-2 (Basics of Vegetable Growing)	-	4	-	2	
Major (Core) M2 Mandatory	DSC-3						2+2=04
	DSC-4	Practical based on DSC-3					
Major (Core) M3 Mandatory Major (Core) M2 Mandatory	DSC-3						2+2=04
	DSC-4	Practical based on DSC-3					
Generic / Open Elective (GE/OE) (Choose any one from pool of courses) It should be chosen compulsorily from the faculty other than that of Major	GE/OE-2	To be chosen from other discipline of same faculty	2	-	2	-	2
VSC (Vocational Skill Courses) (Choose any one from pool of courses)	HORT/ VSC-1	1) Horticulture Nursery Management 2) Fruit and Vegetable Carving	1		1		2
	HORT/ VSC-2	Lab Course on 1) Horticulture Nursery Management 2) Fruit and Vegetable Carving		2		1	
AEC,VEC,IKS Ability Enhancement Course	AEC-2	English	2	-	2	-	2+2=04
	VEC-1	Constitution of India	2	-	2	-	
OJT,FP,CEP, CC,RP	CC-2	Yoga education/sports and fitness	-	4	-	2	02
			16	12	16	06	22 Credits

Exit Option : Award of UG Certificate in major subject with 44 credits and an additional 4 credits NSQF course (related to major / minor) / Internship during summer vacation OR Continue with Major and Minor

- 1) GE/OE-2 : Landscaping and Garden Designing (This course will be available for the student of other faculty)

Students will have to choose any three subjects as a **Major 1, Major 2, Major 3**, from Basket 1 under the Faculty of Science and Technology.

Students will be having three subject options of equal credits (instead of Major and / or minor verticals) in the first year. Students will have to select / declare choice of one subject as a **major subject** in the beginning of second year out of **three major options M1, M2 and M3 (which were opted in the first year)**.

Detailed Illustration of Courses included in 1st and 2nd semester:

- 1) **Major (Core)** subject are mandatory.

DSC-1 : This is a 2 credit theory course corresponding to Major (core) subject

DSC-2 : This is a 2 credit practical course based on DSC-1

DSC-3 : This is a 2 credit theory course corresponding to Major (core) subject

DSC-4 : This is a 2 credit practical course based on DSC-3

- 2) **Generic / Open Elective (GE/OE):** (Needs to be chosen (any two) from pool of courses available at respective college). **These courses should be chosen compulsorily from faculty other than that of Major.**

GE/OE -1 : This is a 2 credit theory course should be chosen compulsorily from faculty other than that of Major.

GE/OE -2 : This is a 2 credit theory course should be chosen compulsorily from faculty other than that of Major.

- 3) **SEC (Skill Enhancement Courses) :** Choose any one from pool of courses. These courses needs to be designed to enhance the technical skills of the students in specific area.

SEC-1 : This is a 1 credit theory course to enhance the technical skills of the students in specific area.

SEC-2 : This is a 1 credit practical course based on SEC-1.

- 4) **VSC (Vocational Skill Courses) :** Choose any one from pool of courses. These courses should be based on Hands on Training corresponding to Major (core) subject.

VSC-1 : This is a 1 credit theory course based Hands on Training corresponding to Major (core) subject.

VSC-2 : This is a 1 credit practical course based on VSC-1

- 5) **AEC (Ability Enhancement courses):** The focus of these courses should be based on linguistic and communication skills.

AEC-1 : English

This is a 2 credit theory course based on linguistic proficiency. It will be common for all the faculty.

AEC-2 : English

This is a 2 credit theory course based on linguistic proficiency. It will be common for all the faculty.

- 6) **IKS (Indian Knowledge System)** : The courses related to traditional and ancient culture of India will be included in this section. The respective college will have to choose one of the courses from the pool of courses designed by the University.

IKS-1 : To be chosen from the pool of courses designed by the University

This is a 2 credit theory course based on Indian Knowledge System. It will be common for all the faculty

- 7) **VEC (Value Education Courses)**: The courses such as understanding India, Environmental Science / Education, Digital and Technological solutions etc will be part of Value Education Courses.

VEC-1 : Constitution of India

This is a 2 credit theory course based on value education. It will be common for all the faculty

- 8) **CC (Curricular Courses)**: The courses such as Health and wellness, Yoga education, Sports and Fitness, Cultural activities, NSS/NCC, Performing Arts.

CC-1 : Health and Wellness

This is a 2 credit practical course based on Co-curricular activities. It will be common for all the faculty

CC-2 : Yoga education / Sports and Fitness

This is a 2 credit practical course based on Co-curricular activities. It will be common for all the faculty

General Guidelines for Course Selection

- 1) The Major subject is the discipline or course of main focus, bachelors degree shall be awarded in that discipline / subject.
- 2) Students will have to choose any three subjects as a Major 1, Major 2, Major 3, from **Basket 1** under the Faculty of Science and Technology (based on the available options in the respective college).
- 3) Students will be having three subject options of equal credits (instead of Major and / or minor verticals) in the first year.
- 4) In the beginning of second year, students will have to select / declare choice of **one major subject** and **one minor subject** from three major options **M1, M2 and M3 (which were opted in the first year)**
- 5) Once the students finalize their **Major Subject** and **Minor Subject** in the beginning of the second year of the programme, they shall pursue their further education in that particular subject as their **Major and Minor** subjects. Therefore, from second year onwards curriculum of the Major and Minor subjects shall be different.
- 6) Students are required to select **Minor subject** from **other discipline of the same faculty**
- 7) Students are required to select **Generic /Open Elective** (vertical 3 in the credit framework) **compulsorily from the faculty different than that of their Major / Minor subjects.**
- 8) Vocational Skill Courses and Skill Enhancement Courses (VSC and SEC) shall be related to the Major subject
- 9) Curriculum of Ability Enhancement Courses (AEC), Value Education Courses (VEC), Indian Knowledge System (IKS), and Co-curricular Courses (CC) will be provided by the University separately.

Programme Educational Objectives (PEOs) :

Programme Educational Objectives (PEOs) for the Bachelor of Science Curriculum under the National Education Policy 2020:

1. **Mastery of Discipline-Specific Knowledge:** Graduates of the Bachelor of Science program will demonstrate a deep understanding of fundamental principles, theories, and methodologies in their chosen scientific discipline, enabling them to analyze complex problems, propose innovative solutions, and contribute to advancements in their field.
2. **Interdisciplinary Proficiency:** Graduates will possess the ability to integrate knowledge and skills from multiple scientific disciplines, fostering a holistic approach to problem-solving and innovation. They will be equipped to address multifaceted challenges by drawing upon diverse perspectives and methodologies.
3. **Critical Thinking and Analytical Skills:** Graduates will develop strong critical thinking abilities, enabling them to evaluate information rigorously, analyze data effectively, and make informed decisions based on evidence. They will demonstrate proficiency in applying logical reasoning and scientific methods to solve problems and generate new knowledge.
4. **Leadership and Innovation:** Graduates will demonstrate leadership qualities and entrepreneurial mindset, capable of initiating and driving positive change in their organizations and communities. They will exhibit creativity, resilience, and adaptability, harnessing innovation to address complex challenges and seize opportunities for growth and advancement.
5. **Global Citizenship and Cultural Sensitivity:** Graduates will possess a global perspective and cultural sensitivity, recognizing the interconnectedness of diverse communities and the importance of collaboration across borders. They will engage in cross-cultural dialogue, embrace diversity, and contribute to the advancement of knowledge and understanding on a global scale.

These Programme Educational Objectives serve as guiding principles for the Bachelor of Science curriculum, reflecting our commitment to nurturing well-rounded graduates who are prepared to excel in their careers, contribute to society, and lead meaningful lives in a rapidly changing world.

Programme Outcomes (POs) :

The National Education Policy (NEP) 2020 for India emphasizes several key aspects for Bachelor of Science (B.Sc.) programs, aiming to produce graduates who are not only well-versed in their respective disciplines but also equipped with skills necessary for holistic development and employability. While specific program outcomes may vary between institutions and disciplines within B.Sc. programs, here are some common outcomes aligned with NEP 2020:

- **PO1. The citizenship and society:** Apply broad understanding of ethical and professional skill in science subjects in the context of global, economic, environmental and societal realities while encompassing relevant contemporary issues.
- **PO2. Environment and sustainability:** Apply broad understanding of impact of science subjects in a global, economic, environmental and societal context and demonstrate the knowledge of, and need for sustainable development.
- **PO3. Ethics:** Apply ability to develop sustainable practical solutions for science subject related problems within positive professional and ethical boundaries.
- **PO4. Individual and team work:** Function effectively as a leader and as well as team member in diverse/ multidisciplinary environments.
- **PO5. Communication:** Communicate effectively on complex science subject related activities with the scientific community in particular and with the society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- **PO6. Project management and finance:** Demonstrate knowledge and understanding of the first principles of science and apply these to one's own work as a member and leader in a team, to complete project in any environment.
- **PO7. Life-long learning:** Recognize the need for lifelong learning and have the ability to engage in independent and life-long learning in the broadest context of technological change.

These program outcomes align with the broader goals of NEP 2020 to transform higher education in India and prepare students for the challenges and opportunities of the 21st century. Board of Studies designing B.Sc. curricula are encouraged to incorporate these outcomes into their program objectives and learning outcomes.

Program Specific Outcomes: On completion of the 03/04 years degree in Horticulture students will be able to

- POS 1:** Graduates should have a strong understanding of plant biology, anatomy, physiology, and genetics. They should be able to apply this knowledge to the cultivation, propagation, and maintenance of various horticultural crops.
- POS 2:** Students should be proficient in the cultivation and management of a wide range of horticultural crops, including fruits, vegetables, ornamental plants, and medicinal herbs.
- POS 3:** Graduates should have the ability to identify and manage pests and diseases that affect horticultural crops through integrated pest management techniques. This includes the use of both chemical and non-chemical methods.
- POS 4:** Graduates should be knowledgeable about soil properties, soil fertility, and nutrient management for optimal crop growth. They should be able to assess soil conditions and make recommendations for soil improvement.
- POS 5:** Graduates should understand the principles of sustainable agriculture and be able to implement conservation practices to protect the environment while managing horticultural resources.
- POS 6:** Graduates should be familiar with modern horticultural technologies and equipment, including greenhouse management, irrigation systems, and precision agriculture techniques.
- POS 7:** Graduates should know how to handle, store, and process horticultural products to maintain quality and shelf life, reducing post-harvest losses.
- POS 8:** Graduates should have the knowledge and skills necessary to start and manage horticultural businesses, such as nurseries, orchards, or landscaping companies.
- POS 9:** Graduates should be able to conduct research in horticulture, including experimental design, data analysis, and interpretation, and contribute to the advancement of horticultural science.
- POS 10:** Graduates should possess effective communication and teamwork skills to work with other professionals, stakeholders, and the community to promote horticultural practices and products.
- POS 11:** Graduates should have an understanding of the ethical considerations and sustainability practices in horticulture, taking into account environmental, economic, and social impacts.
- POS 12:** Graduates should be committed to continuous learning and staying updated with the latest developments and advancements in the field of horticulture.
- POS 13:** Student can taken in depth practical knowledge or skill of these course and utilise in various research and extension services

B.SC. First Year

Semester-I

HORT/DSC-1: Elements of Horticulture

Total Credit :02

Total Contact Hours: 30 Hrs. (2hrs./Week)

Maximum Marks: 50

Learning objectives of the course:

- i) To provide basic knowledge of horticulture and its scope in India and Andhra Pradesh.
- ii) To classify horticultural plants based on soil and climate requirements.
- iii) To demonstrate various methods of plant propagation and nursery management.
- iv) To introduce the students to the green industry and its environmental benefits.
- v) To enable the students to apply horticultural skills and knowledge in their career.

Course Outcome (CO): On successful completion of this course students will be:

- i) Demonstrate a working knowledge and appreciation of the diversity of plants, their culture, and utilization
- ii) Synthesize, integrate, and apply information to solve horticultural problems
- iii) Apply horticultural principles for the successful growth and production of plants
- iv) Students are also expected to know about the recent advancement in horticulture and advanced technology like organic horticulture, protected cultivation, biotechnological tools, micropropagation techniques, and their application in the field of fruits, vegetables, and ornamental crops
- v) In addition to these, students will be able to identify plant vegetative structure, understand basic principles, processes, and plant propagation methods, and understand how to propagate plant, manage, and harvest a variety of plant

Syllabus Content:

Module No.	Topics / actual contents of the syllabus	Contact Hours
I	1) Introduction, Definition, Importance, Present status, and future scope of Horticulture in Maharashtra / India 2) Branches and classification of Horticultural crops. 3) Nursery arrangement – Planning, General nursery practices, various nursery techniques.	10
II	4) Plant propagation- Its Principles and Methods- 5) Sexual plant propagation its merits and demerits, / seed germination, seed dormancy its factors, seed viability and longevity of ornamental crops. 6) Vegetative/ Asexual plant propagation its merits and demerits. 7) Method: Cutting, Layering, Budding, Grafting its factors	10

III	8) Stock Scion relationship- Effect of roots stock on scion, effect of scion on root stock Study of root stock of various crops 9) Micro propagation and importance of tissue culture in Horticultural crops 10) Plant growth regulators its types and their uses in horticultural crops.	10
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Text Books:

1. Adams, C.R. and M. P. Early. 2004. Principles of horticulture. Butterworth – Heinemann, Oxford University Press.
2. Kumar, N.1997. Introduction to Horticulture, Rajalakshmi Publication, Nagercoil.
3. Chadha, K.L. 2001, Handbook of Horticulture, ICAR, New Delhi.

Reference Books:

1. Chandra, R. and M. Mishra. 2003. Micropropagation of horticultural crops. International Book Distributing Co., Lucknow.
2. Edmond, J.B. T.L.Senn, F.S. Andrews and P.G.Halfacre, 1975. Fundamentals of Horticulture, Tata MC. Graw Hill Publishing Co.New Delhi
3. Singh, D.K. 2008. Hi-tech horticulture. Agrotech publishers, Udaipur

HORT/DSC-2: Laboratory Course -1 (Elements of Horticulture)

Total Credit :02

Total Contact Hours: 60 Hrs. (4 hrs./Week)

Maximum Marks: 50

Learning objectives of the course:

- i)** Garden Tool Introduction and Identification: Learn to identify and use common garden tools in horticulture.
- ii)** Potting Mix Preparation and Planting: Gain practical skills in preparing and repotting plants.
- iii)** Plant Growth Media Familiarization: Understand different growing media and their usage based on plant requirements.
- iv)** Nursery Bed Preparation: Develop skills to prepare suitable nursery beds for seedling propagation.
- v)** Application and Methods of Plant Growth Regulators: Understand the application and techniques of these regulators.
- vi)** Aim: Equip graduates with practical skills for effective gardening and plant care.

Course Outcome (CO): On successful completion of this course students will be:

- i)** Students will understand the use and application of garden tools in horticultural activities.
- ii)** Practical skills in preparing potting mixtures and plants. Execution of the repotting process for healthy plant growth.
- iii)** Proficiency in growing plants in various media including soil, sand, leaf mould, sphagnum moss, vermicompost, and soilless culture.
- iv)** Development of the ability to prepare nursery beds for seedling propagation.
- v)** Application and Methods of Plant Growth Regulators, Knowledge of the application and methods of growth regulators.
- vi)** Hands-on skills and knowledge related to garden tools, potting, repotting, plant growth media, nursery bed preparation, and plant growth regulators.

Syllabus Content:

Module No.	Topics / actual contents of the syllabus	Contact Hours
I	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	20
II	6) Various methods of cutting 7) Various methods of layering 8) Various methods of budding 9) Various methods of grafting 10) Propagation by specialized structure- stem, roots, bulb, corm, tuber, tuberous roots, rhizomes	20
III	11) Preparation of Plant Tissue Culture media 12) Micro-propagation Techniques 13) Hardening of Plant Tissue Culture Plant 14) Visit to commercial nurseries. 15) Preparation of project Report for Nursery	20

HORT/SEC-1 A: Fresh Flower Decoration and Exhibition

Total Credit :01

Total Contact Hours: 15 Hrs. (1 hrs./Week)

Maximum Marks: 50

Learning objectives of the course:

- i) Proficiency in creating various floral arrangements including bouquets, centerpieces, corsages, and boutonnieres.
- ii) Understanding design principles, color theory, and composition.
- iii) Identifying and selecting appropriate flowers based on event themes, seasons, and client preferences.
- iv) Handling, conditioning, and care techniques for freshness and longevity of floral arrangements.
- v) Event planning and management skills including venue selection, budgeting, client consultations, timeline development, and vendor coordination.
- vi) Effective communication skills for understanding client preferences and budget constraints.
- vii) Exploration of sustainable practices in floral design and event management.

Course Outcome (CO): On successful completion of this course students will be:

- i) Proficient in creating floral arrangements including bouquets, centerpieces, and decorative elements.
- ii) : Proficient in planning, coordinating, and executing events featuring floral decorations. Proficient in effective communication with clients to understand their preferences and needs.
- iii) Capable of selecting appropriate flowers for specific occasions and client requests.
- iv) Knowledge of proper flower handling, conditioning, and care for longevity and freshness of floral arrangements.
- v) Awareness of sustainability practices in floral design and event management, considering ethical and environmental implications.

Syllabus Content:

Module No.	Topics / actual contents of the syllabus	Contact Hours
I	<ol style="list-style-type: none"> 1) Introduction, of Floriculture specially emphasize on Flower Decoration 2) Scope, and Importance of Floriculture specially emphasize on Flower Decoration 3) Types of Flower Arrangement: Floral Ornaments – Garlands – Floral crowns – 4) Hair decoration – Rangoli – Floral Bouquets – Button holes – Floral arrangement – Western style – 5) Principles of Design viz., – Emphasis – Balance – Proportion – Rhythm – Harmony – Unity – Elements of Design viz., – Line – Form – Texture – Colour 	05
II	<ol style="list-style-type: none"> 6) Selection of flowers and foliage – Line flowers – Form flowers – Mass flowers – Filler flower – Materials required – 7) Design rules – Types of floral arrangement –Circular – Triangular – Radiating – Crescent – Horizontal Hogarthian curve 8) Conditioning – Reconditioning of flowers. 9) Japanese floral arrangement – Ikebana – Moribana – Nageire – Jiyu-bana-Zen'eika – Zen'ei-bana-Morimono – 10) Materials required – General rules – for Moribana and Nageire styles of arrangement, 	05
III	<ol style="list-style-type: none"> 11) Basic styles of Moribana and Nageire , Basic upright and Basic slanting arrangements 12) Economic considerations for flower arrangements. 13) Exhibition, Marketing of Flower arrangement, local and export markets 14) transport - study of domestic and global markets – 15) constraints in Fresh, flower industry. 	05

Text Books:

- 1) Jean Taylor Creative Flower Arrangements. Random House UK; New edition edition (27 November 1993)
- 2) Purnima Shah. Silence Speaks - A book about Japanese flower arrangements (Ikebana). Buddha Bamboo; 1ST edition (2016)
- 3) Stella Coe. Art of Japanese Flower Arrangement

Reference Books:

- 1) Fiona Barnett . Flower Arranging: A Complete Guide to Creative Floral Arrangements . Southwater publisher
- 2) Charlene Tarbox . Creative Haven Beautiful Flower Arrangements Coloring Book. Dover Publications Inc.; Clr Csm edition
- 3) Event Management in leisure & tourism – David Watt
- 4) Conferences – Tomy Rogers

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HORT/SEC-1 B: Dry Flower Decoration and Exhibition

Total Credit :01

Total Contact Hours: 15 Hrs. (1 hrs./Week)

Maximum Marks: 50

Learning objectives of the course:

- i)** Proficiency in creating various floral arrangements including bouquets, centerpieces, corsages, and boutonnieres.
- ii)** Understanding design principles, color theory, and composition.
- iii)** Identifying and selecting appropriate flowers based on event themes, seasons, and client preferences.
- iv)** Handling, conditioning, and care techniques for freshness and longevity of floral arrangements.
- v)** Event planning and management skills including venue selection, budgeting, client consultations, timeline development, and vendor coordination.
- vi)** Effective communication skills for understanding client preferences and budget constraints.
- vii)** Exploration of sustainable practices in floral design and event management.

Course Outcome (CO): On successful completion of this course students will be:

- i)** Proficient in creating floral arrangements including bouquets, centerpieces, and decorative elements.
- ii)** Proficient in planning, coordinating, and executing events featuring floral decorations. Proficient in effective communication with clients to understand their preferences and needs.
- iii)** Capable of selecting appropriate flowers for specific occasions and client requests.
- iv)** Knowledge of proper flower handling, conditioning, and care for longevity and freshness of floral arrangements.
- v)** Awareness of sustainability practices in floral design and event management, considering ethical and environmental implications.

Syllabus Content:

Module No.	Topics / actual contents of the syllabus	Contact Hours
I	1) Introduction, Scope, and Importance of Floriculture specially emphasize on Dry Dry decoration 2) Dry flower arrangements. Types and Designs, 3) Material Selection in Dry Flower arrangements, 4) Methods of dry flower production - air drying – water drying - embedded method - oven drying – skeletonising – 5) Drying by immersion - bleaching and dyeing - preservation, fumigation, and storage –	05
II	6) Marketing of dry flowers national and international market of dry flower industry. 7) Principles and methods of flower arrangement - craft making – table wall hangers, 8) Wreath and cones– 9) Potpourri - wet and dry method– 10) Preparation of greeting cards – final product preparation – trimming, glue painting, ribbon fixing,	05
III	11) Packing – containers and cartons 12) Economic considerations for flower arrangements. 13) Exhibition, Marketing of Flower arrangement, local and export markets 14) Transport - study of domestic and global markets 15) Constraints in dry flower industry.	05

Text Books:

- 1) Jean Taylor Creative Flower Arrangements. Random House UK; New edition edition (27 November 1993)
- 2) Purnima Shah. Silence Speaks - A book about Japanese flower arrangements (Ikebana) . Buddha Bamboo; 1ST edition (2016)
- 3) Stella Coe. Art of Japanese Flower Arrangement .

Reference Books:

- 1) Fiona Barnett . Flower Arranging: A Complete Guide to Creative Floral Arrangements . Southwater publisher
- 2) Charlene Tarbox . Creative Haven Beautiful Flower Arrangements Coloring Book. Dover Publications Inc.; Clr Csm edition
- 3) Event Management in leisure & tourism – David Watt
- 4) Conferences – Tomy Rogers

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HORT/SEC-2 A: Lab Course on Fresh Flower Decoration and Exhibition

Total Credit :01

Total Contact Hours: 30 Hrs. (2 hrs./Week)

Maximum Marks: 50

Learning objectives of the course:

- i)** Proficiency in creating various floral arrangements including bouquets, centerpieces, corsages, and boutonnieres.
- ii)** Understanding design principles, color theory, and composition.
- iii)** Identifying and selecting appropriate flowers based on event themes, seasons, and client preferences.
- iv)** Handling, conditioning, and care techniques for freshness and longevity of floral arrangements.
- v)** Event planning and management skills including venue selection, budgeting, client consultations, timeline development, and vendor coordination.
- vi)** Effective communication skills for understanding client preferences and budget constraints.
- vii)** Exploration of sustainable practices in floral design and event management.

Course Outcome (CO): On successful completion of this course students will be:

- i)** Proficient in creating floral arrangements including bouquets, centerpieces, and decorative elements.
- ii)** : Proficient in planning, coordinating, and executing events featuring floral decorations. Proficient in effective communication with clients to understand their preferences and needs.
- iii)** Capable of selecting appropriate flowers for specific occasions and client requests.
- iv)** Knowledge of proper flower handling, conditioning, and care for longevity and freshness of floral arrangements.
- v)** Awareness of sustainability practices in floral design and event management, considering ethical and environmental implications.

Syllabus Content:

Module No.	Topics / actual contents of the syllabus	Contact Hours
I	1) Identification and proper selection of flower arrangement tool, containers, flowers and other material and accessories 2) Preparation of various types of bouquets 3) Preparation of various types of boutonnieres, wreathes, , etc 4) Preparation of various types of nosegay, etc 5) Practical on Japanese style of flower arrangement- Ikebana, Morribana,	10
II	6) Practical on Japanese style of flower arrangement- Morrimono, Naggire, 7) Preparation of various types of garland, Gajra, Venni etc. 8) Drying and preservation technique of dry flower 9) Preparation of pot pourrie 10) Preparation of Greeting card using dry flower arrangement	10
III	11) Preparation of Rangoli by using various types of flowers 12) Conditioning – Reconditioning of flowers. 13) Exhibition of cut flowers, floral arraignment 14) Project assignment on wedding decoration/ ceremony or other occasion/Event 15) Visit to nearby floriculture market	10

Text Books:

- 4) Jean Taylor Creative Flower Arrangements. Random House UK; New edition edition (27 November 1993)
- 5) Purnima Shah. Silence Speaks - A book about Japanese flower arrangements (Ikebana) . Buddha Bamboo; 1ST edition (2016)
- 6) Stella Coe. Art of Japanese Flower Arrangement .

Reference Books:

- 5) Fiona Barnett . Flower Arranging: A Complete Guide to Creative Floral Arrangements . Southwater publisher
- 6) Charlene Tarbox . Creative Haven Beautiful Flower Arrangements Coloring Book. Dover Publications Inc.; Clr Csm edition
- 7) Event Management in leisure & tourism – David Watt
- 8) Conferences – Tomy Rogers

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HORT/SEC-2 B: Lab Course on Dry Flower Decoration and Exhibition

Total Credit :01

Total Contact Hours: 30 Hrs. (2 hrs./Week)

Maximum Marks: 50

Learning objectives of the course:

- i)** Proficiency in creating various floral arrangements including bouquets, centerpieces, corsages, and boutonnieres.
- ii)** Understanding design principles, color theory, and composition.
- iii)** Identifying and selecting appropriate flowers based on event themes, seasons, and client preferences.
- iv)** Handling, conditioning, and care techniques for freshness and longevity of floral arrangements.
- v)** Event planning and management skills including venue selection, budgeting, client consultations, timeline development, and vendor coordination.
- vi)** Effective communication skills for understanding client preferences and budget constraints.
- vii)** Exploration of sustainable practices in floral design and event management.

Learning Course Outcome (CO): On successful completion of this course students will be:

- i)** Proficient in creating floral arrangements including bouquets, centerpieces, and decorative elements.
- ii)** : Proficient in planning, coordinating, and executing events featuring floral decorations. Proficient in effective communication with clients to understand their preferences and needs.
- iii)** Capable of selecting appropriate flowers for specific occasions and client requests.
- iv)** Knowledge of proper flower handling, conditioning, and care for longevity and freshness of floral arrangements.
- v)** Awareness of sustainability practices in floral design and event management, considering ethical and environmental implications.

Syllabus Content:

Module No.	Topics / actual contents of the syllabus	Contact Hours
I	1) Identification and proper selection of flower arrangement tool, containers, flowers and other material and accessories 2) Drying and preservation technique of dry flower 3) Material Selection in Dry Flower arrangements, 4) Methods of dry flower production - air drying is 5) Methods of dry flower production Water drying	10
II	6) Methods of dry flower production Embedded method 7) Methods of dry flower production Oven drying – skeletonizing 8) Preparation of pot pourrie 9) Preparation of Greeting card using dry flower arrangement 10) Preparation of Rangoli by using various types of Dry flowers	10
III	11) Conditioning – Reconditioning of flowers. 12) Exhibition of Dry cut flowers, floral arraignment 13) Project assignment on weeding decoration/ ceremony or other occasion/Event 14) Visit to Dry floriculture market 15) Visit to Industry	10

Text Books:

- 7) Jean Taylor Creative Flower Arrangements. Random House UK; New edition edition (27 November 1993)
- 8) Purnima Shah. Silence Speaks - A book about Japanese flower arrangements (Ikebana) . Buddha Bamboo; 1ST edition (2016)
- 9) Stella Coe. Art of Japanese Flower Arrangement .

Reference Books:

- 9) Fiona Barnett . Flower Arranging: A Complete Guide to Creative Floral Arrangements . Southwater publisher
- 10) Charlene Tarbox . Creative Haven Beautiful Flower Arrangements Coloring Book. Dover Publications Inc.; Clr Csm edition
- 11) Event Management in leisure & tourism – David Watt
- 12) Conferences – Tomy Rogers

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HORT/ GE/OE-1: Indoor Plants and Interior Scaping

(This course will be available for the students from other faculty)

Total Credit :02

Total Contact Hours: 30 Hrs. (2 hrs./Week)

Maximum Marks: 50

Learning objectives of the course:

- i) Develop a comprehensive understanding of Indoor plant its care and management
- ii) Gain knowledge of the Indoor plant which help to improve environment.
- iii) Learn about Interior plant, garden with arts and its application
- iv) Develop the ability to built own Indoor Garden.
- v) These learning objectives aim to equip students with a strong foundation in Indoor Garden designing, enabling them to make informed decisions and adapt to changing Indoor weather and climate condition. Understanding the dynamic relationship between Human and Plants is essential for modern Indoor Healthy Environment.

Course Outcome (CO): On successful completion of this course students will be:

- i) Student can get in depth knowledge of indoor plant and interior scaping
- ii) Student can develop own Interior gardening and also do consultancy
- iii) They can start their self-employment
- iv) Student can do research and development on Interior-scaping

Syllabus Content:

Module No.	Topics / actual contents of the syllabus	Contact Hours
I	1) Importance and scope of house plants and interior scaping. 2) Identification of important house plants. 3) Factors affecting growth and flowering of house plants. 4) Containers and potting media used for house plants. 5) Plant care including propagation	10
II	6) Training and grooming of Indoor Plant 7) Nutrition of Indoor Plant. 8) Care and maintenance of indoor plants. 9) Cultural operations and maintenance of indoor plants. 10) Selection of sites and plants for interior scaping.	10
III	11) Description and cultivation of various house plants. 12) Principles of interior scaping, 13) Environmental consideration, plant which purify air 14) Special gardens like dish, terrarium, hanging baskets, window boxes, miniature gardens, plant stand and vertical gardens. 15) Familiarization with different indoor gardens.	10

Text Books:

1. The Indoor Plant Bible: The Essential Guide to Choosing and Caring for Indoor, Greenhouse, and Patio Plants by Dorte Nissen
2. The New York Botanical Garden's Guide to Indoor Gardening by Tricia Martin
3. Planting Design for Indoor Gardens by Richard Rosenfeld
4. The Indoor Plant Decorator: Designing with Plants in Every Room of the House by Kylee Baumle

Reference Books:

1. Houseplants: The complete guide to choosing, growing and caring for Indoor Plant : by Lisa eldered steinkopf
2. 6. Interior Landscaping: Principles and Practices: Delmar Cengage Learning; New edition (12 October 2012) by James M. DelPrince
3. Indoor Green: Living with Plants by Bree Claffey and Lauren Bamford
4. Garden Up: Your One Stop Guide To Growin: Your One Stop Guide to Growing Plants at Home. By Ekta Chaudhary
5. Make Your Own Indoor Garden: How to Fill Your Home with Low Maintenance Greenery by Sarah Durber

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B.SC. First Year

Semester-II

HORT/DSC-3: Basics of Vegetable Growing

Total Credit :02

Total Contact Hours: 30 Hrs. (2 hrs./Week)

Maximum Marks: 50

Learning objectives of the course:

- i) To understand the principles and practices of vegetable production
- ii) To identify the major vegetable crops and their botany, morphology, and physiology
- iii) To select the appropriate vegetable varieties, seeds, and planting methods for different regions and seasons
- iv) To apply the best management practices for soil, water, fertilizer, pest, disease, and weed control in vegetable cultivation.
- v) To harvest, store, and market vegetables for quality and profitability
- vi) To appreciate the benefits of vegetable gardening for health, nutrition, and environment
- vii) To develop skills in planning, designing, and maintaining a home or community vegetable garden

Course Outcome (CO): On successful completion of this course students will be:

- i) Students can learn about Exotic vegetables, Problems and Practices of Vegetable Production and Its Maximization
- ii) Understand various types of vegetable cropping
- iii) Learn about the plant growth regulators, hi tech nursery management techniques and Mulching
- iv) Student can start agriculture farming and consultancy.

Syllabus Content:

Module No.	Topics / actual contents of the syllabus	Contact Hours
I	1) Introduction, Definition, importance, and scope of vegetable growing in Maharashtra / India 2) Introduction to exotic vegetables 3) Problems and practices of vegetable production in India 4) Maximization of vegetable production 5) Classification of horticultural crops	10
II	6) Intercropping, relay cropping, mixed cropping, 7) Multiple cropping and companion cropping, rotation cropping & succession cropping. 8) Types of vegetable gardening - Home /kitchen gardening, Commercial vegetable gardening, 9) Market gardening, Truck gardening,	10

	10) Vegetable gardening for seed production, Floating vegetable gardening, Vegetable gardening for processing	
III	11) Hi Tech-Nursery management Practices and 12) Transplanting 13) Use of Plant growth regulators in vegetables 14) Mulching- its various methods and 15) Mulching- role in vegetable production	10

Text Books:

1. Pranab Hazra, A. Chattopadhyay, K. Karmakar and S. Dutta. 2010. "Modern technology in vegetable production" New India Publishing Agency, New Delhi.
2. Uma Shankar Singh, 2008. "Indian vegetables", Anmol publications Pvt., Ltd., New Delhi.
3. Gopalakrishnan, T.R., 2007. "Vegetable Crops" New India publishing agency, New Delhi.

Reference Books:

- 1) James S. Shoemaker and Thomas Smith., 2006. "Culture of Veg., Growing" Asiatic
- 2) Vishnu Swarup, 2006. Vegetable science and technology in India. Kalyani publishers, New Delhi.
- 3) Neeraj Pratap Singh . 2005. "Basic concepts of vegetable science", International Book distributing co., New Delhi.

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HORT/DSC-4: Laboratory Course -2 (Basics of Vegetable Growing)

Total Credit :02

Total Contact Hours: 60 Hrs. (4 hrs./Week)

Maximum Marks: 50

Learning objectives of the course:

- vii)** Garden Tool Introduction and Identification: Learn to identify and use common garden tools in horticulture.
- viii)** Potting Mix Preparation and Planting: Gain practical skills in preparing and repotting plants.
Plant Growth Media Familiarization: Understand different growing media and their usage based on plant requirements.
- ix)** Nursery Bed Preparation: Develop skills to prepare suitable nursery beds for seedling propagation.
- x)** Application and Methods of Plant Growth Regulators: Understand the application and techniques of these regulators.
- xi)** Aim: Equip graduates with practical skills for effective gardening and plant care.

Course Outcome (CO): On successful completion of this course students will be:

- vii)** Students will understand the use and application of garden tools in horticultural activities.
- viii)** Practical skills in preparing potting mixtures and plants. Execution of the repotting process for healthy plant growth.
- ix)** Proficiency in growing plants in various media including soil, sand, leaf mould, sphagnum moss, vermicompost, and soilless culture.
- x)** Development of the ability to prepare nursery beds for seedling propagation.
- xi)** Application and Methods of Plant Growth Regulators, Knowledge of the application and methods of growth regulators.
- xii)** Hands-on skills and knowledge related to garden tools, potting, repotting, plant growth media, nursery bed preparation, and plant growth regulators.

Syllabus Content:

Module No.	Topics / actual contents of the syllabus	Contact Hours
I	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	20
II	6) Types of Vegetative plant propagation <ul style="list-style-type: none"> 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.	20
III	11) Study of various vegetable cropping methods 12) Layout for planting of different vegetables 13) Layout for kitchen/ 14) Float vegetable garden 14) Preparation of vegetable carving 15) Preparation of spawn for mushroom production 16) Visit to commercial nurseries.	20

HORT/ VSC-1 A: Horticulture Nursery Management

Total Credit :01

Total Contact Hours: 15 Hrs. (1 hrs./Week)

Maximum Marks: 50

Learning objectives of the course:

- i) Students will learn about the need for propagation, both sexual and asexual methods, and their respective advantages and disadvantages .
- ii) Students will understand the causes of seed dormancy, both internal and external factors, and methods to break dormancy.
- iii) Learners will explore methods like cuttings and layering for vegetative propagation of plants.
- iv) Students will gain knowledge about grafting and budding techniques, including different types and stages of union formation.
- v) The course will cover factors influencing rooting of cuttings and layering, as well as graft incompatibility and its anatomical aspects.
- vi) These objectives aim to equip students with practical skills and theoretical knowledge necessary for successful nursery management.

Course Outcome (CO): On successful completion of this course students will be:

- i) Familiarization with principles and practices of propagation and nursery management, introduction to propagation, cellular basis, sexual propagation, apomixis, and polyembryony.
- ii) Understanding nutrient and water management, fruit development, and post-harvest practices also Knowledge of seed germination factors, dormancy, and nursery establishment rules and regulations.
- iii) Educating about botany, taxonomy, climatic and soil requirements for cool-season vegetables & Developing skills in financial, marketing, and personnel management for a wholesale nursery.
- iv) Covering topics like varieties, sowing/planting times, nutrition, irrigation, weed control, and post-harvest management. Basic knowledge about temperate fruits, including varieties, ecophysiology, propagation, and canopy management.
- v) Acquiring knowledge of cultural and production techniques relevant to nursery operations. Grasping the basic concepts and physiology of different propagation methods and tissue culture techniques. Gaining insights into nursery management, rootstock-scion relationships, and quality planting materials.

Syllabus Content:

Module No.	Topics / actual contents of the syllabus	Contact Hours
I	<p>1) Types of containers, preparation of media, Tools and implements for bed preparation and propagation, Preparation of nursery beds , pro tray culture, soil sterilization, sowing and maintenance, nutrition practices - use of plant growth regulators, biofertilizers, pesticides, fungicides for nursery, seed treatments</p> <p>2) Raising root stocks for propagation of fruit plants, Potting, pot bound condition and repotting of plants</p> <p>3) Mist chamber, Shade net house, phytotron, Polyhouse, greenhouse, Polytunnel nursery and cold frames structures,</p> <p>4) Hot beds, lath house and pit nursery - ball and bur lapped culture , structures and maintenance for propagation of fruit plants,</p> <p>5) Economics of construction, Practices, erection of low-cost polyhouses</p>	05
II	<p>6) Propagation introduction–Sexual and Asexual methods of propagation, Principles and differences -, Seed propagation techniques - Seed treatment,</p> <p>7) Seed dormancy factors , Seed viability, germination, longevity, seedling vigour, Merits and Demerits of seed propagation of fruit plants , apomixis , polyembryony and principles, practices,</p> <p>8) types of cuttings, Methods of layering Practices - different methods of layering - Maintenance, separation and potting of layers and hardening.</p> <p>09) Merits and demerits of grafting methods - Selection criteria of root stock and scion, Stock –scion relationship, Bud wood selection and budwood certification and incapability, Anatomical and physiological, basis of graft and bud union, Practices - different types of grafting and budding, methods – maintenance –</p> <p>10) Nutrition and plant protection of grafted and budded plants - Visit to commercial fruit plant nurseries –</p>	05
III	<p>11) Rejuvenation and top working of fruit plants – practices – top working - Bridge grafting and buttress grafting –</p> <p>12) Project preparation, establishment of commercial fruit plant nurseries</p> <p>13) Plant tissue culture laboratory- different types - organization and establishment basic structural units - stages of micropropagation - Preparation of stock solutions –</p> <p>14) Plant tissue media preparation - Sterilization and inoculation techniques - shoot tip or Meristem tip culture - Micro grafting techniques in citrus - Tissue culture banana plants - commercial production-meristem culture for induction-proliferation and rooting –</p> <p>15) Hardening techniques - hill banana production-selection of mother plants- soma clonal variation in tissue culture- potential draw backs and elimination - Project preparation for establishment of plant tissue culture lab</p>	05

Text Books:

1. **Hartmann, H.T., D.E. Kester, F.T. Davies and R.L. Greeneve. 2006** Plant Propagation. Principles and Practices. Prentice Hall of India Private Ltd., New Delhi.
2. **Bose T.K.S.K. Mitra, M.K. Sadhu, B. Mitra., 2001** Propagation of tropical and subtropical horticultural crops, Naya Prakash 206, Bidhan Sarani, Calcutta, Six. India.
3. **Prasad, S. and U. Kumar, 2005.** Principle of Horticulture. 3rd edition, Agrobios, India.

Reference Books:

1. **George, E. F. and Sherrington P. D. 1984.**Plant propagation by tissue culture Mahalaksmi enterprise, Bangalore
2. **Parthasarathy, V. A. 2001.** Biotechnology of Horticultural Crops vol. I, II & III. Nayaprakash, Calcutta.
3. **Purohit, S. S. 1998.** Biotechnology: Fundamentals and Applications II Edition; Agro Botanica Bikaner, India

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HORT/ VSC-1 B: Fruit and Vegetable Carving

Total Credit :01

Total Contact Hours: 15 Hrs. (1 hrs./Week)

Maximum Marks: 50

Learning objectives of the course:

- i) The salary of a vegetable carver may vary depending on the location, experience, and employer. In general, vegetable carvers can find work in restaurants, hotels, catering companies, and event planning businesses. The job opportunities for vegetable carvers are relatively limited, but they can earn a decent income if they have the necessary skills and experience.
- ii) Vegetable carving can be a lucrative career for those who have a passion for cooking and creativity. Some career opportunities for vegetable carvers include:
- iii) Working as a vegetable carver in restaurants, hotels, catering companies, and event planning businesses.
- iv) Starting their own vegetable carving business.
- v) Teaching vegetable carving in culinary schools and institutes.
- vi) Creating instructional videos and tutorials on vegetable carving

Course Outcome (CO): On successful completion of this course students will be:

- i) Gain a comprehensive understanding of the core principles and philosophy of Fruit and Vegetable Carving
- ii) Learn and apply Various Carving Procedures and garnishing
- iii) Develop the ability to select appropriate skills of fruit and vegetable carving in various restaurants, functions
- iv) Develop your skills in cutting and carving to great advantage in the sculpting of vegetables and fruits into a multitude of forms. Pumpkins, turnips, tomatoes, carrots, cucumbers, radishes, chillies, onions, and pineapples are transformed into roses, carnations, chrysanthemums, fish and animals.
- v) Familiarize yourself with the requirements and standards for fruit and vegetable carving

Syllabus Content:

Module No.	Topics / actual contents of the syllabus	Contact Hours
I	1) Introduction, Definition, History, 2) Importance and Scope of Fruits and Vegetable Carving in India 3) Types of fruits and vegetables used for carving, Ideal Selection of Fruits, Vegetables, etc. 4) Tools and equipment used in fruit and vegetable carving with their function 5) Knife handling and safety	05
II	6) Basic techniques for carving fruits and vegetables 7) Advanced techniques for carving fruits and vegetables 8) Creating decorative and artistic designs 9) Edible centerpieces and garnishes 10) Food presentation	05
III	11) Exhibition of Fruits and vegetable carving 12) project preparation for Fruit and Vegetable Carving 13) Economics of Fruit and Vegetable Carving 14) 2D Carving & How To Use For Plating 15) Basics of food plating	05

Text Books:

- 1) Rie Yamada -The Complete Book of Fruit Carving: Decorate Your Table for Any Special Occasions
- 2) Creative Carving of Fruits and Vegetables Hardcover – 1 January 2001, by Kikky Sihota - Lustre; First Edition (1 January 2001
- 3) The Abc Of Fruit And Vegetable Carving Paperback, Fruit and Vegetables Showpieces: Ka Omie Carving Central Book of Ideas Paperback – Import, 25 April 2021 by Romeo Nazareno Dalangin

Reference Books:

- 1) Fruit and Vegetable Carvings (English) Paperback – 1 October 2008-by Tarla Dalal
- 2) FRUIT AND VEGETABLE CARVING: Our tale begins more than 700 years ago in the beautiful and mysterious land of smiles, called Thailand. (1 Book 10) Kindle Edition, by Veselina Slavcheva (Author)
- 3) Complete Step by Step Vegetable and Fruit Carving Hardcover – 1 January 2007 by Hongwiwat Nidda
- 4) Fruit and Vegetable Carving Paperback – 1 February 199- by Merrra John Jacob

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HORT/ VSC-2 A: Lab Course on Horticulture Nursery Management

Total Credit :01

Total Contact Hours: 30 Hrs. (2 hrs./Week)

Maximum Marks: 50

Learning objectives of the course:

- i) Students will learn about the need for propagation, both sexual and asexual methods, and their respective advantages and disadvantages .
- ii) Students will understand the causes of seed dormancy, both internal and external factors, and methods to break dormancy.
- iii) Learners will explore methods like cuttings and layering for vegetative propagation of plants.
- iv) Students will gain knowledge about grafting and budding techniques, including different types and stages of union formation.
- v) The course will cover factors influencing rooting of cuttings and layering, as well as graft incompatibility and its anatomical aspects.
- vi) These objectives aim to equip students with practical skills and theoretical knowledge necessary for successful nursery management.

Course Outcome (CO): On successful completion of this course students will be:

- i) Familiarization with principles and practices of propagation and nursery management, introduction to propagation, cellular basis, sexual propagation, apomixis, and polyembryony.
- ii) :Understanding nutrient and water management, fruit development, and post-harvest practices also Knowledge of seed germination factors, dormancy, and nursery establishment rules and regulations.
- iii) Educating about botany, taxonomy, climatic and soil requirements for cool-season vegetables & Developing skills in financial, marketing, and personnel management for a wholesale nursery.
- iv) Covering topics like varieties, sowing/planting times, nutrition, irrigation, weed control, and post-harvest management. Basic knowledge about temperate fruits, including varieties, ecophysiology, propagation, and canopy management.

Syllabus Content:

Module No.	Topics / actual contents of the syllabus	Contact Hours
I	1) Media – rooting and growing media, rooting media ratio and pH for propagation of fruit plants. Preparation of media for filling containers for fruit plants. 2) Types of containers for propagation of fruit plants	10

	<ol style="list-style-type: none"> 3) Tools and implements for soil working and nursery bed preparation for fruit plants. Tools and implements for vegetative propagation of fruit plants. 4) Preparation of nursery beds, pro tray culture, soil sterilization and sowing and maintenance of nursery beds for propagation of fruit plan. 5) Nursery maintenance and nutrition for propagation of fruit plants 6) Practicing the use of Use of biofertilizers for propagation of fruit plants, Practicing the use of Use of pesticides and fungicides in nurser 7) Seed treatments – raising root stocks for propagation of fruit plants 8) Potting, pot bound condition and repotting of plants 9) Different types of propagation structures of fruit plants, Mist chamber – structures – maintenance for propagation of fruit plants, Use of mist chamber for seed and vegetative propagation and hardening and maintenance of plants in mist chamber. Economics of construction of mist chamber for propagation of fruit plants 10) Shadenet house, phytotron – structures and maintenance for propagation of fruit plants, Polyhouse – structures and maintenance for propagation of fruit plants, Economics of construction of shadenet house and polyhouse. 	
<p style="text-align: center;">II</p>	<ol style="list-style-type: none"> 11) Types of greenhouse – principles of construction for propagation of fruit plants , Uses and maintenance of greenhouses in propagation of fruit plants, Economics of construction of greenhouse structures, Polytunnel nursery and cold frames for propagation of fruit plants 12) Hot beds, lath house, pit nursery, ball and bur lapped culture for propagation of fruit plants, Practicing erection of low cost polyhouses for propagation of fruit plants 13) Propagation introduction – sexual method of propagation, Asexual methods of propagation 14) Seed propagation techniques and seed treatment of fruit plant 15) Seed dormancy factors, Seed viability, germination, longevity and seedling vigour of fruit plants, Factors influencing seed propagation of fruit plants, Nursery techniques – apomixis – polyembryony and principles 16) Practicing leaf and leaf bud cuttings 17) Practicing different types of stem cuttings, Practicing and planting of single nodal cuttings and root cuttings. 18) Methods of layering for propagation of fruit plants, Practicing different methods of layering. Practicing different methods of layering, Maintenance, separation and potting of layers and hardening. 19) Methods of grafting for propagation of fruit plants 20) Selection criteria of root stocks and scion for propagation of fruit plants 	<p style="text-align: center;">10</p>

III	<p>16) Practicing different types of grafting methods, Separation of grafts from mother plants in approach grafting - maintenance of grafted plants in the nursery.</p> <p>17) Methods of budding for propagation of fruit plants, Practicing different types of budding, Maintenance of budded plants, Nutrition and plant protection of budded plants</p> <p>18) Rejuvenation and top working of fruit plants, Practicing top working of unproductive and old trees, Bridge grafting and buttress grafting of fruit plants</p> <p>19) Plant tissue culture laboratory- organization and establishment- basic structural units, stages of micropropagation</p> <p>20) Preparation of stock solutions - Plant tissue media preparation. Sterilization and inoculation techniques for general micro propagation, Inoculation of shoot tip or Meristem tip culture of fruit crop</p> <p>21) Micro grafting techniques in citrus for virus free planting materia</p> <p>22) Production of tissue culture banana plants- media for shoot tip culture</p> <p>23) Banana-commercial production-meristem culture for induction-proliferation and rooting</p> <p>24) Hardening techniques-commercial hardening methods- primary and secondary hardening</p> <p>25) Visit to industrial units manufacturing containers, tools and implements</p>	10
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Text Books:

1. Hartmann, H.T., D.E. Kester, F.T. Davies and R.L. Greeneve. 2006 Plant Propagation. Principles and Practices. Prentice Hall of India Private Ltd., New Delhi.
2. Bose T.K.S.K. Mitra, M.K. Sadhu, B. Mitra., 2001 Propagation of tropical and subtropical horticultural crops, Naya Prakash 206, Bidhan Sarani, Calcutta, Six. India.

Reference Books:

1. Prasad, S. and U. Kumar, 2005. Principle of Horticulture. 3rd edition, Agrobios, India.
2. George, E. F. and Sherrington P. D. 1984.Plant propagation by tissue culture Mahalaksmi enterprise, Bangalore
3. Parthasarathy, V. A. 2001. Biotechnology of Horticultural Crops vol. I, II & III. Nayaprakash, Calcutta.

HORT/ VSC-2 B: Lab Course on Fruit and Vegetable Carving

Total Credit :01

Total Contact Hours: 30 Hrs. (2 hrs./Week)

Maximum Marks: 50

Learning objectives of the course:

- i) The salary of a vegetable carver may vary depending on the location, experience, and employer. In general, vegetable carvers can find work in restaurants, hotels, catering companies, and event planning businesses. The job opportunities for vegetable carvers are relatively limited, but they can earn a decent income if they have the necessary skills and experience.
- ii) Vegetable carving can be a lucrative career for those who have a passion for cooking and creativity. Some career opportunities for vegetable carvers include:
- iii) Working as a vegetable carver in restaurants, hotels, catering companies, and event planning businesses.
- iv) Starting their own vegetable carving business.
- v) Teaching vegetable carving in culinary schools and institutes.
- vi) Creating instructional videos and tutorials on vegetable carving

Learning Course Outcome (CO): On successful completion of this course students will be:

- i) Gain a comprehensive understanding of the core principles and philosophy of Fruit and Vegetable Carving
- ii) Learn and apply Various Carving Procedures and garnishing
- iii) Develop the ability to select appropriate skills of fruit and vegetable carving in various restaurants, functions
- iv) Develop your skills in cutting and carving to great advantage in the sculpting of vegetables and fruits into a multitude of forms. Pumpkins, turnips, tomatoes, carrots, cucumbers, radishes, chillies, onions, and pineapples are transformed into roses, carnations, chrysanthemums, fish and animals.
- v) Familiarize yourself with the requirements and standards for fruit and vegetable caring

Syllabus Content:

Module No.	Topics / actual contents of the syllabus	Contact Hours
I	1) Practical on Cucumber Leaf Carving 2) Practical on Carved Pumpkin Bowl 3) Practical on Watermelon Carving Flower 4) Practical on Fancy Watermelon Bowl 5) Practical on Carrot Leaf Carving	10
II	6) Practical on Radish Flower 1 and 2 7) Practical on Carved Melon Bowl 8) Practical on Tomato Basket Garnish 9) Practical on Carrot Rose Carving 10) Practical on Pumpkin Carving Rose	10
III	11) Practical on Watermelon Basket Carving 12) Practical on Watermelon Fruit Bowl 13) Practical on Pumpkin Carving 14) Practical on Cucumber White Lotus 15) Practical on Flowery Watermelon Carving	10

Text Books:

- 1) Rie Yamada -The Complete Book of Fruit Carving: Decorate Your Table for Any Special Occasions
- 2) Creative Carving of Fruits and Vegetables Hardcover – 1 January 2001, by Kikky Sihota - Lustre; First Edition (1 January 2001)
- 3) The Abc Of Fruit And Vegetable Carving Paperback, Fruit and Vegetables Showpieces: Ka Omie Carving Central Book of Ideas Paperback – Import, 25 April 2021 by Romeo Nazareno Dalangin

Reference Books:

- 1) Fruit and Vegetable Carvings (English) Paperback – 1 October 2008-by Tarla Dalal
- 2) FRUIT AND VEGETABLE CARVING: Our tale begins more than 700 years ago in the beautiful and mysterious land of smiles, called Thailand. (1 Book 10) Kindle Edition, by Veselina Slavcheva (Author)
- 3) Complete Step by Step Vegetable and Fruit Carving Hardcover – 1 January 2007 by Hongwiwat Nidda
- 4) Fruit and Vegetable Carving Paperback – 1 February 199- by Merrra John Jacob

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HORT/ GE/OE-2: Landscaping and Garden Designing

(This course will be available for the students from other faculty)

Total Credit :02

Total Contact Hours: 30 Hrs. (2 hrs./Week)

Maximum Marks: 50

Learning objectives of the course:

- i)** Identifying and understanding diverse plant species.
- ii)** Understanding design principles like balance, proportion, harmony, rhythm, and focal points.
- iii)** Conducting site analysis to assess environmental conditions, soil quality, topography, climate, and vegetation.
- iv)** Generating and refining creative design concepts based on client needs.
- v)** Drafting and creating landscape plans including site, planting, and construction drawings.
- vi)** Creating a professional portfolio showcasing design work and projects.
- vii)** Internships or practical experience in the field to apply classroom knowledge.

Course Outcome (CO): On successful completion of this course students will be:

- i)** **CO 1:** Design and installation of hardscape elements like patios, pathways, walls, and water features. Proficiency in creating planting plans considering plant selection, spacing, and arrangement.
- ii)** **CO 2:** Knowledge of sustainable landscaping practices like native plants, water-efficient irrigation, and environmentally responsible materials. Effective communication and presentation skills for client interaction and design ideas presentation.
- iii)** **CO 3:** Understanding project management principles including budgeting, scheduling, and supervision. Basic understanding of landscape construction techniques and practices.
- iv)** **CO 4:** Ability to create maintenance plans for designed landscapes. Familiarity with historical and cultural aspects of garden design.
- v)** **CO 5:** Understanding ecological aspects of landscaping. Proficiency in using CAD software for professional-quality design drawings and presentations.

Syllabus Content:

Module No.	Topics / actual contents of the syllabus	Contact Hours
I	<ol style="list-style-type: none"> 1) Importance and scope of landscaping. 2) Principles of landscaping 3) Garden styles and types, terrace gardening, vertical gardening, 4) Garden components, adornments, lawn making, rockery, water garden, walk-paths, bridges, statues, water bodies, lanterns, bridges, fountains. Material used for pavements and mounds. Other constructed features etc. Gardens for special purposes 5) Garden Plants: Trees: selection, propagation, planting schemes, canopy management, shrubs and herbaceous perennials: selection, propagation, planting schemes, architecture. Climber and creepers: importance, selection, propagation, planting, Annuals: selection, propagation, planting scheme, Other garden plants: palms, ferns, grasses and cacti succulents. Pot plants: selection, arrangement, management. 	10
II	<ol style="list-style-type: none"> 6) Bio-aesthetic planning: definition, need, planning Principles of art and their application in landscape compositions and interior decoration. 7) Manas the human habitat. Natural and man- made forms and features. Analysis of various types of sites and their landscape treatments. Organisation of spaces. Visual aspects of plan arrangement view, vista and axis. Principles of circulation. Garden structures. 8) Analysis of problems and application of landscaping principles for various types of houses, landscaping of urban and rural areas, Peri-urban landscaping, educational institutions, religious places, industrial sites, country side, farm complexes, embassies, hotels and other buildings. 9) Special problem of landscaping of terrace and roof gardens and multistorey buildings. 10) Concepts and significance of planning cities and open spaces. Master plans of cities in relation to open spaces, parks and other recreational areas. 	10
III	<ol style="list-style-type: none"> 11) Analysis of sites for designing of parks and sport centres. Maintenance of parks. Factors affecting outdoor recreation. 12) Selection of sites and their landscaping for various categories of tourist complexes, picnic spots and camping grounds. 13) Landscaping of schools, public places like bus station, railway station, townships, river banks, hospitals, play grounds, airports, industries, institutions, Landscaping of various categories of roads. 14) Interior decoration of hotels and institutional buildings Bioaesthetic planning for urban towns, highways, industrial areas, golf courses 	10

	15) Green belts, landscape ecology. Cost estimates of different landscape plans	
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Text Books:

1. Peerson, S.C. 1970. Ward Lock's Complete Garden. Ward Lock Ltd. London.
2. Randhawa, G.S., K L Chadha and Daljit Singh. The Famous Gardens of India. Malhotra Publishing House, India.
3. Randhawa M S 1976. Gardens Through the Ages. The Me Millon Co. of India, New Delhi.
4. Tatsui, Mutsunosuke 1968. Japanese Gardens. Japan Traven Bureau Inc., Tokyo.
5. Baily, L.H. 1963. The Standard Cyclopedia of Horticulture.
6. Chadha, K.L . and ^B.Chaudhary. 1986. Ornamental Horticulture in India.ICAR, New Delhi.
7. Evett, T.H. 1993. New illustrated Encyclopedia of Gardening. Graystone Press, New York.
8. Iyenger, Gopaldaswamy, 1970. Complete Gardening in India. Kalyani Publishers, New Delhi.
9. Trivedi, P.P. 1983. Home Gardening. ICAR, New Delhi.

Reference Books:

- 1) Floriculture and Landscaping - T. K. Bose, R. G. Maiti, R. S. Dhua & P. Das, Naya Prakash (1999)
- 2) Design Elements of Landscape Gardening - K. M. P. Nambisan, Oxford & IBH (1992) 3. Floriculture: Fundamentals and Practices – A. Lauria & H. R. Victor, Agrobios (2001)
- 3) Brian, H. 1979. Planting Design. E and FN Spox Ltd., London.
- 4) Futehally, Laque 1978)Gardens . National Book Trust India, New Delhi.
- 5) McDowell, Jacle 1972 Sunset ideas for Japanese Gardens. Manic Park , California.

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