



पाठ्यक्रम SYLLABUS

SCHEME OF EXAMINATION AND COURSES OF STUDY

FACULTY OF SCIENCE

M.Phil. Botany

M.Phil Examination Semester-I, Semester-II

2010-11 से प्रभावी(w.e.f.)

सत्र 2013-14

महर्षि दयानन्द सरस्वती विश्वविद्यालय, अजमेर

NOTICE

1. Change in Statutes/Ordinances/Rules/Regulations/ Syllabus and Books may, from time to time, be made by amendment or remaking, and a candidate shall, except in so far as the University determines otherwise comply with any change that applies to years he has not completed at the time of change. **The decision taken by the Academic Council shall be final.**

सूचना

1. समय-समय पर संशोधन या पुनः निर्माण कर परिणियमों / अध्यादेशों / नियमों / विनियमों / पाठ्यक्रमों व पुस्तकों में परिवर्तन किया जा सकता है, तथा किसी भी परिवर्तन को छात्र को मानना होगा बशर्ते कि विश्वविद्यालय ने अन्यथा प्रकार से उनको छूट न दी हो और छात्र ने उस परिवर्तन के पूर्व वर्ष पाठ्यक्रम को पूरा न किया हो। विद्या परिषद द्वारा लिये गये निर्णय अन्तिम होंगे।

**MAHARSHI DAYANAND SARASWATI UNIVERSITY,
AJMER****Ordinance 123 (V) relating to M. Phil Examination
According to Minimum standards and procedure for awards of
M. Phil degree as per the guidelines of U.G.C. Regulation, 2009
Scheme of Examination**

1. For starting or continuing M. Phil course in the University and its affiliated colleges, it must be ensured that at least two qualified teachers are available in that subject. A teacher who possesses Ph.D. Degree shall be eligible to teach M. Phil classes. A teacher who possesses Ph.D. Degree and three years P.G. teaching experience shall be eligible to supervise M. Phil dissertation.
2. A candidate for admission to the courses of study for the Degree of M.Phil must have obtained a Master's Degree in the concerned subject with at least 55% marks at the post graduate Examination of this University or of any other University/ Institution . A candidate with second division at post graduate examination (with less than 55% marks) shall be eligible for the M.Phil. if he/she has second division at the graduate examination. Relaxation in the eligibility will be given to SC/ST/OBC/PH etc as per rules of the University/State Government.
3. **Admission to M. Phil Programme**
 - (i) University shall issue notification regarding Eligibility test for admission to M.Phil Programme. Research Eligibility Test (RET-M.Phil) in the National/Regional news papers etc.
 - (ii) University shall conduct RET-M.Phil on the date notified once every year.
 - (iii) Candidates who have qualified the UGC/CSIR(JRF)/NET/SET/ GATE/or any equivalent examination conducted by the State/ Central government/Teacher Fellowship holder are exempted from RET.
 - (iv) The University shall prepare a merit list of the eligible candidates.
4. **Procedure for Admission to M.Phil Programme**
A merit list shall be prepared of the eligible candidates based on the weightage of percentage of the academic record such as Sr. Secondary, Graduation, Post Graduation, publication in the peer reviewed journal, presentation of paper in National/International Conference/Seminar/ Workshop shall be as follows:

1. Sr. Secondary	10% of the percentage obtained
2. Graduation	20% of the percentage obtained
3. Post graduation	60% of the percentage obtained
4. Publication	05*
5. Conference/seminar	05**

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(*2.5 marks for each publication with maximum 5 Marks,

** 2.5 marks for each conference/seminar with maximum 5 marks)

The number of candidates called for interview shall be twice the availability of seats. Allocation for the candidates for the University and colleges shall be faculty wise and centralized at the University campus.

5. Students allotment Committee

The Composition of the Committee shall be as follows:

- (i) Dean P.G.Studies
- (ii) Dean Concerning Faculty
- (iii) Head of the Department/Incharge/Director of the concerning teaching Department of the University/College
- (iv) Principal or his/her nominee (in the case of College)
- (v) Director Research (Member Secretary)

6. Research Eligibility Test (RET-M.Phil)

A. Procedure

There shall be a Research Eligibility Test for M.Phil. of 200 marks comprising of two papers of 100 marks of two hours duration each. Both the papers will be held on the same day with a gap of one hour. A candidate who does not appear in paper I shall not be allowed to appear in paper II. First paper shall be of Research aptitude and the second paper shall be subject paper based on the concerned subject.

B. Syllabus

Syllabus of paper First shall be based on research aptitude and the Second paper shall be based on the common papers of syllabus of M.D.S. University, Ajmer of their post graduation of the concerned subject. (Except special/optional papers)

Paper I – Research Aptitude

The questions shall be of general nature, intended to assess the research aptitude of the candidate. It will primarily be designed to test reasoning ability, comprehension, divergent thinking, computer skills, elementary statistical methods and general awareness of the candidate. A total of 50 multiple choice questions (MCQ's) will be set. Each question shall carry 2 marks. There will be no negative marking.

Paper II – Subject Paper

There shall be only one subject paper based on the syllabus of the common papers candidate has studied at the post graduation. There will be three sections in this paper.

Section A: 20 question of multiple choice 2 marks each = 40

Section B: 10 question of short answers 3 marks each = 30

Section C: 2 question of long answers 15 marks each = 30
(All Question in Section A and B shall be compulsory. In section C there will be four questions out of which candidate shall be required to attempt any two questions.)

7. The candidate after getting admission in the M.Phil. programme will carry out the M.Phil. studies as per the scheme mentioned below.

Semester Scheme for M.Phil Courses

- (i) M.Phil. course shall be of one academic session to be run under semester scheme and credit system. There will be two semesters in the academic session. Each semester will be of about 20 weeks duration having a minimum of 90 days (16 weeks) of actual teaching, one week for preparatory leave and remaining days for the conduction of examination and other activities.
The tentative schedule is as below:
First semester : July to November
Internship: >2, weeks (December)
Second semester: January to May
- (ii) There will be six (6) theory papers in one academic session divided equally into two semesters. The dissertation is in lieu of IV and VIII theory papers in Semester I and II, respectively.
- (iii) The M.Phil. Course shall be of 32 credit hours, i.e. 16 credits per semester.
- (iv) Each theory credit hour shall be designated as 1L that shall be equal to 1 hour of instruction and one dissertation credit hour shall be designated as 1 D credit that shall be equal to 1.5 hour per week. (L = Lecture; D=Dissertation)
- (v) Each theory paper shall be of 4L credits per semester with total 64 hrs of instructions. The semester shall be of about 16 weeks, 4 hrs instructions shall be given to each theory paper per week.
- (vi) The dissertation shall carry 4 D in each semester with total 96 hours of instruction hours per semester. Since a semester shall be of about 16 weeks, 6 hrs instruction per week shall be given to dissertation.
- (vii) Each theory paper shall be of 50 marks and dissertation shall be of 50 marks. There shall be no evaluation of the dissertation at the end of first semester because the work carried out during the first semester shall be continued in the second semester. Evaluation of the dissertation shall be done at the end of the second semester.
- (viii) The distribution of credits and the examination scheme are as below:

Paper	Title	Max. Marks	Credits	Minimum hours of instruction		Minimum hours of self study	
				Per week	Per semester	Per week	Per semester
Semester I							
I	Research	50	4	4	64	4	64
	Methodology						
II	Optional Paper	50	4	4	64	4	64
III	Optional Paper	50	4	4	64	4	64
IV	Dissertation*	—	4	6	96	12	192
Semester I Total		150	16	18	288	24	384
Semester II							
V	Advance	50	4	4	64	4	64
	Research						
	Methodology						
VI	Optional Paper	50	4	4	64	4	64
VII	Optional Paper	50	4	4	64	4	64
VIII	Dissertation*	100	4	6	96	12	192
Semester II Total		250	16	18	288	24	384
Grand total of Semester I & II		400	32		576		768

There will be internship of two to three weeks between two semesters
*Dissertation will begin from semester I and shall complete at the end of the second semester.

- (ix) The total maximum marks for evaluation in M.Phil. shall be 400.
(x) The time allotted for self study is the minimum time expected to be spent on various activities like practical, field work, library reference work, use of computer and internet and such other facilities.
(xi) There shall be one paper on Research Methodology (Paper-I) in Semester I and one on Advance Research Methodology in Semester II.
(xii) Papers II, III shall be optional paper in Semester I and paper VI and VII shall be optional in II Semester.
(xiii) Out of a maximum of 50 marks in each theory paper 15 marks (30%) shall be for the continuous sessional assessment to be done internally based on assignments (5 marks), written test (5 marks) and seminar/group discussion (5 marks). The internal assessment marks should be sent to

the University by the various Departments/Affiliated Colleges of the University before the commencement of theory examination. The theory examination will be held at the end of each semester. Each theory paper shall be assessed out of a maximum of 35 marks

- (xiv) All paper setters and examiners for the external assessment shall be external persons (i.e. those who are not working either in the M.D.S.U. University or in any of its affiliated colleges). The Board of studies shall prepare a separate panel of Examiners for M. Phil. theory papers as well as dissertation. Appointment of the paper setters and examiners shall be made on the recommendations of the committee for selection of the examiners.
(xv) The answer books of theory papers of external examination shall be evaluated by single examiner. After declaration of the result the student concerned if desires shall be entitled for re-evaluation in accordance with the provisions of the university. Dissertation shall be evaluated by two examiners.
(xvi) The student will have to carry out the work of dissertation in both the semesters and shall submit the thesis for evaluation within two weeks after the last theory examination of II Semester.
(xvii) Dissertation work shall be conducted by the candidate under the supervision of any teacher who is registered as M.Phil. Supervisor with the teaching department concerned. An M.Phil. Supervisor can normally guide five dissertations at a time. However, the maximum limit may be relaxed by the Vice-chancellor on the recommendation of the Head. The work load for dissertation shall be six hours per week per class.
(xviii) For dissertation work the placement of every candidate under a supervisor shall be decided within one month from the last date of admission.
(xix) The dissertation will be divided into two parts. Part I of Semester I will constitute preparation of plan of work that should be presented by the student in front of the faculty of the department, who will assess the feasibility and recommend suggestions, if any, for the improvement. The student must suitably incorporate the changes, if any, in the synopsis in consultation with the supervisor. Following this he/she must write and submit type written draft of chapters on review of literature and methodology to the supervisor. He/she may also conduct some preliminary work/experiments to understand the techniques. The supervisor shall submit a report of satisfactory progress to the Head of the Department before beginning of the theory examination. The latter shall forward it to the university along with marks for internal assessment. The dissertation shall be of 100 marks to be evaluated out of 70 marks by an external examiner. The marks obtained, shall be added to the marks obtained in the viva voce examination to be held subsequently.

- (xx) In the second part of dissertation in Semester II, the student will have to complete the work as per the aims and objectives of the study and submit a dissertation. Prior to final submission of the dissertation, the student shall make a pre- M. Phil. presentation in the department in the presence of all the faculty chaired by the Head of the Department. Suggestions, if any, may be suitably incorporated into the dissertation.
- (xxa) The candidate must give a certificate that (1) the dissertation incorporates his/her own work, (2) the work incorporated in the dissertation is not a repetition of earlier work, (3) any part of the dissertation containing information from other sources has been properly cited or has been printed after having obtained due permission from the original author, and (4) any kind of assistance or help taken during the course of work has been properly acknowledged. This certificate must be attached immediately after the title page of the dissertation. Supervisor shall give a certificate according to the prescribed format ((Annexure-I)
- (xxii) The dissertation must be hard bound and type written dissertation on A-4 size paper. Four hard copies and four soft copies in non-editable PDF format must be submitted to the Head of the Department through the Supervisor. The colour of the cover page of dissertation shall be faculty wise (Annexure-II).
- (xxiii) On receipt of satisfactory evaluation report of dissertation, i.e., minimum 50% marks M. Phil. students shall undergo a viva voce examination of 30 marks which shall also be openly defended. There will be an examination committee comprising one external examiner and one internal examiner; the later may be the supervisor of the candidate or the Head of the Department in the absence of the supervisor.
- (xxiv) Every student shall be required to undertake a compulsory internship of 2-3 weeks in between the two semesters. The internship schedule shall be decided by the concerning Head of the Department. The teaching institution may decide for the provision of stipend for the students taking internship. The students will be required to submit and present a report of the internship. The participating organization/institution will give the performance appraisal of the student's work. The concerning supervisor of the Department shall certify the satisfactory performance of the students during internship and submit the same to the examination section through the Head of the Department of the university.
- (xxv) Every candidate shall be required to attend a minimum of 75% of the lectures, tutorials, seminars and practical (taken together) held in each paper.
- (xxvi) Every student of semester I shall be promoted to the next semester at her/his own risk in case he/she qualifies in 50% of papers (2 theory papers of semester I).

- (xxvii) The student who fails in any paper of Semester Ist or IInd shall appear in the due paper in the next year along with the concerned Semester.
- (xxviii) The award list should show both, total marks of the continuous internal assessment as well as external assessment in the theory papers separately and the third column must have the aggregate marks of the two. The candidate will be considered pass on the basis of the combined total marks secured in each paper.
- (8) For a pass, a student will have to obtain (a) at least 40% marks in each paper separately and (b) a minimum of 50% marks in the aggregate of all the papers prescribed for the examination. In the marksheet, successful candidates shall be classified as under:

Pass	50% or more but less than 55% marks in the aggregate
Second Division	55% or more but less than 65% marks in the aggregate
First Division	65% or more but less than 75% marks in the aggregate
First Division with Distinction	75% or more marks in the aggregate

A candidate who fails at the examination even in one paper/dissertation shall be required to reappear at the examination in a subsequent year in all the papers/dissertation prescribed for the examination, provided that a candidate who obtains at least 50% marks in dissertation shall be exempted from submitting a fresh dissertation and the marks obtained by him shall be carried forward for working out his result.

9. Depository with UGC

- (i) Following the successful completion of the evaluation process and announcements of the award of M.Phil the University shall submit a soft copy of the M.Phil dissertation obtained from the candidate to the UGC, for hosting the same in INFLIBNET accessible to all Institution/Universities.
- (ii) Along with the Degree, the University, shall issue a Provisional Certificate certifying to the effect that the Degree has been awarded in accordance with the provisions to these Regulations of the UGC.

M.Phil Syllabus Botany & Pattern of Examination
Semester - I (4 Paper Scheme)

Paper - I Research Methodology

Optional Groups (for Paper - II and Paper III)

Group A: Advanced topics in Plant tissue culture and biotechnology - I

Group B: Plant Physiology - I

Group C: Phytopathology - I

Group D: Topics in advanced ecology and environmental biology - I

Note: Any two groups to be selected as paper-II and Paper III from the above said four groups.

Paper-IV Dissertation : Experimental work to be completed
Semester - II

Paper - V Advanced Research Methodology

Optional Groups (for Paper - VI and Paper-VII)

Group A: Advanced topics in Plant tissue culture and biotechnology - II

Group B: Plant Physiology - II

Group C: Phytopathology - II

Group D: Topics in advanced ecology and environmental biology - II

Note: Any two groups to be selected as paper-VI and Paper VII from the above four groups. Two selected groups should be same as selected in semester-I.

Paper-VIII Dissertation : Preparation and submission.

SYLLABUS OF M.PHIL-BOTANY
SEMESTER SYSTEM

SEMESTER – I

PAPER-I : RESEARCH METHODOLOGY

Time : 3 hours

Max. Marks : 50

Note: Ten questions will be set, out of which candidate will answer any five questions.

1. Microscopy - Light, dark field, phase contrast, Fluorescent, Transmission and scanning electron microscopy.
2. Molecular biological techniques-PCR and Electrophoresis.
3. Chromatography- HPLC
4. Histological, Histochemical and Cytological techniques.
5. Colorimetry and spectrophotometry.

OPTIONAL GROUPS (FOR PAPER II AND III)

GROUP A - : ADVANCED TOPICS IN PLANT TISSUE CULTURE AND BIOTECHNOLOGY-I

Time : 3 hours

Max. Marks : 50

Note: Ten questions will be set out of which candidate will answer any five questions.

1. Cell and tissue culture media, initiation of aseptic culture, cellular totipotency, polarity, organogenesis and somatic embryogenesis.
2. Haploid production : Androgenesis (Anther and pollen culture), Application in plant breeding)
3. *In vitro* clonal propagation (Micro propagation) : techniques, merits and demerits, automation in microporopagation.
4. Protoplast isolation, culture and fusion. Selection of hybrid cells and regeneration of hybridization and cybridization. Transfer of cytoplasmic male sterility using protoplast fusion methods.

GROUP-B: PLANT PHYSIOLOGY-I

Time : 3 hours

Max.Marks 50

Note: Ten questions will be set out of which candidate will answer any five questions.

1. Water relations : Cell water relations in classical and thermodynamic terms, stomatal physiology and concept of stomata as physiological tool.
2. Stress physiology : Plant Physiology in relation to heat, low temperature, water, salt and chemical stress.
3. Electron Transport system : In relation to photosynthesis and Respiration
 (a) Photoelectron system in chloroplast.
 (b) Respiratory chain in mitochondria.
 (c) Biochemistry of ATP synthesis.
4. Growth Physiology : Mechanism of action of plant growth regulators, Hormone sensitivity concept, Growth inhibitors, Role of PGR's in forestry, Horticulture and Agriculture, interaction of PGR's in relation to abscission and senescence.

GROUP-C : PHYTOPATHOLOGY-I

Time: 3 hours

Max. Marks.: 50

Note: Ten questions will be set out of which candidate will answer any five questions.

1. History of plant pathology, and its modern trends, plant pathology in India and role of plant pathology in Indian Agriculture.
2. Pathogenesis : Penetration and entry of plant pathogens and development of pathogenesis inside host tissues.

3. Epiphytotics : The spread of pathogens within crop areas. The factors which influence the dissemination of pathogens within crop & areas, and phyllosphere relation to seed pathology.
4. Enzymes and toxins in plants disease.
5. Plant disease control : physical, chemical, biological, quarantine., role of biotechnology with special reference to plant pathology.

GROUP-D- : TOPICS IN ADVANCE ECOLOGY AND ENVIRONMENTAL BIOLOGY-I

Time: 3 hours

Max. Marks.: 50

Note : Ten questions will be set out of which candidate will answer any five questions.

01. Recent development in ecosystem concept, Stability of ecosystem, Homeostasis-Bio-demographic and biogeochemical regulation, Mc Arthur's stability index, Ecosystem maturation, patterns of change in maturity.
02. System Ecology : Mathematical tools in model building. Ecological data analysis by use of computers with reference to Excel software.
03. Ecological variation and plant diversity. Environmental heterogeneity. Plant response on environmental gradients. Genocological differential evolutionary entities and species population analysis. Genetics model for range extensions.
04. Ecology of stress conditions : Fluoride and salts, Current researches on inland salt marshes. Ecophysiological adaptation and production potential of plant under salt stress conditions, traditional and potential utilization of halophytes.
05. Stabilization of desert, land use patterns in semi-arid. Screening of desert flora for identification of fast depleting taxa of Rajasthan desert.

Paper – IV Dissertation : Experimental work to be completed

SEMESTER-II

PAPER-V : ADVANCED RESEARCH METHODOLOGY

Time : 3 hours

Max. Marks : 50

1. Microtomy
2. Lyophilisation
3. Computer Applications in Research.
4. Statistical methods:- Probability & Chi-square test, ANOVA, P value.
5. Isolation & Purification of Microbial Cultures.

OPTIONAL GROUPS (FOR PAPER VI AND VII)

GROUP-A : ADVANCED TOPICS IN PLANT TISSUE CULTURE AND BIOTECHNOLOGY-II

Time : 3 hours

Max. Marks : 50

Note : Ten questions will be set out of which candidate will answer any five questions.

1. Transgenic plants Production, Role of transgenic plants in crop improvement, gene silencing, environmental considerations for release of transgenic plants.
2. Molecular biology of nitrogen fixation, Nif and other genes involved in nitrogen fixation. Genetic manipulation of nitrogen fixation in legumes and non-legumes.
3. Morphological, Physiological and bio-chemical characteristics of micro-organisms used in biotechnology.
4. Plant cell culture for the production of useful chemicals, pigments, flavonoids, insecticides and other secondary products.

GROUP-B : PLANT PHYSIOLOGY-II

Time: 3 hours

Max. Marks.: 50

Note: Ten questions will be set out of which candidate will answer any five questions.

1. Nitrogen metabolism : Nitrogen fixation, chemistry and synthesis of amino acids and proteins.
2. Carbon : Pathways C3, C4 and CAM and their significance.
3. Regulation of alkaloid production in plant tissue cultures. Introduction, biosynthesis, Enzymes involved in biosynthesis, accumulation, factors influencing the alkaloidal content with special reference to Tropane and Indole alkaloids.

4. Steroidal saponins : Structure, biosynthesis and role of steroidal saponins with special reference to researches conducted in plant tissue culture.

GROUP-C : PHYTOPATHOLOGY-II

Time: 3 hours

Max. Marks.: 50

Note : Ten questions will be set out of which candidate will answer any five questions.

1. Classification of Plant diseases and Symptomatology : Description of symptoms of fungal, bacterial and viral diseases.
3. General account of disease with special reference to symptoms, casual organism, disease cycles and control, measures of the following diseases. : Smut-covered smut of barley, Bunt of Wheat, pigeon pea, : powdery mildew of grapes, blast of rice, ergot of bajra.
4. General account of bacterial diseases : Fire blight of stone fruits, tundu disease of wheat; crown gall disease of gular, leaf spot of cotton, soft rot of vegetables; brown rot and ring rot of potato.
5. Classification, morphology, physiology and nature of viruses. Disease & caused by mycoplasma. Virus diseases of potato caused by PVX and PVY, mosaic disease of tomato, sesamum phyllody, witches broom of legumes.
6. Anatomy and classification of plant parasitic nematodes. Disease caused by nematodes-root knots and ear cockle of wheat.
7. Classification and anatomy of insect induced gall. Physiology and bio-chemistry of insect galls formation. Study of some insect induced galls-Cordia, Ficus, Pongamia : leaf gall, Zizphus.

GROUP-D- : TOPICS IN ADVANCE ECOLOGY AND ENVIRONMENTAL BIOLOGY-II

Time: 3 hours

Max. Marks.: 50

Note : Ten questions will be set out of which candidate will answer any five questions.

01. Plant invasion in the tropics with particular reference to Indian subcontinent. Strategies and effect of invader colonizing species and their recruitment. Alien plant invaders of tropical fresh waters, their ecological consequences.
02. Ecological disturbances, mining operations and its impact on vegetation. Re-vegetation of disturbed lands. Nature of disturbances and population Response. Species characteristics to disturbances. Reclamation

- of disturbed Soils, suitable species for re-vegetation
03. Researches on patterns of primary production and energy flow pathways in forest, forest depletion and their conservation. Bio-diversity and its relevance. Micropropagation and tissue culture in tree species.
04. Biomass Production, bioenergy, Biogas from waste water, Microbial degradation. Use of micro organisms in pollution control. Bio-monitoring of waste toxins. Global energy crisis, alternative sources of energy.
05. Degradation of fresh water bodies with special reference to Rajasthan. Eutrophication, Biodynamic changes due to sewage waste disposal in water bodies. Hazardous chemical flat of toxins. Minimizing toxic effects. Toxicity measurement and toxicity rating, Risk assessment.

Paper- VIII Dissertation : Preparation and submission

