

SOLAPUR UNIVERSITY, SOLAUR

FACULTY Of SCIENCE

M. Phil. Examination Syllabus

In

BOTANY

Syllabus of M.Phil. Course in Botany

The revised syllabus of the M. Phil. Botany shall have following features

A Candidate has to appear for three theory papers, each carrying 100 marks.

M. Phil. Paper- I: Information Technology and Research Methodology in Botany. This paper is consisting of two sections of 50 marks each.

Section – I: Information Technology in Botany – 50 Marks

Section – II: Research Methodology in Botany –50 Marks

M. Phil. Paper – II: Recent Advances in Botany – 100 Marks

M. Phil Paper – III: Recent Advances in respective specialization – 100 Marks.

Paper I and II shall be common to all while Paper III shall be optional or elective.

The candidate shall have to offer any one of the following elective paper.

Paper III: Recent Advances in Cytogenetic and Plant Breeding.

Paper III: Recent Advances in Mycology and Plant Pathology.

Paper III: Recent Advances in Plant Protection.

Paper III: Recent Advances in Phycology.

Paper III: Recent Advances in Bryology.

Paper III: Recent Advances in Pteridology.

Paper III: Recent Advances in Plant Ecology.

Paper III: Recent Advances in Plant Physiology.

Paper III: Recent Advances in Taxonomy of Angiosperms and Ethnobotany

M. Phil Paper- I
Information Technology And Research Methodology in
Botany
Section – I
Information Technology

1: Computer:

- 1.1 : Introduction
- 1.2 : Structure of computer
- 1.3 : Input and output devices
- 1.4 : Primary and Secondary storage
- 1.5 : Software – Definition, types.
- 1.6 : Operating system : Windows

2: Computer application.:

- 2.1 : Excel, Power point
- 2.2 : Browser – Use of internet using web browser like internet explorer
- 2.3 : Software's used in biology – WASP, FASTA, BLAST, etc.

References :

- Basandra, K : Computer Today
- O'Leary T.J. and O'Leary L.I. (2001). Computing Essentials, T.M.H., New Delhi.
- Books of Bioinformatics.

Section- II

Research Methodology in Botany

1. Theory of Scientific and Research methods in Natural Sciences (Botany), Deduction, Induction and Generalization.
2. Design, execution, analysis and evaluation of experiments.
3. Methodology.
 - a. Selection of research topics and data retrieval : Using library, internet, compiling of working bibliography
4. Preparation of abstracts, manuscripts, dissertation, thesis and reports: Typing or printing, paper, margins, spacing, title and heading , keywords and running title, page numbers, tables and illustration corrections and insertion.
5. Writing research grant proposal and reports.
6. Preparation of review article and book reviews.
7. Presentation of Research work: Paper presentation in Seminar/ Symposia etc.

References:

- Barzum, J and Graff Henry, 1977. The Modern researcher.
- Edekar, V. H., 1982. How to write assignments, Research papers, dissertations, Kanak publ., New Delhi.
- Berlyn, G.P. Miksche 1976. Botanical microtechnique and Cytochemistry. The Iowa state University Press, Ames, Iowa.
- Falk, D.W. 1971 Biology teaching methods. John Wiley London.

- Gatner, E.S.M. and F. Cardasco 1970. Research and Report writing, Barnes and Nobel, New York.
- Gibaldi Joseph and Achtert Walte S 1981. Modern Language Association Hand Book for writers of Research papers. Affiliated East West Press Pvt. Ltd.
- Blick, D. and Reschbboum, R. M. 1977. Techniques of biological and biophysical methodology. John, E. Wiley and Jons London.
- Gupta S. P. 1978. Science and its methodology. Ajanta publ.
- Hercourt Brace Javanavich Inc. 3rd Ed.
- Koch, K. F. 1972. Flurecence. Microscope, Instruments and application, Ernst Leitz, Wetzlor, Germany.
- Salunkhe, D.K. and Bapat D.R. 1981. Preparation and presentation of scientific publication. Registrar, Mahatma Phule Agricultural University, Rahuri – 413722 Dist – Ahmednagar (M. S. India)

SOLAPUR UNIVERSITY, SOLAPUR
M.Phil. Paper - II
Recent Advances in Botany

1. Algal Biotechnology.
2. Role of Fungi in industry.
3. Gymnosperm biotechnology.
4. Ethno-medicinal uses of Pteridophytes.
5. Alternative pathways in the life cycles of Bryophytes.
6. Anatomy, Embryology and Palynology in relation to taxonomy of Angiosperms.
7. Recent trends in Photosynthesis in Higher plants.
8. Genetic engineering in plants, transgenic plants.
9. Conservation of biodiversity (Ex-situ, In-situ)
10. Soil reclamation, Physical and Chemical properties of soil (Soil profile, moisture content, colloids, humus, cation exchange capacity, pH, electrical conductivity etc.) Characteristics of Alkaline soil and Acidic soils.
11. Study of vegetation by remote sensing.
12. Ethnobotany :Scope and interdisciplinary approach.

References :-

- Agrawal S.K.1998 Environmental Biotechnology.APH Pb. Corp. New Delhi.
- Bhatnager and A. Malhortra 1997. Gymnosperm, New age Int. Pvt. Ltd, New Delhi.
- Bonner and Verner, Plant Biochemistry.
- Chopra R.N. and Kumar 2001. Biology of Bryophytes, New Age Int.Pvt. Ltd, New Delhi.
- Cotton C.M. 1996 Ethno botany Principals and application. John Wiley and Sons, London, UK.

- Ellis S. and A. Mellor 1995. Introduction to Plant Physiology. John Wiley and Sons.
- Industrial mycology, Edward Arnold Pb. London.,
- Jain S.K. 1991 Contributions of Ethnobotany of India. Scientific Publ.Jodhapur.
- Jain S.K. Flora of India and Geographical regions.
- Jain S.K. 1991 Dictionary of Indian Folk medicine and Ethnobotany, Deep Publ.New Delhi.
- Jain S.K. 1991 Medicinal plants of India Vol. I – II, Algonac, Mich, USA.
- James G., Crujckshank 1972 Soil Geography, Halsted Press Division, John Wiley and Sons.
- Misra K.C. 1972 Manual of plants Ecology. Oxford and IBH Publ. Co. ltd., New Delhi.
- Mishra : Systematic Botany and Ecology.
- Pal D.C. and S.K. Jain 1998 Tribal medicine Publ. Naya Praskash Bidhan Sarani, Calcutta.
- Parikh and Swarnkar 2000 Trends in Plant tissue culture and biotechnology, Agrobios.
- Pitty A.F. 1979 Geography and Soil Properties, Methuen & Co.
- Smit J.E. and D.R. Berry 1978 The Filamentous Fungi, Vol.- I.
- Stumph and d Conn E.E. Plant Biochemistry Vol. I to V.
- Subba Rao N.S. 1982 Advances in Agricultural Microbiology, Oxford IBH Pb,Co. New Delhi.
- Taiz L and Zieger F. 1998 Plant Physiology. Sinqer Associated Inc. Publ. Sunderlands Massa chusetts.
- Tauro P.K.K. Kapoor and K.S. Yadav 1993. An Introduction to Microbiology. Wiley Eastern, Pb. New Delhi.

- Tiwari K.K.and G.S. Singahal 1997. Plant Molecular Biology and Biotechnology. Narosa Publ. House, New Delhi.
- Trehan K. 1994 Biotechnology, Wiley Eastern ltd. New Delhi.
- Trivedi P.C. 2002 Advances in Pteridology, Pointer publ. Jaipur.
- Vasil I.K. 1984 Cell culture and somatic cell genetics of plants Vol. I.Academic Press INC.
- Waisel, Yovav. 1972 Biology of Halophytes, Physiological Ecology, A series of monograph text and treatise.
- Walter, H.H. 1997 Plant Biochemistry and Molecular Biology. Oxford University, Press.
- Whipps J.M. and R.D.Lumsden 1989 Biotechnology of fungi for improving plants growth. Eds. Cambridge Univ. Press New York.
- Zelitch - Photosynthesis, Photorespiration and Productivity.

Journals :

- Phytomorphology, Advances in Plant Science, Geobios, Current Sciences, Indian Journal of experimental Biology, Plants, Bio Technology, Journal of Environment and Pollution, Taxon, Botanical Reviews.

SOLAPUR UNIVERSITY, SOLAPUR
M.Phil. Paper - III (Special)

Recent Advances in Plant Ecology

1. Recent trends in ecological methodology, Systems analysis and simulation.
2. Phytogeography of the Indian subcontinents.
3. Plants habitat relationship : Allelopathy
4. Ecology of some halophytes : *Spartina townsendii* *Suaeda maritime*, *Aeluropus lagopoides*, *Achrostichum aureum* – distribution occurrence, adaptations, salt tolerance, Ecophysiology of magrooves.
5. Mechanism of self regulation in ecological systems.
6. Understanding rarity and monitoring rare plant populations , use of IUCN guidenlines.
7. Impact of developmental projects such as hydroelectric plant, thermal power plant etc.
8. Restoration of degraded lands: Habitat restoration for afforestation.eg. restoration of degraded land in mangroove area.
9. Econtoxicology with respect to contamination of food chains, Ecofriendly approach, Bioremediation Green products.

References :

- Braun Blanguet J. 1972 Plant Sociology.
- Davy A.S. Hutchings M.S. and Watkinson A.R. 1988 Plant population ecology, 28th Symposium of the British ecological society.
- Greig Smith P. 1983 Quantitative plant ecology.
- Hanson C.H. and Churchill E.D. 1965. The Plants community
- Haywood V.H.1973. Taxonomy and Ecology.

Krebs C.J. (1994) Ecology (IV Edt.) The experimental analysis of distribution and abundance. Hamper Collins.

Misra R. and R.R. Das 1971 Proceedings of the school on plant ecology.

Osborne P.L. 2000 Tropical ecosystems and ecological concept. Cambridge University Press.

Robert J. Reimold and Willim. H. Queen 1974 Ecology of Halophytes.

Synge H. 1981.1 The Biological aspects of rare plant conservation. John Wiley and Sons.

Willis A.T. 1973. Introduction to plant Ecology.

Yoav Waisel 1972 Biology of halophytes.

Journals :

- Nature and Biosphere
- Nature, Environment and Pollution Technology
- Ecology, Environment and Conservation
- Indian Journals of Environment and Ecoplanning
- Journal of Tropical Ecology.

SOLAPUR UNIVERSITY, SOLAPUR

M.Phil. Theory Syllabus

Special Paper III floristics, taxonomy & ethnobotany

Unit 1: History of classification (pre and post-Darwinian). Aims of taxonomy.

Unit Of Classification, taxonomic hierarchy, concepts of families, genera, species and intraspecific taxa. Importance of characters, including anatomical, cytological embryological and palynological, in taxonomy.

Unit 2 : Herbarium and its function. Major herbaria in India. Floras, revisions and monographs. Botanical nomenclature. History of floristic studies in peninsular India.

Unit 3 : Ethno botany of Maharashtra tribals. Ethno botanical aspects of conservation and management of the resources. Importance of wild relatives of cultivated plants.

Unit 4 : Floristic regions of India. Flora of peninsular India and their affinities and endemism with particular reference to angiosperms. Vegetation/forest types in India.

Unit 5 : Floristic diversity (flowering plants) in India. Services rendered and goods supplied by tropical forests. Causal factors of degradation and depletion of tropical forests. Rare and endangered species of flowering plants and their in situ (including National parks, Wildlife sanctuaries and biosphere reserves in peninsular India) and ex-situ conservation.

REFERENCES:-

- 1) Cronquist, A. 1968. Evolution and Classification of flowering plants.
- 2) Cronquist, A . 1981. An integrated system of Classification of flowering pants.
- 3) Davis, P.H. and V.M. Heywood 1963. Principles of Angiosperm taxonomy.
- 4) Dahlgren P.M.T. 1980 A revised system of classification of the Angiosperms Bot.J.Linn. Soc. 80 : 91-124.
- 5) Dahlgren, R.M.T 1981. Angiosperm classification and phylogeny-A rectifying comment Bot. J.Linn. Soc. 82 : 89-92.
- 6) Lawrence, G.H.M. 1951, Taxonomy of vascular plants.
- 7) Naik V.N. 1984 Taxonomy of Angiosperms.
- 8) Nayar, M.P. 1996. Hot spots of endemic plants of India, Nepal and Bhutan.
- 9) Rao, R.R. 1994 Biodiversity of India (Floristic aspects).
- 10) Takhtajan, A.L. 1969. Flowering plants: origin and dispersal.
- 11) The new global Taxonomy initiatives BOTANTY 2000-ASIA Newsletter 5(4) 1996.
- 12) UNESCO Botany 2000 Asia. New tasks ahead for the 21st century. BOTANTY 2000-ASIA Newsletter 6(1) 1997.
- 13) Systematics agenda 2000 charting the biosphere : a global initiative to discover, discribe, and classify the world's species. Technical report. Published by SA 2000. New York Botanical Gardens.

Soapur University, Solapur**M.Phil. syllabus****Special paper III:- Recent Advances in plant Physiology****Unit-1 Photosynthesis**

General Concept, historical background, Evolution of photosynthetic apparatus, Photosynthetic Pigments, Light harvesting complex.

Light reaction – Types, Mechanism and energy production.

Dark reaction – Types, Mechanism and Photosynthetic efficiency.

Unit 2 Photorespiration :- Mechanism and significance.**Unit 3 Floral physiology:- Photoperiodism and vernalization.****Unit 4 Nitrogen metabolism :- Mechanism and genetics**

Unit 5 Plant growth regulators and elicitors – Mechanism of action and applications.

Unit 6 Environmental Stress physiology – Abiotic stresses- Light, temperature, water, Radiation, ion etc. Biotic Stress- Allelopathy

Unit 7 Post Harvest physiology and technology of fruit crops.

References :

1. Taiz & Zeiger, Plant Physiology (third edition), panima Publishing Corporation. New Delhi.
2. Mohr & Schopfer, plant physiology, (springer)
3. Dwivedi & Dwivedi, Physiology of Abiotic stress in plants, published by Agrobios (India).
4. S.S. Purohit, Plant Physiology, published by Student Edition.
5. Devlin & Witham, Plant Physiology, CBS publisher & di
6. V.K. Jain, Fundamental of plant Physiology, S. Chand, publication.
7. A. Hemantaranjan, Advances in plant physiology, Vol. 9, Scientific publisher (India).

Journals :

Journals of Plant Physiology

SOLAPUR UNIVERSITY, SOLAPUR
M.Phil. Theory Syllabus

Special Paper – III : Recent Advances in Mycology And plant Pathology

Unit 1 : The Fungi :-

Vegetative Structure, nutrition, reproduction, origion and phyllogeny, recent trends of classification.

Unit 2 : Plant diseases :

Classification of plant diseases based on pathogen, Symptoms , Occurrence & dispersal.

Unit 3 : Methods of studying plant diseases / Pathogens :

Microscopic, Histochemicals, cultural & serological.

Unit 4 : Epidemiology, assessment & Forecasting of plant diseases :-

Element of disease epidemic, factors affecting epidemic, assessment of plant disease and yield loss, measurement of disease intenisty, Forecasting of plant disease epidemics.

Unit 5 : Defense mechanism in plants :

Per-existing structural & chemical defense, induced structural & biochemical defense mechanism.

Unit 6 : Biocides in plant protection :

Types of microbial biocides– viral insecticides, bacterial bactericides, fungal insecticides, Fungicides and Inseeticides.

Unit 7 : Plant diseases Mangement :

Regulatory methods, cultural methods, chemicl control, physical methods and biolgical methods.

REFERENCES

- 1) Pathogens and plant diseases :-**
B.P. Pandey, S. Chand and company pvt. Ltd. Ramnagar New Delhi 110055
- 2) The Fungi :**
B.S. Mehrotra, Oxford & IBH publ. company, New Delhi, Bombay, Calcutta.
- 3) Introductory mycology :**
C.J. Alexopoulos, C.M. Mims, Wiley Eastern Ltd. New Delhi, Bangalore, Bombay, Calcutta, Madras, Hyderabad.
- 4) Outline of Fungi & Plant Diseases :**
F.T. Bennett, Ambey Publi. Delhi (India).
- 5) A. Text book of modern Plant pathology :**
Vikas publi. house pvt. Ltd. New Delhi. 11004
- 6) Plant pathology, pathogens and plant diseases** B.P. Pandey, S. Chand and Company Pvt. Ltd. Ramnagar, New Delhi 110055
- 7) Agricultural microbiology : -**
G. Rangaswami, D.J. Bagyaraj, Prentice Hall of India Pvt. Ltd. New Delhi. 110001
- 8) Principles of plant pathology & Diseases :-**
A.K. Shrivastav, Pragati Prakashan, Meerut 250001 (India).
- 9) Plant Pathology** G.P. Gupta, Discovery publishing House, New Delhi, 11002.
- 10) The Fungi :** P.D. Sharma Rastogi Publication, Shivaji Road Meerut. 25002 (India)
- 11) Plant Pathology : -** P.D. Sharma Rastogi Publication, Shivaji Road Meerut. 25002 (India)
- 12) Plant Pathology :-** G.N. Agrios, Published by Elsevier, India Pvt. Ltd. Lajpathnagar – IV New Delhi - 110024
- 13) Diseases of Crop Plants in India :-** G. Rangaswami and A. Mahadevan, Prentice Hall of India Pvt. Ltd. New Delhi 110001.
- 14) The Fungi :-** B.R. Vashista and A.K. Singh, S. Chand and Company Ltd. Ramnagar, Delhi. 110055.