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DR.BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY

CIRCULAR NO.SU/Sci.& Tech./B.Voc./33/2018

It is hereby inform to all concerned that, on the recommendation of the Dean, Faculty of Science & Technology, the Hon'ble Vice-Chancellor has accepted the **following curriculum under B.Voc. programme viz: Certificate, Diploma, Advanced Diploma and B.Voc. Degree** in his emergency powers under section 12(7) of the Maharashtra Public Universities Act, 2016 on behalf of the Academic Council as appended herewith:

1.	B.Voc. Industrial Automation,
2.	B.Voc. Automobile Technology,
3.	B.Voc. Farm Equipment and Machinery,
4.	B.Voc. I.T.Skills and Software Development,
5.	B.Voc. Architectural Planning and Interior Design,
6.	B.Voc. Dairy Products,
7.	B.Voc. Drill Technology,
8.	B.Voc. Plant Tissue Culture and Green House Technology,
9.	B.Voc. Renewable Energy Source,
10.	B.Voc. Computer Hardware & Networking Maintenance.
11.	B.Voc.Food Processing and Preservation.
12.	B.Voc. Sustainable Agriculture.
13.	B.Voc. Bioproducts technician

This is effective from the Academic Year 2018-2019 and onwards.

This curriculum are also available on the university website www.bamu.ac.in

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

University Campus,
Aurangabad-431 004.
Ref.No.
SU/B.Voc/2018/21709-22148
Date:- 12-12-2018

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12.12.18
Deputy Registrar,
Syllabus Section.

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Copy forwarded with compliments to :-

1] **The Principals, affiliated concerned Colleges, Dr. Babasaheb Ambedkar Marathwada University.**

2] **The Director, University Network & Information Centre, UNIC, with <u>a request to upload this Circular on University Website.</u>**

Copy to :-

1] The Director, Board of Examinations & Evaluation, Dr.BAMU,A'bad.
2] The Section Officer, [BCS Unit] Examination Branch,
3] The Section officer, [Eligibility Unit], Dr.BAMU,A'bad.
4] The Programmer [Computer Unit-1] Examinations, Dr.BAMU,A'bad.
5] The Programmer [Computer Unit-2] Examinations, Dr.BAMU,A'bad.
6] The In-charge, [E-Suvidha Kendra], Rajarshi Shahu Maharaj Pariksha Bhavan, Dr. Babasaheb Ambekar Marathwada University.
7] The Public Relation Officer, Dr.BAMU,A'bad.
8] The Record Keeper. Dr.BAMU,A'bad.

DR. BABASAHEB AMBEDKAR MARATHWADA UNIVERSITY, AURANGABAD.

Curriculum of

B.Voc. Plant Tissue Culture and Green House Technology

Three Years

UNDER THE FACULTY OF SCIENCE & TECHNOLOGY.

[Effective from 2018-19 & onwards]

3yrs degree course in

Plant Tissue Culture and Green House Technology

SYLLABUS

Course content

Name of the course- Degree course in plant tissue culture and green house technology.

Duration- 3 year (6 semesters) **Credits- 180**

Eligibility- 12th Pass **NSQF level-7**

Semester I

(Fundamentals of cell) **(18 Credits)**

(Cell Architecture and origin)

Discovery of Cell, Structure of Eukaryotic and Prokaryotic cell, Endosymbiotic origin of Eukaryotic cell.

(Cellular Organelles)

Ultra-structure and functions of Plasma Membrane, Golgi Complex, Endoplasmic Reticulum, Vacuoles, Lysosomes, Chloroplast, Mitochondria.

(Cell Structures)

Ultra-structure and functional aspects of Nuclear Envelope, Cytoskeletal structures, Chromosomal organization.

(Cell Signaling)

Cell-Cell Interaction, G-protein coupled reactions, Secondary Messengers, Growth factors in cell signaling, Na-K Atpase pump.

(Cell Differentiation)

Phenomenon of Cell Differentiation, Totipotency, Factors affecting cellular Differentiation, Experimental basis of cell differentiation.

(Media and Culture Preparation)

Role of Micro and macro nutrients, Vitamins and carbon source in tissue culture,Types of media MS, B5, SH,WPM,NN etc ,Media preparation- pH, Temprature, Solidifying agents, Slant Preparations etc. Maintenance of cultures, Environmental Conditions, explants characteristics. Explants selection, sterilization and inoculation; culture initiation.

Semester I Practical **(12 credits)**

1)Preparation of various Tissue culture media (MS,B5, Gamber's etc.)

2) Effect of Growth Hormones on organogenesis.

a) In vitro shoot initiation, differentiation and multiplication

b) Callus induction and differentiation.

c) Root initiation and differentiation.

3) Single cell culture.

4) Shoot tip, auxillary bud, Meristem culture.

5) Propagation of horticultural.

Semester II

(Basic Plant Tissue Culture) **(18 Credits)**

(Introduction to Plant Tissue culture)

Introduction to Plant Tissue culture, Terms and definitions, Historical background, Laboratory organization, Tools and techniques, methods of sterilization. Laboratory contaminants- it's control and measures.

(Initiation of culture)

Induction and growth parameters;

Culture initiation, Callusandcell suspension culture, Micropropagation through various explants (Leaf, Stem, Axillary bud, Tuber, Corms and Bulbills). Organogensisis and somatic embryogenesis, Anther and ovary culture, microspore culture, Meristem culture etc., development of haploids and doubled haploids.

(Culture techniques)

Explants selection, sterilization and inoculation; Various media preparations; MS, B5, SH PC L-2; Callus and cell suspension culture.

Semester II Practical **(12 credits)**

1) Propagation of Medicinal plants.

2) Propagation of Aromatic plants.

3) Hardening methods and their utility.

4) Effect of growth regulators on seed germination.

Semester III

(Initiation of Cultures) **(18 Credits)**

Induction and growth parameters; Culture initiation, Callus culture., Micropropagation through various explants (Leaf, Stem, Axillary bud, Tuber, Corms and Bulbills).

(*In-vitro* Fertilization)

Role of Ovary and ovule in *In-vitro* Fertilization in production of agricultural and horticultural crops. Techniques and significance of Androgensis and Gynogenesis (ovary, ovule, egg, synergids culture).

(Micropropagation)

Micropropagation and its Applications; Types, Stages, Establishment of propagated plants, micropropagation for large scale multiplication of crop plants, forest trees, medicinal plants and ornamentals.

(Germplasm preservation)

Germplasm preservation- Definition, Importance and Methods, *In-situ* and *Ex-situ* conservation, Centers of germplasm preservation in India.

Rooting; In Vitro and Exvitro rooting, media and growth hormones for rooting etc.

(Hardening)

Hardening: Hardening stages, Role of Polyhouse, Net House, Compost, Chemical fertilizer, Cocopit, Soil in hardening.

(Commercial Floriculture)

Floriculture – commercial aspects of floriculture – Production of cut flowers and home floriculture.

Disease and pest control in gardening- Fungicides and pesticides.Plant growing problems and their control, cold house storage.

(Commercial Horticulture)

Propagation of Horticultural crops by tissue culture techniques such as Banana, Sugarcane, Papaya, Mango, grapes and Medicinal and Aromatic plants of economic importance.

Semester III

Project Based on Tissue culture technique **(12 credits)**

Semester IV

Basics of Controlled Environment Agriculture **(18 Credits)**

Definition, concept, and history, Characteristics of controlled environment plant production. Current status and trends in greenhouse industry

Environmental Modifications

Greenhouse structure and construction, Greenhouse cover materials. Bench construction and space utilization. Greenhouse heating, cooling, and ventilation. Lights and lighting. Carbon dioxide enrichment.

Semester IV Practical **(12 credits)**

a) Construction of Green House

b) Environmental controlling and installation.

c) Lights and Lighting construction.

d) Gases regulation.

e) Production of selected floral and vegetable crops

f) Handling of soil, water, and plant tissue analysis

g) Fertilizer concentration calculations

h) Cleaning and Maintenance.

Semester V

Greenhouse Production Technology **(18 Credits)**

Growing media. Greenhouse irrigation methods. Plant nutrients and fertilization. Chemical growth regulation. Insect and disease control. Hydroponics and substrate cultures.

Importance & scope of post harvest management of fruits and vegetables in Indian economy.

Post harvest handling: factors affecting quality, factors responsible for deterioration of horticultural produce and post harvest losses, causes of postharvest losses .

Hardening and delaying ripening process- factors responsible for hardening and delaying ripening

Handling of important vegetables -Morphology, structure and composition of fruits and vegetables 5 Unit 5. Standards and specifications for vegetables for market .

Primary processing for sorting and grading.

Post-harvest treatment and pre-cooling, pre-storage treatments.

Practicals Sem IV **(12 credits)**

1. Study of Good Cultivation Practices of Cut Flowers.
2. Judging maturity indices of Flowers.
3. Packaging material – types of packaging for cut flowers.
4. Drying of Various Flowers.
5. Study of Methods of Harvesting of Cut Flowers.
6. Study of Handling of Cut Flowers.
7. Study of Pre-Packaging of Cut Flowers.
8. Dtidy of Post-Packaging of Cut Flowers.

Semester VI

Greenhouse maintenance and harvesting **(18 Credits)**

Importance & scope of post harvest management of cut flowers in Indian economy.

Post harvest handling: factors affecting quality, factors responsible for deterioration of horticultural produce and post harvest losses, causes of postharvest losses .

Handling of important cut flowers -Morphology, structure.

Standards and specifications for vegetables for market.

Prepackaging; sorting and grading,treatment and pre-cooling, pre-storage treatments.

Packaging, marketing of cut flowers.

Semester VI **Project Based on Green house technology** **(12 credits)**