



बाबासाहेब भीमराव अम्बेडकर विश्वविद्यालय
विद्या विहार, रायबरेली रोड, लखनऊ-२२६०२५
BABASAHEB BHIMRAO AMBEDKAR UNIVERSITY
(A Central University)
Vidya Vihar, Rae Bareilly Road, Lucknow-226025

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NOTICE

This is to inform all concerned that the Department of Horticulture is offering the following 02 Optional papers. Any one of these can be opted by any student of the university under the Choice Based Credit System (CBCS) being followed by the university. The details of papers are as under:

Sl. No.	Paper Code	Paper Name	Semester	No. of Credits
PG Course				
1	HORT-205	Biotechnology of Horticultural Crops	II	4 Cr (3 + 1)
UG Course				
2	FLG-205	Hi-tech Horticulture	II	4 Cr (3 + 1)

For further details regarding Time-Table kindly see the notice board of the Department. For more details please contact for the course of HORT-205 (Prof. Deepa H. Dwivedi) and FLG-205 (Dr. R. S. Verma), Department of Horticulture.

Head
Department of Horticulture

Copy to:

- 1) The AR to V.C., BBAU, Lucknow
- 2) The P.S. to Registrar, BBAU, Lucknow
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- 5) The Dean, SAST, BBAU, Lucknow
- 6) All Heads/Coordinators/Dean with a request to give it a wide publicity among the stakeholders.
- 7) Notice Board of the Department.
- 8) I/c University Website for its uploading on University website.
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25/3/2021

Head
24/3/2021
Department of Horticulture

HORT-205: BIOTECHNOLOGY OF HORTICULTURAL CROPS

4 Cr. (3 + 1)

Objective: Understandings the principles, theoretical aspects and developing skills in biotechnology of horticultural crops

Theory

UNIT I

Harnessing bio-technology in horticultural crops, influence of plant materials, physical, chemical factors and growth regulators on growth and development of plant cell, tissue and organ culture.

UNIT II

Callus culture types, cell division, differentiation, morphogenesis, organogenesis, embryogenesis.

UNIT III

Use of bioreactors and *in vitro* methods for production of secondary metabolites, suspension culture, nutrition of tissues and cells, regeneration of tissues, ex vitro, establishment of tissue cultured plants.

UNIT IV

Physiology of hardening- hardening and field transfer, organ culture- meristem, embryo, anther, ovule culture, embryo rescue, somaclonal variations, protoplast culture and fusion.

UNIT V

Construction and identification of somatic hybrids and cybrids, wide hybridization, *in vitro* pollination and fertilization, haploids in vitro mutation, artificial seeds, cryopreservation, rapid clonal propagation, genetic engineering in horticultural crops, use of molecular markers. *In vitro* selection for biotic and abiotic stress, achievements of biotechnology in horticultural crops.

UNIT-VI

Exposure to commercial tissue culture industry/organizations. Visit to biotech park, project preparation to establish a commercial biotech laboratory.

Practical

An exposure to low cost, commercial and homestead tissue culture laboratories, media preparation, inoculation of explants for clonal propagation, callus induction and culture, regeneration of plantlets from somaclonal variation, *in vitro* mutant selection against abiotic stress, protoplast culture, fusion technique, development of protocols for mass multiplication, project development for establishment of commercial tissue culture laboratory.

Suggested Readings

- Bajaj, YPS. (Ed.). 1989. *Biotechnology in Agriculture and Forestry*. Vol. V, Fruits. Springer.
- Brown, TA. 2001. *Gene Cloning and DNA Analysis and Introduction*. Blackwell Publ.
- Chopra, VL and Nasim, A. 1990. *Genetic Engineering and Biotechnology-Concepts, Methods and Applications*. Oxford and IBH.
- Gorden, H and Rubsell, S. 1960. *Hormones and Cell Culture*. AB Book Publ.
- Keshavachandran, R and Peter, KV. 2008. *Plant Biotechnology: Tissue Culture and Gene Transfer*. Orient and Longman (Universal Press).
- Keshavachandran, R, Nazeem, P.A., Girija D, John PS and Peter KV. 2007. *Recent Trends in Biotechnology of Horticultural Crops*. Vols. I, II. New India Publ. Agency.
- Parthasarathy, V.A., Bose, T.K., Deka, P.C., Das P, Mitra SK and Mohandas S. 2001. *Biotechnology of Horticultural Crops*. Vols. I-III. Naya Prokash.
- Pierik, R.L.M., 1987. *In vitro Culture of Higher Plants*. Martinus Nijhoff Publ.
- Skoog, F and Miller CO. 1957. *Chemical Regulation of Growth and Formation in Plant Tissue Culture in vitro*. *Symp. Soc. Exp. Biol.* 11:118-131.
- Vasil, TK, Vasi M, While DNR and Bery HR. 1979. *Somatic Hybridization and Genetic Manipulation in Plants*. *Plants Regulation and World Agricultural*. Planum Press.
- Williamson, R. 1981-86. *Genetic Engineering*. Vols I-V. Academic Press.

Theory:

Introduction & Importance, Nursery Management and mechanization, micro propagation of horticultural crops, Modern field preparation and planting methods, protected cultivation advantages, controlled conditions methods and techniques, micro irrigation systems and its components: EC, pH based fertilizers scheduling, canopy management, high density orcharding, components of precision farming, remote sensing, geographical information system (GIS), Differential Geo-positioning System (DGPS), Variable Rate applicator (VRA), Application of precision farming in horticultural crops (fruits, vegetables and ornamental crops), mechanized harvesting of produce.

Practicals:

Types of polyhouses and shade net house, intercultural operations, tools and equipments identification and application, Micro-propagation, Nursery Protrays, Micro-Irrigation, EC, pH based fertilizers scheduling, canopy management, visit to hi-tech orchard/nursery.

Suggested Readings:

- Bhattacharjee SK. 2006. *Advances in Ornamental Horticulture*. Vols. I-VI. Pointer Publ.
- Bose TK & Yadav LP. 1989. *Commercial Flowers*. Naya prokash.
- Bose TK, Maiti RG, Dhua RS & Das P. 1999. *Floriculture and Landscaping*. Naya Prokash.
- Chadha KL. 1995. *Advances in Horticulture*. Vol . XII. Malhotra Publ. House.
- Lauria A & Victor HR. 2001. *Floriculture –Fundamentals and practices* Agrobios.
- Nelson PV. 1978. *Green House Operation and Management*. Reston Publ. Co.
- Prasad S & Kumar U. 2003. *Commercial Floriculture*. Agrobios .
- Randhawa GS & Mukhopadhyay A, 1986. *Floriculture in India*. Allied Publ.
- Reddy S, Janakiram B, Balaji T, Kulkarni S &Mishra RL. 2007. *High-tech Floriculture*. Indian Society of Ornamental Horticulture, New Delhi.