

# Devi Ahilya Vishwavidyalaya Indore (M.P.)

Department of Higher Education, Govt. of M.P.

Post Graduate Semester wise Syllabus

As recommended and Approved by Board of Studies D.A.V.V.

उच्च शिक्षा विभाग, म.प्र. शासन

स्नातकोत्तर कक्षाओं के लिये सेमेस्टर अनुसार पाठ्यक्रम


अध्ययन मण्डल देवी अहिल्या विश्वविद्यालय द्वारा अनुशंसित तथा अनुमोदित

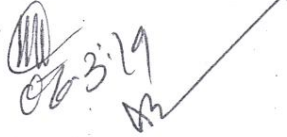
Session (सत्र)

2019-20

## M.Sc. Botany First Semester

Course No.	Name of the Course	Total
PG 101	Biology and Diversity of Viruses, Bacteria and Fungi	85 + CCE 15 = 100
PG 102	Biology and Diversity of Algae and Bryophytes	85 + CCE 15 = 100
PG 103	Biology and Diversity of Pteridophytes and Gymnosperms	85 + CCE 15 = 100
PG 104	Ecology and Environment	85 + CCE 15 = 100
PG 105	Practical I. based on Course PG 101 and 104	50
PG 106	Practical II. based on Course PG 102 and 103	50
	Total	500



  
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Session (सत्र) 2019-20

M. Sc. Botany (Semester System)

First Semester

Course PG 101: **Biology and Diversity of Viruses, Bacteria and Fungi** 85+ 15

- UNIT I **Viruses:** Characteristics and ultra-structure of virions, isolation and purification of viruses; chemical nature of viruses; replication, transmission and economic importance of viruses. Viral diseases of plants.
- UNIT II **Prokaryotes:** Archaeobacteria, Eubacteria, Actinomycetes and Mycoplasma: General characters, ultra-structure, nutrition, classification, reproduction, transmission, plant diseases and their control measures. Cyanobacteria: salient features, ultra-structure and biological importance.
- UNIT III **Mycology:** General characters, substrate relationship of fungi, cell ultra-structure, thallus organization, mode of nutrition (saprophytic, parasitic, symbiotic) and reproduction. Heterothallism and parasexuality. Economic importance of fungi.
- UNIT IV **Mycology:** Classification (Ainswarth, 1973; Alexopoulous *et.al.* 1996), General account of Mastigomycotina and Zygomycotina. Fungi as biocontrol agent.
- UNIT V **Mycology:** Diagnostic features and general account of Ascomycotina, Basidiomycotina and Deuteromycotina. General account of Heterokariosis, Mycorrhiza, Symbiosis and some important fungal diseases of plants.

## Suggested Readings

1. Alexopoulus, C.J. Mims, C. W. and Blackwel, M; 1996: Introductory Mycology, Ibon Wiley and Sons Inc.
2. Clifton, A; 1958: Introduction to Bacteria, McGraw- Hills Book Co. New Delhi.
3. Madigan, M T. Martinko, J. M and Parker Jack; I 997: Brock Biology of Microorganisms, (8<sup>th</sup> edition) Prentice Hall, N,J. U.S.A
4. Mandahar, C. L.; 1978: Introduction to Plant Viruses. Chand and Co.Ltd. Delhi.
5. Mehrotra, RS. and Aneja, RS.; 1998: An Introduction to Mycology. New Age Intermediate Press.
6. Rangaswamy, G. and Mahadevan, A; 1999: Diseases of Crop Plants in India (4<sup>th</sup> edition).Prentice Hall of India Ltd. New Delhi.
7. Webster, J.; 1985: Introduction to Fungi Cambridge University Press.
8. Dubey, R C. and Maheshwari, D. K.; 2005: A Text Book of Microbiology, S. Chand Publisher, New Delhi

  
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Session (सत्र) : 2019-20

M. Sc. Botany (Semester System)

First Semester

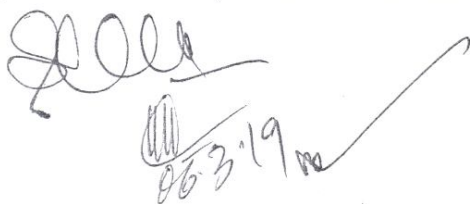
Course PG 102: Biology and Diversity of Algae and Bryophytes

85+15

- UNIT I: **Algae:** General characters, diversified habitats (terrestrial, freshwater, marine); thallus organization, cell ultra-structure; criteria of classification (pigments, reserve food, flagella); economic importance (as food, feed, industry, algal blooms and bio-fertilizer); salient features of Protochlorophyta.
- UNIT II: **Algae:** Salient features, classification, reproduction and economic importance of Chlorophyta, Charophyta and Xanthophyta.
- UNIT III: **Algae:** Salient features, classification, reproduction and economic importance of Bacillariophyta, Phaeophyta and Rhodophyta.
- UNIT IV: **Bryophyta:** General characters, distribution, classification, vegetative propagation, sexual reproduction, alternation of generation and ecological importance of Bryophytes. General account of Sphaerocarpaceae, Marchantiales and Jungermanniales.
- UNIT V: **Bryophyta:** General account of Anthocerotales, Funariales, Sphagnales, Andraeales and Polytrichales.

## Suggested Readings

1. Smith G. M., Cryptogamic Botany VolII (2nd edition)-Tata McGraw-Hill Publishing Company Ltd. Bombay -New Delhi.
2. Kumar H. D. 1988., Introductory Phycology. Affiliated East-West Press Ltd. New Delhi.
3. Parihar, N.S. 1991., Bryophyta. Central Book Depot. Allahabad.
4. Brower, 1926., Primitive Land Plants- Cambridge At the University Press.
5. Kashyap, 1972., Liver worts of Western Himalayas and Punjab. Research co Publication.
6. Smith, G. M., Cryptogamic Botany Vol I (2nd edition), TataMc Graw -Hill Publishing Company, Bombay -New Delhi.
7. Puri P. 1980., Bryophyta -Morphology, Growth and Differentiation. Atmaram and Sons, Delhi.
8. Chopra and Kumar, 1988., Biology of Bryophyta; Wiley Eastern Ltd.
9. Ram Udar; 1970: An Introduction to Bryophyta; Shashidhar Malviya Prakashan.
10. Watson; 1968: Structure and life of Bryophyta; Hutchinson and Co. Ltd.

  
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Session (सत्र) 2019-20

M. Sc. Botany (Semester System)

First Semester

Course PG 103: Biology and Diversity of Pteridophytes and Gymnosperms 85+15

- UNIT I: **Pteridophyta:** General characters, classification, morphology, anatomy and life history of Pteridophyta. Evolution of stele, heterospory and origin of seed habit. Basic idea about Paleobotany. General account of Psilophytosida.
- UNIT II: **Pteridophyta:** Morphology, anatomy, reproduction of Psilopsida, Lycopsidea, Sphenosida and Pteropsida.
- UNIT III: **Gymnosperms:** General characters, morphology, anatomy, reproduction of Gymnosperms. Classification (Pant and Raizada; Bierhort), economic importance and evolution of Gymnosperms.
- UNIT IV: **Gymnosperms:** General account of Pteridospermales, distribution, morphology, anatomy and reproduction of Cycadeoidales, Corditales, Cycadales and Ginkgoales.
- UNIT V: **Gymnosperms:** Distribution, morphology, anatomy, reproduction and inter relationship of Coniferales, Ephedrales, Welwitschiales and Gnetales.

## Suggested Readings

1. Bhatnagar, S.P. and Moitra, A; 1996: Gymnosperms. New Age International Pvt. Ltd., New Delhi.
2. Singh H.; 1978: Embryology of Gymnosperms, Encyclopedia of Plant Anatomy X. Gebruder Borntraeger, Berlin.
3. Sporne K R; 1991: The Morphology of Gymnosperms; Hutchinson Univ. Library; London.
4. Foster A S. and Gifford E. M; Comparative morphology of vascular Plants; Vakils, Feffer, and Simons Private Ltd. Bombay.
5. Chamberlain; Gymnosperms -Structure and Evolution; CBS Publishers and Distributors Delhi.
6. Shukla A C. and Mishra S. P.; Essentials of Paleobotany; Vikas Publishing House Pvt. Ltd. Delhi-Bombay-:6angalore-Calcutta-Kanpur .
7. Campbell; 1939: The evolution of land plants; Stanford University.
8. Sporne, K.R. 1991. The Morphology of Pteridophytes.



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M. Sc. Botany (Semester System)

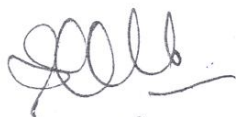

First Semester

Course PG 104:

Ecology and Environment

85+15

- UNIT I: **Ecology and Ecosystem:** definition, Trophic organization and structure, Food chains and webs; ecological pyramids, energy flow pathway, Ecological efficiencies, consumption, assimilation and production; Primary production - methods of measurement of primary production, Global patterns, Limiting factors.
- UNIT II: **Fate of matter in Ecosystems:** Recycling pathway, Relationship between energy flow and recycling pathways, Global biogeochemical cycles of C, N, P and S; Physical, chemical and biological characteristics of soil.
- UNIT III: **Ecosystem development and Stability:** Temporal changes, cyclic and non cyclic; Succession processes and types; Mechanism of succession facilitation, Tolerance and inhibition models; Concept of climax community. Ecological perturbation- natural and anthropogenic. Ecosystem restoration.
- UNIT IV: **Community organization:** Concepts of community and continuum; analysis of community, analytical and synthetic characters and community coefficients. Intra and Interspecific association, negative and positive Interaction and concept of ecological niche. Ordination concepts of biodiversity; evolution and differentiation of species. Allopatric and sympatric speciation; ecads and ecotypes.
- UNIT V: **Population ecology:** Population and Environment; density and distribution, Natality, Mortality, Survivorship curves, Age structure and pyramids, Fecundity schedules, Life tables; Population growth. Exponential and logistic curves; Intra specific competition and self regulation; r-and k-strategies.

  
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### Suggested Readings

1. Smith. R.L. 1996. Ecology and Field Biology. Harper Collins. New York.
2. Muller-Dombois. D. and Ellenberg. H.1974. Aims and Methods of Vegetation Ecology, Wiley, New York.
3. Begon. M., Harper, J.L. and Townsend, C.R. 1996. Ecology. Blackwell Science. Cambridge.
4. Ludwig. J. and Reynolds. J.F. 1988. Statistical Ecology. John Wiley and Sons.
5. Odum. E.P. 1971. Fundamentals of Ecology. Saunders, Philadelphia.
6. Odum, E.P. 1983. Basic Ecology. Saunders, Philadelphia.
7. Barbour, M.G., Burk, J.H. and Pitts, W.O. 1987. Terrestrial Plant Ecology. Cummings Publication Company, California.
8. Kormondy, E.J. 1966. Concepts of Ecology. Prentice-Hall of India Pvt. Ltd., New Delhi.
9. Chapman, J.L. and Reiss, M.J. 1988. Ecology: Principles and Applications. Cambridge University Press, Cambridge, U.K.
10. Moldan, B. and Billharz, S. 1997. Sustainability Indicators. John Wiley and Sons, New York.

  
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Session (सत्र) 2019-20

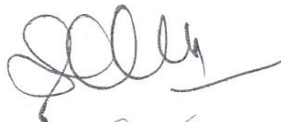
## Scheme of Practical Examination

M.Sc. I Sem. Botany (Practical – I)

(Based on PG 101 and 104)

- 2019-20

Time 4 hrs.	Maximum Marks	50
1. Microbiological exercise.	-	05
2. Study of Mycological Material.	-	10
3. Major ecological exercise.	-	10
4. Spotting (1-5)	-	10
5. Viva - Voce	-	05
6. Record and Sessional.	-	10
Total		50

  
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Session (सत्र) 2019-20

## Scheme of Practical Examination 2019-20

### M.Sc. I Sem. Botany (Practical – II)

(Based on PG 102 and 103)

Time 4 hrs.	Maximum Marks	50
1. Study of Algal Material.	-	06
2. Study of Bryophyta.	-	06
3. Study of Pteridophyta Material.	-	06
4. Detailed Study of Gymnosperm Material.	-	07
5. Spotting. (1-5)	-	10
6. Viva.	-	05
7. Record and Sessional.	-	10
Total		50

  
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Course No.	Name of the Course	Total
PG 201	Taxonomy of Angiosperms	85 + CCE 15 = 100
PG 202	Morphology and Anatomy of Angiosperms	85 + CCE 15 = 100
PG 203	Embryology and Reproduction of Angiosperms	85 + CCE 15 = 100
PG 204	Utilization and Conservation of Plant Resources	85 + CCE 15 = 100
PG 205	* Practical I. based on Course PG 201 and 202	50
PG 206	Practical II. based on Course PG 203 and 204	50
	Total	500

\*N.B.: PG 205 will include the following points:

1. Numbers of representative families (about 25) shall be taken up in the practical classes describing the plants up to species level.
2. Study of the primary and secondary anomalies in dicots and monocots.

Note: Excursion is compulsory for all students (Both local and out station) in Previous and Final year.

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Session (सत्र) - 2019-20

**M. Sc. Botany (Semester System)**

**Second Semester**

**Course PG 201:**

**Taxonomy of Angiosperms**

**85+15**

- UNIT I: **Principle and methods of Taxonomy:** Taxonomic hierarchy, species, genus, family and other categories, principle used in assessing relationship, delimitation of taxa and attribution of rank. Silent features of International Code of Botanical nomenclature. Taxonomic Tools- Herbarium, Floras, Botanical Gardens.
- UNIT II: **Taxonomic evidence and Phylogeny:** Anatomy, palynology, embryology, cytology, phytochemistry, genome analysis and nucleic acid hybridization in relation to taxonomy, different approaches and views of origin and evolution of Angiosperm.
- UNIT III: **Systems of Angiosperm classifications:** Phenetic versus phylogenetic systems, Bentham and Hooker's classification, Takhtajan's classification, APG system of classification, merits and demerits of above classifications.
- UNIT IV: **Taxonomic studies:** Magnoliaceae, Annonaceae, Papaveraceae, Capparidaceae, Caryophyllaceae, Meliaceae, Rosaceae, Myrtaceae, Cucurbitaceae and Cactaceae.
- UNIT V: **Taxonomic studies:** Rubiaceae, Asteraceae, Apocynaceae, Convolvulaceae, Acanthaceae, Verbenaceae, Orchidaceae, Zingiberaceae, Musaceae and Areaceae.

## Suggested Readings

1. Heywood and Moore, D.M; 1984: CWTent concept *in* Plant Taxonomy Academic Press.
2. Banson, L.B.; 1957: Plant Classification, Health and Co. Boston.
3. Davis, P.R and Heywood, V.H 1973: Principles of Angiosperms and Taxonomy, Robert E.
4. Kreiger Pub. Co. New York, USA
5. Eames, A.I.; 1961: Morphology of Angiosperms, Mc-Graw Hill, New York.
6. Jeffery, C.; 1968: An Introduction to Plant Taxonomy J. and H. Churchill Limited.
7. Lawrence, G .H.M.; 1951: Taxonomy of Vascular Plants Macmillan, New York.
8. Naik V. N.; 1984: Taxonomy of Angiosperms. Tata Mc-Graw Hill Pub. Co. Ltd. New Delhi.
9. Porter, L.L.; 1959: Taxonomy of Flowering Plants. San Francisco. Radfor~ A. E. Dickinson, W.C. Massey J.R and. Ben. C.R: 1974: VQ-llar Plant SYstematics, Harper and Row, New York

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Session (सत्र) : 2019-20

M. Sc. Botany (Semester System)

Second Semester

Course PG 202: Morphology and Anatomy of Angiosperms 85+15

- UNIT I **Floral morphology:** Types, origin and evolution of Inflorescence, Floral morphology, Flower: a modified shoot; genetics of floral organ (A,B,C models); Morphology of stamen and carpel and its evolution, inferior Ovary; Types and origin of placentation. Fruit types and its evolution.
- UNIT II **Shoot Apical Meristem:** Apical, lateral and intercalary meristems- their ultra structure and histochemistry of Shoot development. Organization of shoot apical meristem (SAM), secretory ducts and laticifers, Nodal Anatomy.
- UNIT III **Root Apical Meristem:** Organization of root apical meristem (RAM), cell fate and lineages, lateral roots, root hairs, secondary growth and root stem transition. Root-microbe interactions.
- UNIT IV **Leaf differentiation and Anatomy:** Leaf histogenesis, leaf meristem, differentiation of epidermis (with special reference to types of stomata and trichomes), mesophylls and vascular system of dicot and monocot leaf.
- UNIT V **Secondary growth and anomalies:** Secondary growth of stem and activity of cambium. Ultra structure and function of primary and secondary xylem (wood anatomy) and phloem. Wood development in relation to environmental factors. Nyctanthes, Boerhaavia, Bougainvillea, Mirabilis, Chenopodium, Bignonia, Leptadenia, Salvadora, Tinospora and Draceana stems.

## Suggested Readings :

1. Burgess.J.1985.An introduction to Plant Cell Development. Cambridge University Press, Cambridge.
  2. Fahn, A 1 982.Plant Anatomy. (3rd edition).Pergamon Press, Oxford.
  3. Fosket, D.E.1994. Plant Growth and Development. A Molecular Approach. Academic Press, San Diego.
  4. Lyndon, R.F.1990. Plant Development. The Cellular Basis. Unin Hyman. Lon Chandurkar P.J. Plant Anatomy.
  5. Vashishitha, P.C.,1999. Plant Anatomy.
  6. Pandey, B.P.,2004. Plant Anatomy
- Esau, K., 2006. Plant Anatomy.

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Session (सत्र) 2019-20

M. Sc. Botany (Semester System)  
Second Semester

Course PG 203: Embryology and Reproduction of Angiosperm 85 + 15

- UNIT I: **Development and Structure of Stamens:** structure and development of anther (Microsporangium), micro-sporogenesis and micro-gametogenesis, role of tapetum, pollen development and gene expression, male sterility, sperm dimorphism, Nemece phenomenon and pollen development in Cyperaceae.
- UNIT II: **Development and Structure of Pistil:** Types, structure and Development of Ovule; Mega-sporogenesis and mega-gametogenesis; Embryosac haustoria; Organisation and structure of Monosporic, bisporic, tetrasporic and Pollen embryo sacs.
- UNIT III: **Pollination:** Mechanism, types and vectors. Pollen tube growth and guidance, Pollen Stigma interaction. Self Incompatibility: SSI and GSI (cytological, biochemical and molecular aspects).
- UNIT IV: **Embryogeny:** Double fertilization and triple fusion; development, types and significance of Endosperm; Storage proteins of endosperm and embryo; Embryogenesis in monocots and dicots; Polyembryony and parthenocarpy.
- UNIT V: **Dynamics of fruit growth:** Dynamics of fruit growth: Biochemistry and molecular biology of fruit maturation; Apomixis; Seed development, biochemical aspects and seed germination.

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### Suggested Readings

1. Bhojwani, S.S. and Bhatnagar, S.P.2000. The Embryology of Angiosperms (4th revised and enlarged edition). Vikas Publishing House, New Delhi.
2. Burgess, J.1985.An introduction to Plant Cell Development. Cambridge University Press, Cambridge.
3. Fageri, K. and Van der Pijl,L1979. The Principles of Pollination Ecology. Pergamon Press, Oxford.
4. Fahn, A 1 982.Plant Anatomy.(3rd edition).Pergamon Press, Oxford.
5. Fosket, D .E.1994 .Plant Growth and Development. A Molecular Approach. Academic Press, San Diego.
6. Howell, S.H.1998. Molecular Genetics of Plant Development, Cambridge University Press, Cambridge.
7. Leins, P., Tucker, S.C. and Endress, P .K.1988.Aspects of Floral Development. J. Cramer, Germany.
8. Lyndon, R.F.1990.Plant Development. The Cellular Basis. Unin Hyman .London.
9. Murphy, T. M. and Thompson, W. E. 1988 Molecular Plant Development. Prentice Hall, New Jersey.
10. Proctor, M. and Yeo,P.1973.The Pollination of Flowers. William Collins Sons, London.
11. Raghvan, V.,1997 .Molecular Embryology of Flowering Plants. Cambridge University Press, Cambridge.
12. Raghvan, V., 1999. Development Biology of Flowering P Jants. Springer-verlag.
13. Houpt, A.W., 1953. Plant Morphology.
14. Bold, H.C., 1987. Plant Morphology.

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स्नातकोत्तर कक्षाओं के लिये सेमेस्टर अनुसार पाठ्यक्रम

अध्ययन मण्डल देवी अहिल्या विश्वविद्यालय द्वारा अनुशंसित तथा अनुमोदित

Session (सत्र) - 2019-20

M. Sc. Botany (Semester System)

Second Semester

Course PG 204: Utilization and Conservation of Plant Resources 85+15

- UNIT I: Organization of Resources:** Utilization of Resources from forest, grassland and aquatic habitat; World centers of primary diversity of domesticated plants; Secondary centers of origin. Threats to quality and quantity of Resources to overexploitation.
- UNIT II: Food Plants:** Botany, cultivation and uses of Cereals(Golden Rice, Recent hybrid varieties of Wheat and Maize); Pulses (Gram and Pigeon pea);Vegetables; Fruits; Beverages (Coffee); Oil Yielding Plants(sunflower) and Sugarcane. A brief account of Spices and Condiments.
- UNIT III: Timber and Non-wood timber plant:** General account of Petro crops and Forage. Important timber yielding plants; Non-wood timber forest products (NWFPs): Paper, Pulp, Gums, Tannins, Resins and Dyes. Fibres and fibre yielding plants (Cotton and Sunn Hemp). Plants used as avenue for shade, pollution control and aesthetics.
- UNIT IV: Conservation of resources:** Principles of Conservation, *in-situ* conservation: Sanctuaries, National parks, Habitat conservation practices, conservation for forests, ranges, soil and water; Ex-situ conservation- Botanical gardens, gene banks, seed banks and cryo-banks.
- UNIT V: Resource monitoring:** Remote sensing concepts and basic biosensors, Tools, Satellite remote sensing, Visual and digital interpretation, EMR bands and their applications; Indian remote sensing programme; thematic mapping of resources. Application of remote sensing in Ecology and Forestry.GIS.

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### Suggested Readings

1. Moldan, B. and Billharz, S. 1997. Sustainability Indicators. John Wiley and Sons, New York.
2. Treshow, M. 1985. Air Pollution and Plant Life. Wiley Interscience.
3. Heywood, V.H. and Watson, R.T. 1995. Global Biodiversity Assessment. Cambridge University Press.
4. Mason, C.F. 1991. Biology of Freshwater Pollution. Longman.
5. Hill, M.K. 1997. Understanding Environmental Pollution. Cambridge University Press.
6. Brady, N.C. 1990. The Nature and Properties of Soils. MacMillan.
7. Kothari, A. 1997. Understanding Biodiversity: Life Sustainability and Equity. Orient Longman.
8. Kohli, R., Arya, K.S., Singh, P.H. and Dhillon, H.S.; 1994. Tree Directory of Chandigarh. Lovedale Educational, New Delhi.
9. Nair, M.N.B. et. al (Eds) 1998. Sustainable Management of Non-wood Forest Products.
10. Faculty of Forestry, University Putra Malaysia. 434004 PM Serdang, Selangor, Malaysia.
11. Paroda, R.S. and Arora, R.K. 1991. Plant Genetic Resources Conservation and Management. IPGRI (Publication) South Asia Office, C/o NBPGR, Pusa Campus, New Delhi.
12. Pimentel, D. and Hall, C.W. (eds) 1989. Food and Natural Resources. Academic Press, London-New York.

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# Devi Ahilya Vishwavidyalaya Indore (M.P.)

Department of Higher Education, Govt. of M.P.

Post Graduate Semester wise Syllabus

As recommended and Approved by Board of Studies D.A.V.V.

उच्च शिक्षा विभाग, म.प्र. शासन

स्नातकोत्तर कक्षाओं के लिये सेमेस्टर अनुसार पाठ्यक्रम

अध्ययन मण्डल देवी अहिल्या विश्वविद्यालय द्वारा अनुशंसित तथा अनुमोदित

Session (सत्र) : 2019-20

Scheme of Practical Examination

M.Sc. II Sem. Botany

(Based on PG 201 and 202)

Taxonomy of Angiosperm

and

Morphology and Anatomy of Angiosperm

Time – 4 Hrs

Max. Marks - 50

1.	Major exercise based on anomalies of stem anatomy. -	10
2.	Major exercise based on Taxonomy. -	10
3.	Minor exercise based on RAM / SAM -	05
4.	Spotting 1 to 5 -	10
5.	Viva-Voce -	05
6.	Sessional/Record -	10

Total - 50

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# Devi Ahilya Vishwavidyalaya Indore (M.P.)

Department of Higher Education, Govt. of M.P.

Post Graduate Semester wise Syllabus

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Session (सत्र) 2019-20

Scheme of Practical Examination

M.Sc. II Sem. Botany

(Based on PG 203 and 204)

Embryology and Reproduction of Angiosperm

and

Utilization and Conservation of Plant Resources

Time – 4 Hrs

Max. Marks - 50

1.	Exercise based on Morphology of stamens and carpels.-	05
2.	Exercise based on Embryology/ Placentation.	05
3.	Morphology, anatomy and Economic Important. of any (Food/Forage/Fibre /oil Yielding)	10
4.	Exercise based on Non-wood timber Prescribed in Syllabus.	05
5.	Spotting 1 to 5	10
6.	Viva-Voce	05
7.	Sessional and Record	10

Total - 50

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## Devi Ahilya Vishwavidyalaya Indore (M.P.)

Department of Higher Education, Govt. of M.P.

Post Graduate Semester wise Syllabus

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Session (सत्र) : 2020-21

M.Sc. Botany

Third Semester

Course No.	Name of the Course	Total
PG 301	Plant Physiology	85 + CCE 15 = 100
PG 302	Biochemistry	85 + CCE 15 = 100
PG 303	Cell and Molecular Biology	85 + CCE 15 = 100
PG 304	Genetics and Biostatistics	85 + CCE 15 = 100
PG 305	Practical I – based on Course PG 301 and 302	50
PG 306	Practical II – based on Course PG 303 and 304	50
	Total	500

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Department of Higher Education, Govt. of M.P.

Post Graduate Semester wise Syllabus

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Session (सत्र) : 2020-21

## M. Sc. Botany (Semester System)

### Third Semester

Course PG 301: Plant Physiology 85+15

- UNIT I: **Plant water Relations** : Importance of water to plant ; plant water relations, diffusion, osmosis, concept of water potential ; absorption of water ; ascent of sap; transpiration , physiology of stomata ; mechanism of water transport through xylem .
- UNIT II: **Phloem transport**: Molecular mechanism of phloem, loading and unloading. Passive and active solute transport. Signal transduction over view, receptor-proteins, phospholipids signaling, role of cyclic nucleotides, Calcium calmodulin cascade.
- UNIT III: **Plant growth regulator and elicitors**: Physiological effects and mechanism of action of auxins, gibberellins, cytokinins, ethylene, abscisic acid, brassinosteroids, polyamines, Jasmonic acid and salicylic acid. Hormone receptors.
- UNIT IV: **Flowering process**: Photoperiodism and its significance. Endogenous clock and its regulation. Floral induction and development, Phytochrome and Cryptochrome and their photochemical and biochemical properties; Vernalization.
- UNIT V: **Stress Physiology** : Plant responses to biotic and abiotic stress, Water deficit and drought resistance. Salinity stress and resistance, Concept of freezing, heat and oxidative stresses.

  
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**Suggested Laboratory Exercise based on P.G. 301:**

1. Radioisotope methodology, autoradiography, instrumentation ( GM counter and scintillation counter) and principles involved .
2. Principles of colorimetry, spectrophotometry, and florimetry/calorimetry.
3. Determine rate of transpiration by Ganong's photometer.
4. Determine rate of respiration in germinating/young buds by Ganong's respirometer

**Suggested readings-**

1. Lodish, H.,Berk,A., Zipursky, S.L., Matsudaira, P., Baltimore, D. and Darnell, J.2000. Molecular cell biology (4<sup>th</sup> edition).W.H., Freeman and Company, New York USA.
2. Moore, T.C.1989. Biochemistry and Physiology of Plant harmones (2ed.). Sp[ringer-Verlag, New York USA.
3. Nobel,P.S.1999.Physiochemical and environmental plant physiology(2ed). Academic press, San Diego, USA
4. Salisbury. F.,B., and Ross, C.W .1991. Plant physiology 4<sup>th</sup> edition. Wdsworth Publishing CO. California USA.
5. Taiz, I. and Zeiger, E.1998. Plant Physiology(2<sup>nd</sup>.Ed.). Sinauer Associates Inc. Publisher MS.
6. Dennis, D.T. and Terpin, D.H. Lefevere DD and Layzell D.V. 1997. Plant Metabolism. 2ed. Longman England.
7. Buchanan, B.B.grulssem, W. and jones,R.L.2000. Biochemistry and Molecular Biology of Plants. American society of plants physiologists, Maryland USA.

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# Devi Ahilya Vishwavidyalaya Indore (M.P.)

Department of Higher Education, Govt. of M.P.

Post Graduate Semester wise Syllabus

As recommended and Approved by Board of Studies D.A.V.V.

उच्च शिक्षा विभाग, म.प्र. शासन

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Session (सत्र)

2020-21

**M. Sc. Botany (Semester System)**

**Third Semester**

**Course PG 302:**

**Biochemistry**

**85+15**

- UNIT I: **Fundamental Enzymology:** Nomenclature, Classification and characteristics of Enzymes, mechanism of enzyme action, Factors affecting enzymatic activities, cofactors, coenzyme, Allosteric mechanism, regulatory and active site, isoenzymes. Michalis Menton equation and its significance. Inhibition of enzymes - competitive, noncompetitive and mixed inhibition.
- UNIT II: **Photochemistry and photosynthesis:** General concept, evolution of photosynthetic apparatus, Photosynthetic pigments and photo-system, Photo-oxidation of water, mechanism of electron and proton transport. Carbon assimilation - Calvin cycle, photorespiration and its significance, C4 cycle. Factors affecting photosynthesis.
- UNIT III: **Respiration:** General Concept, Overview of plant respiration, Glycolysis, TCA cycle, Electron transport system and ATP synthesis, Oxidative phosphorelation, Pentose phosphate Pathway. Glyoxalate cycle, Structure and function of ATP.
- UNIT IV: **Lipid and Sulphate Metabolism:** Structure and function of lipids, synthesis of membrane lipid, structural and storage lipids; Fatty acid biosynthesis and oxidation(Ketone bodies), Sulphate uptake, transport and assimilation.
- UNIT V: **Nitrogen Metabolism:** Nitrogen uptake and Nitrogen metabolism over view, Nitrogen fixation mechanism, Nodule formation; Ammonium assimilation.

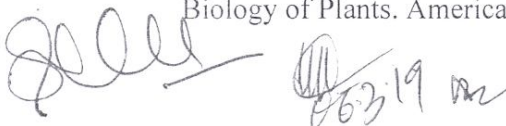
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**Suggested Laboratory Exercise based on P.G. 302.**

1. Effect of time and enzyme concentration on the rate of reaction of enzyme C e.g. acid phosphate, nitrate reductase.
2. Effect of substrate concentration on activity of any enzyme C (catalase, amylase).
3. Demonstration of the substrate inducibility of the enzyme nitrate reductase.
4. Determination of succinate dehydrogenase activity, its kinetics and sensitivity to inhibitors.
5. Separation of isoenzyme of esterase, peroxidases by native polyacrelamide gel electrophoresis.
6. To demonstrate photophosphorylation in intact chloroplast, resolve the phosphoproteins by SDS-PAGE and perform autoradiography desalting of proteins by gel filtration chromatography embaying Sephadex G-25.
7. Extraction of seed proteins depending upon the solubility.
8. Desalting of proteins by gel filtration chromatography employing Sephadex G-25.
9. Preparation of standard curve of protein and estimation of protein contents in extracts of plant material by Lowry's Bradford's method.
10. Fraction of proteins using gel filtration chromatography by Sephadex G-100 or Sephadex G-200.

**Suggested readings-**

1. Moore, T.C.1989. Biochemistry and Physiology of Plant harmones (2ed.). Sp [ringer-Verlag, New York USA.
2. Buchanan, B.B.grulssem, W. and jones, R.L.2000. Biochemistry and Molecular Biology of Plants. American society of plants physiologists, Maryland USA
3. Dennis, D.T. and Terpin, D.H. Lefevere DD and Layzell D.V. 1997. Plant Metabolism.2ed. Longman England.
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5. Nobel,P.S.1999.Physiochemical and environmental plant physiology(2ed) Academic press, San Diego, USA
6. Salisbury.. F.,B., and Ross, C.W .1991. Plant physiology 4<sup>th</sup> edition. Wdswort Publishing CO. California USA.
7. Taiz,I. and Zeiger,E.1998. Plant Physiology(2nd. Ed.).Sinauer AssociatesInc.Publisher MS.
8. Buchanan,B.B.grulssem,W. and jones,R.L.2000. Biochemistry and Molecular Biology of Plants. American society of plants physiologists, Maryland USA.

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Post Gradu.

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स्नातकोत्तर कक्षाओं के लि

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Session (सत्र)

M. Sc. Botany (Semester System)

Third Semester

Course PG 303:

Cell and Molecular Biology

85+15

ya Indore (M.P.)

Govt. of M.P.

Syllabus

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अनुसार पाठ्यक्रम

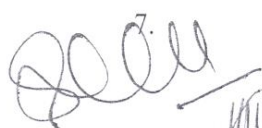
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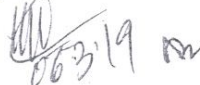
2020-21

- UNIT I: Cellular communication: Regulation of haematopoiesis, general principles of cell communication, cell adhesion and roles of different adhesion molecules, gap junctions, extra cellular matrix, integrins, neurotransmission and its regulation, cytodifferentiation and its types.
- UNIT II: DNA structures A, B and Z forms, DNA replication in prokaryotes and eukaryotes, plant promoters, structure of t-RNA, m-RNA and r-RNA. DNA damage and repair mechanism
- UNIT III: Fine structure of gene, Split gene, overlapping gene, jumping genes. Cis-trans test, Gene expression in prokaryotes and eukaryotes and gene regulation (Operon and repetitive DNA), Gene interaction, genetic code, central dogma.
- UNIT IV: Mechanisms of transcription, translation, initiation, elongation and termination in prokaryotes and eukaryotes and transcription factors. m-RNA splicing. Protein sorting and protein targeting, physical mapping–restriction mapping, sequenced tagged site (STS) mapping. Chromosome walking.
- UNIT V: Molecular techniques-basic concept, principles, technique and application, Gel electrophoresis. In situ hybridization, Southern blotting technique, Northern blotting technique, Western blotting technique and Dot blots technique; FISH, GISH.

**Suggested readings-**

1. Lewin, B. 2000, Genes VII Oxford University Press, New York.
2. Alberts, B., Bray, D., Lewis, J., Ratf, M., Roberts, K., and Watson, J.D. Molecular Biology of the Cell. Garland Publishing: Inc., New York.
3. Wolfe, S.L. 1993. Molecular and Cellular Biology, Wadsworth Publishing Co., California, USA
4. Rost, T. et. al. 1998. Plant Biology, Wadsworth Publishing Co., California, U.S.A
5. Krishanmurthy K V. 2000 Methods in Cell Wall Cytochemistry, CRC Press, Boca Raton, Florida U.S.A
6. Buchanan, B.B. Groissem, W. and Jones, RL. 2000. Biochemistry And Molecular Biology of Plants. American Society of Plant Physiologists, Maryland, USA
7. De, D.N. 2000: Plant Cell Vacuoles: An Introduction. CSIRO Publication, CollIJ18W~Australia.



  
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# Devi Ahilya Vishwavidyalaya Indore (M.P.)

Department of Higher Education, Govt. of M.P.

Post Graduate Semester wise Syllabus

As recommended and Approved by Board of Studies D.A.V.V.

उच्च शिक्षा विभाग, म.प्र. शासन

स्नातकोत्तर कक्षाओं के लिये सेमेस्टर अनुसार पाठ्यक्रम

अध्ययन मण्डल देवी अहिल्या विश्वविद्यालय द्वारा अनुशंसित तथा अनुमोदित

Session (सत्र) 2020-21

M. Sc. Botany (Semester System)


Third Semester

Course PG 304:

Genetics and Biostatistics

85+15

- UNIT I: **Mendelian genetics:** Monohybrid, dihybrid crosses, gene interaction, co-dominance and lethal allele, extra nuclear inheritance, chloroplatic DNA and mitochondrial DNA. Mechanism of genetic recombination, gene mapping in prokaryotes.
- UNIT II: **Genetics of eukaryotes:** Linkage phenomenon, detection of linkage through test cross, genetics recombination in eukaryotes. Crossing over, mechanism of genetics recombination. Hybrid DNA models, constructions of genetic maps using two point and three point test cross, tetrad analysis mitotic recombination.
- UNIT III: **Gene mutation:** Spontaneous, induced, physical, chemical mutagens and molecular basis of mutation. Importance of mutation. DNA damage and repair mechanism. Transposable genetic elements in prokaryotes and eukaryotes. Mutation by transposones.
- UNIT IV: **Nuclear DNA content:** c-Value paradox, cot curve and its significance, repetition and satellite DNA. 'in situ' hybridization of satellite DNA. Introns and their significance. Multigene family and their evolution.
- UNIT V: **Biostatistics:** Measurement of central tendencies, Standard deviation, standard error, Probability rules, t-text,  $X^2$  (chi-square) test, correlation, regression analysis and Binomial distribution.

  
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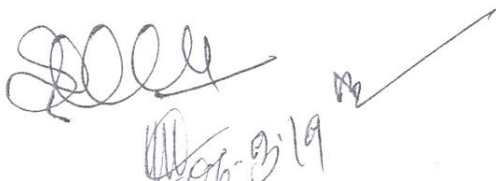


Suggested Laboratory Exercises based on course 303-

1. Isolation of DNA and preparation of cot curve.
2. Demonstration of Mitosis/Meiosis(normal and abnormal).
3. Determination of Mitotic index in various plant materials.
4. Exercise based on probability rules.
5. Genetic exercise on Mendel's laws, Monohybrid and Dihybrid crosses.
6. Numerical exercise on gene interactions.
7. Numerical on chi square test, F-test and central tendencies.
8. Numerical exercise on genetical mapping in Eukaryotes.
9. Experiments on mutation.
10. Demonstration of aneuploidy, polyploidy etc.

Suggested Readings-

1. Atherly, A.G. Girton, J.R. and Mc Donald, J.E.1999. The Science of Genetics: SaPosts college publishing, Fort Worth, USA.
2. Burnham, C.R.1962. Discussions in Cytogenetics, Burgess publishing Co. Minnesota.
3. Busch. H. and Rothblum. L.1982. Volume X. The cell nucleus rDNA part A. Academic press.
4. Hartl, D.L. and Jones, E.W.1998. Genetics: Principles and Analysis(4th edition). Jones and Bartlett publishers, Massachusetts, USA.
5. Hattl, D.L.and Jones, E.W.2006. Genetics:Principles and Analysis(5th edition). Jones and Bartlett publishers, Massachusetts, USA.
6. Khush, G.S.1973. Cytogenetics of Aneuploids. Academic press, New York, London.
7. Lewis, B.2000 Gene7. Oxford University Press, New York, USA.
8. Lewis,R.1997, Human, Genetics: Concepts and Application (2nd edition). WCB McGraw, Hill, USA.
9. Russel, P.J.1998. Genetics(5th edition). The Benjamin/Cummings publishing company Inc.,USA.
10. Snusted, D.P. and Simmons, M.J. 2000. Principles of Genetics(2nd edition). Jhon Wiley and Sons Inc., USA.
11. Snusted, D.P. and Simmons, M.J.2006 Principles of Genetics(3rd edition). Jhon Wiley and Sons Inc.,USA.
12. Lewin, B.2006, Genes 7, Oxford University press, New York.

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# Devi Ahilya Vishwavidyalaya Indore (M.P.)

Department of Higher Education, Govt. of M.P.

Post Graduate Semester wise Syllabus

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Session (सत्र) - 2020-21

Scheme of Practical Examination - 2020-21

**M.Sc. III Sem. Botany (Practical – I)**

(Based on PG 301 and 302)

Time : 4 hrs.

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1. Exercise based on Physiology	-	15
2. Exercise based on Biochemistry	-	10
3. Spot 1 to 5	-	10
4. Viva-Voce	-	05
5. Sessionals and Record	-	10

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Total - 50

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06-3-19

# Devi Ahilya Vishwavidyalaya Indore (M.P.)

Department of Higher Education, Govt. of M.P.

Post Graduate Semester wise Syllabus

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Session (सत्र)

2020-21

## Scheme of Practical Examination

2020-21

### M.Sc. III Sem. Botany (Practical – II)

(Based on PG 303 and 304)

Time: 4 hrs.

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1.	Exercise based on Cell and Molecular Biology	-	10
2.	Exercise based on Genetics	-	05
3.	Exercise based on Biostatistics	-	10
4.	Spot 1 to 5	-	10
5.	Viva-Voce	-	05
6.	Sessionals and Record	-	10

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Total - 50

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06-3/19

## Fourth Semester

2020-21

Course No.	Name of the Course	Total
PG 401	Biotechnology	85 + CCE 15 = 100
PG 402	Genetic Engineering and Genomics	85 + CCE 15 = 100
PG 403	Elective I*	85 + CCE 15 = 100
PG 404	Elective II*	85 + CCE 15 = 100
PG 405	Practical I – based on Course PG 401 and 402	50
PG 406	Practical II – based on Course PG 403 and 404	50
PG 407	Project work related to course Paper	100
	Total	600

Note: Excursion is compulsory for all students (Both local and out station) in Previous and Final year.

 06-3-19

# Devi Ahilya Vishwavidyalaya Indore (M.P.)

Department of Higher Education, Govt. of M.P.

Post Graduate Semester wise Syllabus

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Session (सत्र)

2020-21

M. Sc. Botany (Semester System)

Fourth Semester

Course PG 401:

Biotechnology

85+15

- UNIT I: **Plant Tissue Culture:** General introduction, History and scope and basic concepts, laboratory organization; media preparation and sterilization techniques, Nutrition of plant tissue - Growth limiting factors, Concept of cellular differentiation and totipotency, Types of culture, Embryo and endosperm culture, Induction and maintenance of callus and suspension culture.
- UNIT II: **Somatic embryogenesis:** Fundamental aspects of morphogenesis, study of differentiation through Organogenesis and Embryogenesis, Somatic embryogenesis, Zygotic vs. Somatic embryogenesis, Micropropagation, Advances and encapsulation of somatic embryo and shoot tip for artificial seeds and its applications. In vitro production of haploids for breeding and selection of mutants.
- UNIT III: **Protoplast culture:** Isolation, fusion, culture, hybrid selection and regeneration of Protoplast and possibilities with special reference to crop plants, Limitation of protoplast research, Somatic hybridization and selection mechanism for hybrids and cybrids, cell line selection through callus/suspension culture for the production of stress resistant plants, their application in crop improvement.
- UNIT IV: **Clonal variation:** Clonal Propagation; Somaclonal and Gemetoclinal variations, Large scale clonally propagation of plants, Cryopreservation and germplasm storage. Embryo and endosperm culture. Genetic manipulation of plants: *Agrobacterium tumefaciens* and *Agrobacterium rhizogenes*.
- UNIT V: **Applications of plant tissue culture:** Productions of transgenic plants, methods of transformation in plants, Applications of plant tissue culture in forestry, ornamental plants, disease free plants and in the production of secondary metabolites and natural products. Role of tissue culture in Agriculture.

PRACTICALS: Laboratory exercises corresponding to theory courses covering.

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# Devi Ahilya Vishwavidyalaya Indore (M.P.)

Department of Higher Education, Govt. of M.P.

Post Graduate Semester wise Syllabus

As recommended and Approved by Board of Studies D.A.V.V.

उच्च शिक्षा विभाग, म.प्र. शासन

स्नातकोत्तर कक्षाओं के लिये सेमेस्टर अनुसार पाठ्यक्रम  
अध्ययन मण्डल देवी अहिल्या विश्वविद्यालय द्वारा अनुशंसित तथा अनुमोदित

Session (सत्र)

2020-21

M. Sc. Botany (Semester System)

Fourth Semester

Course PG 402:

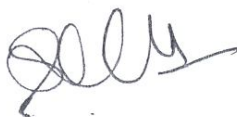
Genetic Engineering and Genomics

85+15

- UNIT I: **Basics concept:** Recombinant DNA technology and its Tools- Cloning Vectors (Plasmids, Bacteriophage M13 Cosmids, Phasmid, Lambda YACs, BAC Vectors), Restriction enzymes and others -Types and applications.
- UNIT II: **Cloning Methodology:** Gene cloning, principle and techniques; Construction of libraries, cDNA and genomic library. cDNA Genomic Cloning; Principle of DNA sequencing, Polymer Chain reaction; DNA finger printing.
- UNIT III: **Genomics:** Basic concept, types and strategies for genome analysis. DNA chips technology and microarrays; Genetic improvement of industrial microbes, Nitrogen fixers; Transcriptome; Rice Genome Project, Arabidopsis Genome Project.
- UNIT IV: **Proteomics:** Concept, methodology and application of Proteomics; Protein profiling. Bioinformatics basic concept and its application in biological science; Ribotyping.
- UNIT V: **Transgenic plants:** Strategies and methodology for development transgenic plants; Agrobacterium mediated gene transfer; Transposon tagging and direct gene transfer techniques. Ecological risk and ethical concern; Intellectual property rights.

## PRACTICALS:

Laboratory exercises corresponding to theory courses covering all units.



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# Devi Ahilya Vishwavidyalaya Indore (M.P.)

Department of Higher Education, Govt. of M.P.

Post Graduate Semester wise Syllabus

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Session (सत्र) 2020-21

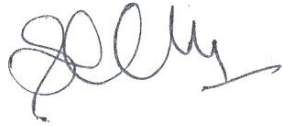
**M. Sc. Botany (Semester System)**

**Fourth Semester**

**403: List of Elective Papers.**

The student may opt any one of the following Elective paper (operative in the university/college) List of suggested Elective Papers.

1. Industrial Microbiology
2. Plant Taxonomy
3. Applied Mycology
4. Plants and Society



  
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# Devi Ahilya Vishwavidyalaya Indore (M.P.)

Department of Higher Education, Govt. of M.P.

Post Graduate Semester wise Syllabus

As recommended and Approved by Board of Studies D.A.V.V.

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Session (सत्र)

2020-21

M. Sc. Botany (Semester System)

Fourth Semester

Course PG 403: Industrial Microbiology (Elective Paper I)

85+15

- UNIT I:** Basic techniques in microbiology - Microscopy, staining techniques, Culture, Nutrition and growth of microorganisms. Replication and structure of viruses and other a cellular microorganisms, prokaryotic microorganisms, classification and diversity of Bacteria, Eukaryotic microorganisms.
- UNIT II:** Food Microbiology: Food spoilage, Food preservation methods, Microbiological production of food such as fermented products, alcoholic beverages, vinegar. Fermented vegetables. Single cell protein production in industry, fermented dairy products and uses.
- UNIT III:** Fermentation Industry: Selection of micro-organisms, Techniques and quality control, Production of antibiotics, steroids, Human proteins, Vaccines and vitamins. Survey of microorganisms of industrial uses. Production of organic acids, amino acids, Enzymes, Solvents and fuels.
- UNIT IV:** Microbial Products: Recovery of minerals by using microbes, Oil recovery, Biodeterioration, Mushroom culture, Biotech products including human insulin, Microbial Growth-Environmental influences, Physical control, Chemical control and Antibiotic controls.
- UNIT V:** Water quality in industry: Bacteriological safety of potable water, water quality analysis, importance of BOD. Biodegradation of wastes and pollutants, Primary, Secondary and Tertiary Sewage treatments.

## PRACTICALS

Laboratory exercises corresponding to theory courses covering all Units.

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# Devi Ahilya Vishwavidyalaya Indore (M.P.)

Department of Higher Education, Govt. of M.P.

Post Graduate Semester wise Syllabus

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Session (सत्र)

2020-2021

M. Sc. Botany (Semester System)

Fourth Semester

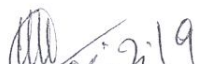
2020-21

Course PG 403: Plant Taxonomy (Elective Paper I)

85+15

- UNIT I:** **Concept of Plant Taxonomy:** Basic Aims, Principle, phases and significance of Taxonomy. Evolutionary trend of flower and in florescence. History of plant exploration work in India. Monophyly and polyphyly, Parallelism and convergence, Homology and Analogy, Primitive and advanced characters.
- UNIT II:** **Classification:** History and Types of classification (Artificial, Natural and phylogenetic system of classification). Principle, outline, merit and demerit of Bentham and Hooker: Engler and Prantle system of classification. Principle, outline merit and demerit of Hutchinson and Cronquist system of classification. Angiosperm phylogeny group system (APG) of flowering plant classification.
- UNIT III:** **Nomenclature and plant identification:** Principle of plant nomenclature, Binomial nomenclature. Rank of Taxa, Author citation, Nomenclatural Type, Rule of priority, Effective and valid publication, Rejection of Name. Methods of collecting plant: Field collections preparation of plant specimen, documentation of plant collection (Field site Data, Plant Data). Preparation of Herbarium specimens, Herbarium operations. Methods of Plant identification: Flora, Monograph, Taxonomic keys, written description, specimen comparison, image comparison, Expert determination.
- UNIT IV:** **Systematic of orders and tools of modern Taxonomy :** Taxonomy, Floral structure and phylogeny of order. Magnoliales, Rosales, Caryophyllales. Taxonomy, Floral structure and phylogeny of order Alismatales, Zingiberales, Orchidales. Numerical Taxonomy and its importance. Molecular characters and their importance in systematic.
- UNIT V:** **Plant Geography:** Botanical region of India. Speciation and species concept. Phenotypic plasticity, physical factors affecting phenotypic plasticity. Endemism and Endemic plants in India.





**Suggested Laboratory Exercise based on P.G. 403 :**

1. Comparison of different species of a genus or different genera of a family to calculate similarity Co-efficient and preparation of dendrograms.
2. Plant identification upto specie level.
3. Select a genus such as Ipomoea, with five or more species within the area for leaf variation study. Prepare a character taxon matrixe for leaf shape, apex, margin and lower surface, vestiture for each species .
4. Preparation of Artificial-key.
5. Field survey of plants.
6. Preparation of Harbarium of available common plants. (At least 50 plants).
7. Exercise on similar and Dissimilar character of plants.

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# Devi Ahilya Vishwavidyalaya Indore (M.P.)

Department of Higher Education, Govt. of M.P.

Post Graduate Semester wise Syllabus

As recommended and Approved by Board of Studies D.A.V.V.

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Session (सत्र)

2020-21

M. Sc. Botany (Semester System)

Fourth Semester

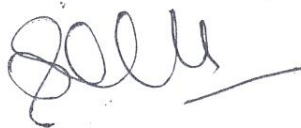
Course PG 403: Applied Mycology (Elective Paper I)


85+15

- UNIT I:** General Characteristics of Fungi. Taxonomic Status and classification of Fungi. Harmful activities of fungi-fungi as plant pathogens. Fungal disease of human-being and animals. Fungi involved in degradation of goods and spoilage of foodstuffs.
- UNIT II:** Fungi s food- Detailed account of edible fungi with special reference to Agaricus, Pleurotus, Geastrum, Lycoperdon, and mushroom toxins. Cultivation of mushroom. Yeast and single cell protein.
- UNIT III:** Fungi as medicines. Steroid bioconversion through fungi. Production of vitamins. Riboflavin, vitamin A Antibiotics Medicinal value of Ergot. Glycerol reduction.
- UNIT IV:** Fungi in industry. Baking Brewery and Dairy industry. Enzyme Production- Amylase, invertase, protease and cellulose. Production of Organic acid, Fumaric acid, Gluconic acid, Kojic acid.
- UNIT V:** Principles of Fungal disease management. Disease forecasting, Regulatory methods. Physical and cultural measures of disease management chemical and biological control methods. Fungi in agriculture – In improvement of soil fertility, Mycorrhiza. Laboratory Exercise based on theory Syllabus.

PRACTICALS:

Laboratory exercises corresponding to theory courses covering.



  
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# Devi Ahilya Vishwavidyalaya Indore (M.P.)

Department of Higher Education, Govt. of M.P.

Post Graduate Semester wise Syllabus

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Session (सत्र)

2020-21

**M. Sc. Botany (Semester System)**

**Fourth Semester**

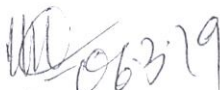
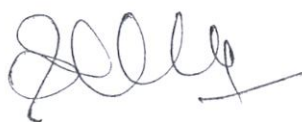
**Course PG 403: Plants and Society (Elective Paper I)**

**85+15**

- UNIT I:** History of plants and development of society, Role of plants in tracing human history, green revolution: benefits and adverse consequences. Innovations for meeting world food demands. Early domestication centers of major cultivated plants, Plants in Mythology, folklores Role of Ethno botany in relation to development of society.
- UNIT II:** Plants and Human Health, Usage of plants in different systems of medicine allopathic, Homeopathic Aurvedic, Herbal Medicine, and concept of Herbal Cosmetic. Plants as health hazards. Food spoilage. Viral, Bacterial and fungal diseases of human beings.
- UNIT III:** Plants in Entrepreneurial Areas-A: Techniques of cultivation and marketing of few Chlorophytum, Guggul, Commiphera wightii, Rauwolfia serpentina. Plants and other uses: Agriculture and Horticulture.
- UNIT IV:** Plants in Entrepreneurial Areas - B: Use of plants in earning livelihood - Such as Bamboos, Rattans, Raw Materials of papermaking, Gums tannins, dyes, resins and fruits. Techniques of cultivation and marketing of - Aromatic Plants - Lemon grass, plasma Rosa, Floriculture - rose and gladioli.
- UNIT V:** Plants in Entrepreneurial Areas - C: Techniques of cultivation and marketing of - Mushroom Cultivation, Nursery management, Vermiculture and Vermicompost. Mass cultivation of few plants using tissue culture techniques. Bonsai Techniques.

## PRACTICALS:

Laboratory exercises corresponding to theory courses covering all Units.



**Devi Ahilya Vishwavidyalaya Indore (M.P.)**

Department of Higher Education, Govt. of M.P.

Post Graduate Semester wise Syllabus

As recommended and Approved by Board of Studies D.A.V.V.

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2020-21

**M. Sc. Botany (Semester System)****Fourth Semester****404: List of Elective Paper -II**

The student may opt any one of the following Elective paper (operative in the university/college) List of suggested Elective Papers.

1. Plant pathology.
2. Molecular biology and biotechnology.
3. Pollution Ecology.
4. Ethnobotany.



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# Devi Ahilya Vishwavidyalaya Indore (M.P.)

Department of Higher Education, Govt. of M.P.

Post Graduate Semester wise Syllabus

As recommended and Approved by Board of Studies D.A.V.V.

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Session (सत्र)

2020-21

**M. Sc. Botany (Semester System)**

**Fourth Semester**

**Course PG 404: Plant Pathology (Elective Paper II)**

**85+15**

- UNIT I: Nature and concept of plant disease, impact of plant disease pathological terms and definitions. History and progress of plant pathology. Agents of infectious disease: Fungi Bacteria Mycoplasma and Viruses. Classification of plant disease. Symptoms of plant disease Methods of studying plant disease
- UNIT II: Phenomenon of infection prepenetration, penetration and development of pathogen inside the host. Role of enzyme, Toxins and hormones in pathogenesis. Defense mechanisms in plants: Structural defense, Biochemical defence. Effect of infection on physiology of the host plant.
- UNIT III: Genetics of Virulence in pathogen and of resistance in host plant, physiological specialization and its significance. Effect of environment on pathogenesis. Survival of plant pathogens. Dispersal of plant pathogens.
- UNIT IV: General principles of disease control. Chemical methods for plant disease control. Biological control. Chemotherapy. Breeding for disease resistance.
- UNIT V: Important disease of main crops of M.P. such as Wheat Barley, Jowar, Bajra, Potato, Pulses, Sugarcane, Oil-Seeds (Ground nut, Til and Lin seed). Vegetables, Fruits (Papaya, Mango, Guava, Lemon and Banana) and Cotton.

**PRACTICALS:**

Laboratory exercises corresponding to theory courses covering.

  
06-3/19  


Project (As per H.C.)

# Devi Ahilya Vishwavidyalaya Indore (M.P.)

Department of Higher Education, Govt. of M.P.

Post Graduate Semester wise Syllabus

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Session (सत्र) 2020-21

## M. Sc. Botany (Semester System)

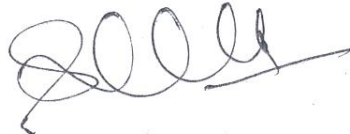
### Fourth Semester

Course PG 404: Molecular Biology and Biotechnology (Elective Paper II) 85+15

- UNIT I: Genetic material of prokaryotes and eukaryotes, properties, function, replication, transcription, reverse transcription, mechanism of gene expression in prokaryotes and eukaryotes, inhibition of gene expression.
- UNIT II: Biotechnology- History, scope, and achievements, genetic engineering, recombinant DNA technology, genetic engineering procedure enzymes and vectors, isolations of plasmid and chromosomal DNA, PCR, hybridization techniques-Southern, Northern, and Western blotting technology.
- UNIT III: History of tissue culture, Media preparation for plant tissue culture, plant tissue culture techniques, production of haploid, anther and pollen culture, organogenesis and embryogenesis, Transformation and growth of cell. somaclonal variation, Transgenic plant.
- UNIT IV: Monoclonal Antibody and hybridoma technology, Application of Biotechnology in Agriculture, Horticulture, Forestry, food and industries, health and immunology, environment, ethics of biotechnology.
- UNIT V: Instrumentation – Spectrophotometer, Electrophoresis, Chromatography, Microscopy, Importance of statistics in biological studies, test of significance based on small and large samples t, z, x<sup>2</sup>, And f test, Basic of computer and Bioinformatics, computer application in biology.

### PRACTICALS:

Laboratory exercises corresponding to theory courses covering.



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# Devi Ahilya Vishwavidyalaya Indore (M.P.)

Department of Higher Education, Govt. of M.P.

Post Graduate Semester wise Syllabus

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Session (सत्र),

2020-21

M. Sc. Botany (Semester System)

Fourth Semester

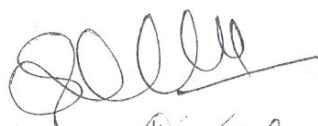
Course PG 404: Pollution Ecology (Elective Paper II)

85+15

- UNIT I: Pollution: Status and Concerns Classification of contaminants and pollutants. Brief account of major environmental disasters of the past. Indicator concept- biological indicators of pollution.
- UNIT II: Air pollution Sources and causes of air pollution. Effects of air pollution on flora and fauna, materials and structures, soil atmosphere, water bodies and on human health. Transport and dispersion of pollutants.
- UNIT III: Water Pollution Sources and causes of water pollution Status of water pollution in India and M.P. Water harvesting and recharging of water resources-concerns and remedies.
- UNIT IV: Soil pollution and other pollution types Causes and sources of soil pollution. Pesticides and heavy metal pollution-sources, causes and effects Nuclear, thermal and noise pollution-sources, causes and effects.
- UNIT V: Pollution: Monitoring and Control Monitoring systems and analytical methods for air, water and soil pollution. Control and abatement measures for air, water and soil pollution. Brief account of legislation and environmental protection acts in India.

## PRACTICALS:

Laboratory exercises corresponding to theory courses covering.



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M



# Devi Ahilya Vishwavidyalaya Indore (M.P.)

Department of Higher Education, Govt. of M.P.

Post Graduate Semester wise Syllabus

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Session (सत्र)

2020-21

M. Sc. Botany (Semester System)

Fourth Semester ~~2017-18~~ 2020-21

Course PG 404: ETHNOBOTANY (Elective Paper II) 85+ 15

- UNIT I:** Definition, Concept, relevance and Scope of Ethnobotany. Sub disciplines of Ethnobotany. Indian work of Ethnobotany. Relation between Economic botany and Ethnobotany.
- UNIT II:** Sources of Data and methods of study of Ethnobotany. The origin and utility of some vernacular plant names. Sacred groves- Concept, classification, distributions of sacred groves in India, threats to sacred groves and significance. Plants in Mythology.
- UNIT III:** Wild edible plants used by ethnic people. Ethnoreligious plants used by tribals. Ethnobotany and its role in conservation of native plant genetic resources. Ethnobotanical plants used in different veterinary disease.
- UNIT IV:** Ethnobotanical importance of Butea monosperma, Madhuca indica, Azadiracta Indica. Ethnobotanical importance – Buchnanian lanzan, Diospyros melanoxylon, Nyctanthes arbortristis. Ethnobotanical plants used in fish poisoning, musical instruments. Totem and Taboos and their role in Conservation.
- UNIT V:** Study of common Ethnobotanical plants and their parts used in the treatment fever cough, bronchial asthma, tuberculosis, skin disease, leukoderma, expulsion of worm and leprosy. Study of common ethnomedicinal plants used in dysentery, digestive problem, abdominal disorder, jaundice, piles, rheumatism, bone fracture, heart disease and urino-genital problem.

## PRACTICALS:

Laboratory exercises corresponding to theory courses covering:

  
06/3/19

# Devi Ahilya Vishwavidyalaya Indore (M.P.)

Department of Higher Education, Govt. of M.P.

Post Graduate Semester wise Syllabus

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Session (सत्र)

2020-2021

## Scheme of Practical Examination

2020-21

### M.Sc. IV Sem. Botany (Practical – I)

(Based on PG 401 and 402)

Time – 4 Hrs.

Max. Marks - 50

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1. Exercise based on Biotechnology	- 10
2. Practical based on Genetic Engineering and Genomics	- 15
3. Spot 1 to 5	- 10
4. Viva-Voce	- 05
5. Sessionals and Record	- 10

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Total - 50

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06-3-19

**Devi Ahilya Vishwavidyalaya Indore (M.P.)**

Department of Higher Education, Govt. of M.P.

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उच्च शिक्षा विभाग, म.प्र. शासन

स्नातकोत्तर कक्षाओं के लिये सेमेस्टर अनुसार पाठ्यक्रम

अध्ययन मण्डल देवी अहिल्या विश्वविद्यालय द्वारा अनुशंसित तथा अनुमोदित

Session (सत्र)

-2020-21

**Scheme of Practical Examination.**

2020-21

**M.Sc. IV Sem. Botany (Practical – II)**

(Based on PG 403 and 404)

**Time – 4 Hrs**

**Max. Marks - 50**

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1. Major Exercise based on Elective -I	-	08
2. Minor Exercise based on Elective -I	-	04
3. Major Exercise based on Elective -II	-	08
4. Minor Exercise based on Elective -II	-	04
5. Spot 1 to 5	-	10
6. Viva-Voce	-	06
7. Sessionals and Record	-	10

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06/3/19