

B.Sc. Botany, Sixth Semester Practical- 6.1

Code: BOT-601

Univ Code:

Contact Hours: 50 Hours

Workload: 3 hours per week

Credit Points:

Evaluation: Continuous Internal Assessment - 30 marks

Semester and Examination- 70 marks

Paper: VII – Plant Breeding, Biotechnology and Plant Tissue Culture

Unit 1. Plant Breeding: Principles and objectives: Methods of plant breeding (Mass selection, Single plant or pure line selection, clonal selection, progeny selection, recurrent selection).

Significance of plant breeding – increase in yield, resistance to diseases and insect pests. Plant breeding in producing new and improved varieties of medicinal plants and economically important plants. Pollen banks, Quarantine methods, industrial importance and its maintenance. **12 Hrs**

Unit 2. Hybridization: Objectives, techniques of emasculation, artificial pollination, intraspecific and intergeneric crosses. **Propagation** – Cutting, Gooting (air layering), Grafting, Wedge grafting, approach grafting, bud grafting. **06 Hrs**

Unit 3. Biotechnology: - Introduction, Scope of Genetic Engineering (DNA technology), Tools and techniques in recombinant DNA technology, DNA finger printing and its applications. Production of Polyclonal and Monoclonal antibodies. Gene therapy & Stem cell culture. Genetic manipulation through tissue culture, Gene mapping.

Application of Biotechnology - in pharmaceutical, agriculture, industrial, environmental oil spill (Green peace movement, Waste disposal management and sewage water treatment). ELISA method to detect plant diseases.

Transgenic plants – BT Cottons, Tomato, *Arabidopsis thaliana* **17Hrs**

Unit 4. Tissue Culture: Aim and scope, Totipotency, callus culture, organogenesis through callus culture, somatic embryogenesis, haploid culture (Example anther culture). Application of tissue culture in agriculture and human welfare. **05 Hrs**

Reference Books :-

1. Chahal. Principles and procedures of Plant Breeding. L.B. Publications.
2. Gopalakrishnan, T.S., Itta Sambasivaiah and Kamalakar Rao. Principles of organic evolution
3. Gupta, P.K. Cytology, Genetics and Evolution. Rastogi publications, Meerut .
4. Khanna, S.S. Genetics, Heridity and Evolution.
5. Sinha and Sinha. Cytogenetics, Plant Breeding and Evolution. Vikas Publications.
6. Joshi, P. Genetic engineering and its applications. Panima Book Distribution, Bangalore.
7. Menetre, S.S. Molecular basis of cytoplasmic male sterility in crop plants. International Book Distribution.
8. Purohit, S.S. Molecular Biology and Biotechnology. Daya Publishing House, New Delhi.
9. Ratledge. Basic Biotechnology. L.B. Publications.
10. Sawahel and Wagley, 1997. Plant Genetic Engineering. Daya Publishing House, New Delhi.
11. Vyas, S.P. and Kohi, D.V. Methods in Biotechnology and Bioengineering. Daya Publishing House, New Delhi.
12. Yadav. Biotechnology. L.B. Publications.
13. Vasil, I.K. and Thorpe, T.A. 1994. Plant Cell and Tissue Culture. Kluwer Academic Publishers, The Netherlands.

14. Bhojwani, S.S. 1990. Plant Tissue Culture: Applications and Limitations. Elsevier
 15. Collins, H.A. And Edwards, S. 1998. Plant Cell Culture. Bios Scientific Publishers, Oxford, UK.
 16. Old, R.W. and Primrose, S.B. 1989. Principles of Gene manipulation. Blackwell Scientific Publications, Oxford, UK.

B.Sc. Botany, Sixth Semester Plant Breeding, Biotechnology and Plant Tissue Culture Practical Question Paper – 6.1

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| Time: 3 Hrs | Max Marks: 40 |
| Q1- Show the technique of Hybridization - 'A' | 05 |
| Q2. Procedure of the inoculation techniques 'B' or MS media preparation procedure | 05 |
| Q3. Comment on C, D, E and F | 16 |
| Q4. Project work – Submission of any one topic you have studied from (I semester to VI semester) | 09 |
| Q5. Records | 05 |
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| Total | 40 |

**B.Sc. Botany, Sixth Semester
 Plant Breeding, Biotechnology and Plant Tissue Culture
Scheme of Evaluation Paper – 6.1**

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| 1. 'A' – Technique of hybridization Emasculation and bagging | 05 |
| 2. 'B' Procedure of MS media or method of inoculation | 05 |
| 3. 'C' - Biotechnology Products – Antibiotics, Rhizobium, Penicillin 'D' - Photographs from Genetic Engineering 'E' - Photographs or charts from plant breeding, Biotech and genetic engineering. 'F' - Plant propagation – Cutting, Gooting, Layering, Budding | 16 |
| 4. Project work – Submission of any 01 topic you have studied from 1semester to 6 th Semester | 09 |
| 5. Record Submission | 05 |
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| Total | 40 |