

MAHARSHI DAYANAND SARASWATI UNIVERSITY, AJMER

FACULTY OF SCIENCE

Syllabus

Bachelor of Science

B Sc Part-I (Session- 2023-24)

Semester- I & II



Maharshi Dayanand Saraswati University

Ajmer

Bachelor of Science (B Sc)

1. Objective

B Sc program of Maharshi Dayanand Saraswati University, Ajmer shall be a three year program in six semester designed to become science graduates. B Sc graduates shall also be eligible for graduating into higher degree of learning. B Sc programme emphasizes on conceptual understanding, enhancing creativity and critical thinking to encourage scientific thinking. The B Sc level education should also prepare learner to take up self-employment in a chosen area of expertise.

2. Programme

B Sc program is designed as a six semester program spread over a three year period.

3. Eligibility

- a. Candidate seeking admission to B Sc program shall have passed XII (10+2) standard of CBSE or Rajasthan Board of Secondary Education or from any board of education in India or abroad recognised equivalent there to in Science discipline with at least 50% marks (45% for SC/ST/OBC) marks in aggregate or as per the orders/guidelines of the competent authority from time to time.
- b. Candidates who have appeared or are going to appear in XII examination may also apply for B Sc program for the coming academic session. Admission of such candidates shall remain provisional until the specified date of that year, and if s/he fails to submit her/his marks sheet showing that s/he has passed XII examination with at least 50% marks (45% for SC/ST/OBC) marks in aggregate or as per the orders/guidelines of the competent authority from time to time, her/his admission shall stand cancelled.

3. Scheme of Examination

“Scheme of examination for end of semester examination applicable to all undergraduate courses (Pass Course)

The question paper of semester Examination for the Disciplinary Centric Core Course (DCCC), Discipline Specific elective (DSE), Ability Enhancement Course (AEC), Value Added Course (VAC) and Skill Enhancement Course (SEC) will be of 70 marks and it will be divided in two parts i.e. Part - A and Part-B. Part-A will consist of 10 compulsory questions. There will be at least three questions from each unit and answer to each question shall be limited up to 50 words. Each question will carry two marks. Total 20 Marks.

Part-B will consist of 10 questions. Atleast three question from each unit be set and student will have to answer five question, selecting atleast one question from each unit. The answer to each question shall be limited to 400 words. Each question carries 10 Marks. Total 50 Marks.

7. Internal Assessment- Continuous Evaluation: The continuous assessment will be of 30 marks for each paper and will be based on the following criteria by the concerned teacher of the subject as per requirement of the subject.

S. No.	Item
1	Tests/Term Papers/Quizzes
2	Assignments (May include Case Demos/Presentations/Write ups/ Viva voce, reflections etc.)
3	Attendance (It helps in developing discipline amongst students)

4. The student has to pass the external theory paper and internal assessment- continuous evaluation separately.

5. Program structure

Bachelor of Science (Multidisciplinary)								
Year	Semester	Discipline Centric Core Course (DCC)	Discipline Specific Elective (DSE)	Ability Enhancement Course (AEC)	Skill Enhancement Course (SEC)	Core or elective course of any other discipline of choice	Value Aided Course (VAC)	Total credits
1 st	I		-	-	-	-	-	20
		DCC-2 Microbiology, Mycology and Phytopathology, Algae, Lichens and Bryophytes (4) DCC-2 P Practicals based on DCC-2 (2)						
	II		-	-	-	-	-	20
		DCC-5 Pteridophyta, Gymnosperms and Palaeobotany, Anatomy, Taxonomy and Developmental Biology of higher plants(4) DCC-5P Practicals based on DCC-5 (2)						

B.Sc. 1st year (Sem-1)

DCC-2 Microbiology, Mycology and Phytopathology, Algae, Lichens and Bryophytes (4)

Course Nomenclature	Microbiology, Mycology and Phytopathology, Algae, Lichens and Bryophytes	
Course Code		
Course Credit	No. of Hours per Week	Total No. of Teaching Hours
4	4 Hours	56
Teaching Pedagogy	Classrooms lecture, tutorials, Group discussion, Seminar, & field work etc.,	
Course Outcomes	<p>After studying this course, a student will able to –</p> <p>CO1. Summarized the structure, pigmentation, food reserves and methods of reproduction of Fungi.</p> <p>CO2. Explain the Economic importance of Fungi.</p> <p>CO3. Differentiate some plant diseases with special reference to the causative agents, symptoms, etiology and control measures.</p> <p>CO4. Enumerate the structure, pigmentation, food reserves and methods of reproduction of Algae.</p> <p>CO5. Explain the Economic importance of algae, Fungi and lichen.</p>	
Unit I	<p>MICROBIOLOGY – Virus- Discovery, general structure .classification (LHT), Replication of TMV, Lytic and lysogenic cycles. Economic importance of viruses, Bacteriophages.</p> <p>Bacteria- - Discovery, general characters, cell structure & type, archaeobacteria, eubacteria, Gram’s staining. nutritional types and reproduction in bacteria- vegetative, asexual &recombination types (conjugation, transformation & transduction).</p> <p>Mycoplasma- General account. Cyanobacteria - General characters & economic importance. Life history of <i>Oscillatoria&Nostoc</i>.</p> <p>MYCOLOGY - General characters & classification of fungi (Alexopoulos & Mim’s 1979) Economic importance of fungi, important features & life historyof-</p> <p>a. Mastigomycotina – <i>Phytophthora</i> b. Zygomycotina – <i>Mucor</i></p> <p>c. Ascomycotina – <i>Peziza</i> d. Basidiomycotina – <i>Agaricus, Puccinia, Ustilago</i></p>	

	<p>e. Deuteromycotina – <i>Cercospora</i>.</p> <p>PHYTOPATHOLOGY – Occurrence, disease symptoms, Etiology, treatment & control of following plant diseases:</p> <p>Viruses - 1. Tobacco mosaic virus. 2. Yellow vein mosaic of Bhindi</p> <p>Bacteria - 1. Citrus canker</p> <p>Phytoplasma-1. Little leaf of Brinjal</p> <p>Fungi - 1. Black Rust of wheat 2. Smut of wheat</p> <p> 3. Tikka of Groundnut</p>
Unit II	<p>General account of lichens, growth forms of lichens (Crustose, Foliose & fruticose) , thallus and reproductive structures (soredia & apothecium).</p> <p>Arbuscular Mycorrhizae and their significance.</p> <p>Algae: General characters and thallus organisation, types of pigments and reserve food material. Classification (Fritsch's classification) and economic importance.</p> <p>Important features and life history of-</p> <p>a. Chlorophyceae – <i>Volvox, Oedogonium, Chara</i>.</p> <p>b. Xanthophyceae – <i>Vaucheria</i></p> <p>c. Phaeophyceae – <i>Ectocarpus, Sargassum</i></p> <p>d. Rhodophyceae – <i>Polysiphonia</i></p>
Unit III	<p>General characters and classification of Bryophyta, economic importance of Bryophyta. Evolutionary trends in thallus & sporogonium. Structure, reproduction and classification of-</p> <p>A. Hepaticopsida- <i>Riccia, Marchantia</i></p> <p>B. Anthocerotopsida- <i>Anthoceros</i></p> <p>C. Bryopsida– <i>Funaria</i>.</p>

➤	Text books	<p>Sharma, O.P. 1992. Text Book of Thallophytes. McGraw Hill Pub.Co, New Delhi</p> <p>Sharma. P.D. 1991. The Fungi. Rastogi & Co. Meerut</p> <p>Dube. H.C. 1990. An Introduction of Fungi. Scientific Pub. House, Jodhpur</p> <p>Clifton A. 1985. Introduction of the Bacteria. McGraw Hill & Co. New York.</p> <p>Kumar HD (2017), Introductory Phycology, East West Pub., New Delhi</p> <p>Vashishtha BR et al. (2010) Bryophyta, S Chand & Comp. New Delhi</p> <p>Vashishtha BR et al. (2010) Algae, S Chand & Comp. New Delhi</p> <p>Lee R (2008), Phycology, Cambridge Univ. Press 4th Edition</p> <p>Shama, O.P. 1992. Text Book of Thallophytes. McGraw Hill Pub. Co.</p> <p>Puri, P. 1980. Bryophyta. Atma Ram & Sons Delhi.</p>
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DCC-2P Practicals based on DCC-2 (2)

Course Nomenclature	Practicals based on DCC-2 (2)	
Course Credit	No. of Hours per Week	Total No. of Teaching Hours
2	4	56
	<p>1. Study of genera included under Microbiology, Fungi and Pathology.</p> <p>2. Observation of disease symptoms in hosts infected by fungi, viruses, bacteria and phytoplasma. Section cutting of diseased material and identification of the pathogens as per the theory syllabus.</p>	
	<p>Study of morphology, reproductive structures and anatomy of the examples cited in the theory under Algae, Lichens and Bryophyta.</p>	

B.Sc. 1st year (Sem-2)

DCC-5 Pteridophyta, Gymnosperms and Palaeobotany, Anatomy, Taxonomy and Developmental Biology of higher plants (4)

Course Nomenclature	Pteridophyta, Gymnosperms and Palaeobotany, Anatomy, Taxonomy and Developmental Biology of higher plants	
Course Code		
Course Credit	No. of Hours per Week	Total No. of Teaching Hours
4	4 Hours	56
Teaching Pedagogy	Classrooms lecture, tutorials, Group discussion, Seminar, & field work etc.,	
Course Outcomes	<p>After studying this course, a student will able to –</p> <p>CO1. Interpret the general characters and classification, stelar evolution, heterospory and origin of seed habit.</p> <p>CO2. Determine the structure, life history and Economic importance of Gymnosperms.</p> <p>CO3: Define the types of classifications- artificial, Natural and phylogenetic.</p> <p>CO4: Explain the knowledge about ICBN.</p> <p>CO5: Determine the herbarium techniques.</p> <p>CO6: Compare the taxonomic evidences from molecular, numerical and chemicals.</p>	
Unit I	<p>Pteridophyta- The first vascular plants- study of Pteridoptytes in India Characterstics & Broad classification of Pteridophytes. Stelar system in pteridophytes, origin of seed habit - heterospory. Important characters of psilopsida, lycopsida, sphenopsida & pteropsida.</p> <p>Structure and reproduction in-</p> <p>A. <i>Lycopodium</i></p> <p>B. <i>Selaginella</i></p> <p>C. <i>Equisetum</i></p> <p>D. <i>Pteris</i></p>	

	<p><i>E. Marsilea</i></p> <p>Gymnosperms: General features, classification, Evolution and diversity of gymnosperms. Morphology of vegetative and reproductive parts: Anatomy of root, stem and leaf, reproductive parts and life cycle of <i>Cycus, Pinus</i> and <i>Ephedra</i>.</p>
Unit II	<p>Basic body plan of flowering plant: Primary and secondary tissues. Branching pattern, Monopodial and sympodial growth and canopy architecture. Root System: Apical meristem, Differentiation, structural modifications, Primary and secondary growth in dicot and monocot root Shoot System: Apical meristem, Histological organisation, Primary and secondary growth in monocot and dicot stem</p> <p>Leaf: Origin, arrangement and development of leaf., Morphology and Internal structure Botanical Nomenclature: Principles and rules, taxonomic ranks. Type concept, principle of priority, Basic Herbarium techniques.</p> <p>Developmental Biology: Flower as a modified shoot and its structure. Anther and pistil: Pollen pistil interaction, the male and female gametophyte, types of pollination. Double fertilization and development of embryo, endosperm, seed and fruit.</p>
Unit III	<p>Classification of Angiosperms: Salient features of systems proposed by Bentham & Hooker, Engler & Prantl. Diversity of flowering plants as illustrated by members of the families Ranunculaceae, Brassicaceae, Malvaceae, Fabaceae, Asclepiadaceae, Solanaceae, Lamiaceae, Asteraceae, Liliaceae & Poaceae.</p> <p>PALEOBOTANY-Geological time scale; Process of fossilization, types of fossils, basic idea of techniques of calculating the age of fossils, Fossil gymnosperms, History and general account of Paleobotany in India Study of fossil plants - <i>Rhynia</i>, <i>Williamsonia</i></p>

➤	Text books	<p>Bhatnagar. S. P. and Moitra, A 1996. Gymnosperms. New Age international limited. New Delhi.</p> <p>Stewart, W. M. 1983. Palaeobotany and the evolution of plants. Cambridge University Press, Cambridge.</p> <p>Rashid A. 1999 Introduction to Pteridophyta, Vikas Publishing House, New Delhi</p> <p>Biswas C and Johri BM 1997, The Gymnosperm, Springer Verlag</p> <p>Heywood, V.H. and Moore. D.M (eds) 1984 .Current concepts in “Plant taxonomy” Academic press, London.</p> <p>Jeffrey.C. 1982, An Introduction to Plant Taxonomy, Cambridge University press Cambridge, London.</p> <p>Jones.S.B Jr. and Luchsinger, A.E. 1986. Plant Systematics (2nd edition) McGraw Hill Book Co., New York.</p> <p>Radford, A.E. 1986. Fundamentals of Plant Systematics. Harper and Row, New York.</p> <p>Singh. G 1999. Plant systematics: Theory and practice, Oxford and IBH Pvt. Ltd. New Delhi.</p> <p>Stale. C.A. 1989, Plant Taxonomy and Biosystematics (2nd edition) Edward Arnold London.</p> <p>Bhojwani S.S., Bhatnagar S.P. and Dantu P.K. 2015, The embryology of angiosperms, Vikas Publishing house, New Delhi</p> <p>Pandey B.P. 2001, Plant Anatomy, S Chand Pub. New Delhi</p>
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DCC-5P: Practicals based on DCC-5 (2)

Course Nomenclature	Practicals based on DCC-5	
Course Code		
Course Credit	No. of Hours per Week	Total No. of Teaching Hours
2	4 Hours	56
Teaching Pedagogy	Classrooms lecture, tutorials, Group discussion, Seminar, & field work etc.,	
Course Outcomes	<p>After studying this course, student will be able to:</p> <p>CO1: Describe plant tissues and their functions.</p> <p>CO2: Explain plant anatomy, Taxonomy and Embryology</p> <p>CO3: Differentiate the structure and development of monocot and dicot embryo.</p> <p>CO4: Conclude the function and morphology of Flower, Seed and Fruit.</p>	
	<p>Study of morphology, reproductive structures and anatomy of the examples cited in the theory under Pteridophyta: Lycopodium, Selaginella, Equisetum and Marsilea & Paleobotany (Rhynia and Williamsonia).</p> <p>Gymnosperms: <i>Cycas</i></p> <ol style="list-style-type: none"> Habit, armour of leaf bases on the stem (if Specimen is not available show photograph), very young leaf (circinate vernation) and old foliage leaves, scaly leaf, bulbils, male cone (specimen). microsporophyll, megasporophyll, mature seed. Study through permanent slides normal root (T.S), stem (T.S.) (if section are not available show photographs") -ovule (L.S) Study through hand sections or dissections - coralloid root (T.S,) rachis (T.S). leaflet (V.S). Microsporophyll(VS), Pollen grains (W.M.) <p><i>Pinus</i></p> <ol style="list-style-type: none"> Habit. long and dwarf shoot showing cataphylls and scale leaves. T.S, Wood showing growth rings, male cone 1st year, 2nd year and 3rd year Female cones winged seeds. Study through permanent slides-root (T.S.), female cone (L.S.). ovule (L.S.), embryo (W.M.) showing polycotyledonous condition. Study through hand sections or dissections- young stem (T.S.) old stem (wood) (T.L.S. and R.L.S.), needle (T.S.), Male cone (L.S.and T.S.). pollen grains (W.M.) <p><i>Ephedra</i></p>	

	<ol style="list-style-type: none"> 1. Habit and structure of whole male and female cones. 2. Permanent slides- female cones (L.S.) 3 Hand Sections/dissections-node (L.S.), internode (T.S.), Macerated stem to see vessel structure, epidermal peel mount of vegetative parts to study stomata, male cone (T.S. and L.S.), pollen grains.
	<p>Angiosperms The following species are suitable for study. The list is only indicative. Teachers may select plants available in their locality:</p> <ol style="list-style-type: none"> 1. Ranunculaceae: <i>Delphinium</i> 2. Brassicaceae: <i>Brassica</i> 3. Malvaceae: <i>Hibiscus</i> 4. Fabaceae: Faboideae: <i>Pisum</i> Caesalpinioideae: <i>Cassia</i> Mimnosoideae: <i>Acacia</i> 5. Asclepiadaceae: <i>Calotropis</i> 6. Asteraceae: <i>Tagetes</i> 7. Solanaceae: <i>Datura</i> 8. Lamiaceae: <i>Ocimum</i> 9. Liliaceae: <i>Allium</i> 10. Poaceae: <i>Triticum</i> 11. Special types of inflorescences: <i>Verticillaster, Cyathium and Hypanthodium</i> 12. TS of monocot and dicot root, stem and leaf, Anomalous Structure in <i>Nyctanthes, Boerhaavia, Bignonia, Achyranthes, Salvadoria, Leptadenia, Dracaena</i> 13. LS of Shoot and root tip 14. Structure of Anther and Pollen grains 15. Pollen viability and pollinia germination 16. Structure of ovule and embryo sac 17. Types and Structure of endosperms in dicots and monocots 18. Mandatory Field visit/s

