

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

Maharshi Dayanand Saraswati University, Ajmer

SYLLABUS

Scheme of Examination and Courses of Study

AEC: General English

(B.A. /B.Sc. /B.Com. Part- I Semester-I)

AND

AEC: English and Communication

(B.A./B.Sc/B.Com Part-I Semester-II)

(UG C.B.C.S. Semester System)

w.e.f. Session 2023-24

Scheme of Examination

The question paper for End of Semester Examination of **General English** (Semester-I) and **English and Communication** (Semester-II) will be of seventy marks which will be divided into two parts:

Part-A and Part-B.

Part A will consist of 10 compulsory questions. There will be at least three questions from each unit and the word limit of each answer will be approximately 50 words. Each question will carry two marks. (10x2= 20)

Part B will consist of 10 questions. At least three questions from each unit will be asked and the students will have to answer five questions selecting at least one question from each unit and the word limit of each answer will be up to 400 words. Each question will carry ten marks. (5x10=50)

Note- A student has to pass End of Semester Examination i.e. external theory paper and internal Continuous Assessment (CA) separately.

AEC: General English

Course Code - ENG5160T-A

For B.A. /B.Sc /B.Com Part-I: Semester-I

Course Objectives:

- ❖ To make students read English prose with a view to enlarge their comprehension of the language as this is essentially a language based course.
- ❖ To inculcate reading habit in students.
- ❖ To equip them with basic skills of grammar.
- ❖ To widen their vocabulary for better expression power.
- ❖ To enable students to write better English.
- ❖ To improve speaking skill in personal, social and professional settings.
- ❖ To enhance employability skills among students.

The Pattern of End of Semester Exam (EoSE) i.e. external exam question paper will be as follows-

Duration- 3 Hrs.

M.M. 70

UNIT-I

Text book -“Spectrum: An Anthology of Short Stories” Ed. J. Sasikumar and Paul Gunashekar (Oreint Black Swan)

From chapter number one to chapter number six from the above mentioned book.

UNIT-II

1 Application Writing

2 Paragraph Writing

3 Precis Writing

4 Determiners

5 Modals

6 Phrasal Verbs

UNIT- III

1 Letter

2 Translation (Hindi to English)

3 Unseen Passage

4 Tense and Usage

5 Active and Passive Voice

6 Direct and Indirect Speech

Continuous Assessment (CA) i.e. internal examination, will be based on above mentioned three units: M.M.30

Project Work and Viva voce-

30 Marks

Books Recommended:

1. A.J. Thomson and A.V. Martinet: *A Practical English Grammar* (Oxford Paper Back)
2. S. Pit. Corder: *Intermediate English Practice Book* (Orient Longman)
3. Bhaskaran and Horburg: *Strengthen Your English* (OUP 1973)
4. I.K. Sharma and V.D. Singh: *A Practical Course of English* (Ramesh Book Depot, Jaipur)
5. *Oxford Learner's Pocket Verbs and Tenses*- Joe Hird (OUP)
6. *Cambridge Grammar and Writing Skills*- Mike Gould and Eoin Higgins
7. *Communication Skills*- Sanjay Kumar and Pushp Lata (OUP)

Course Outcomes:

- 1 Students will be equipped with better understanding of English prose.
- 2 Students will be equipped with better writing skills.
- 3 They will be equipped with better communication skills.
- 4 They will be equipped with enhanced employability skills.

Semester-II
AEC: English and Communication
Course Code- ENG5261T-A
B.A./B.Sc/B.Com Part-I: Semester-II

Course Objectives:

- ❖ To make students read English prose with a view to enlarge their comprehension of the language as this is essentially a language based course.
- ❖ To encourage reading habit in students.
- ❖ To equip them with basic skills of grammar.
- ❖ To widen their vocabulary for better expression power.
- ❖ To enable students to write better English.
- ❖ To improve communication skills.
- ❖ To enhance employability skills among student

The Pattern of End of Semester Exam (EoSE) i.e. external exam question paper will be as follows-

Duration- 3 Hrs.

M.M. 70

UNIT-I

Text book -“Spectrum: An Anthology of Short Stories” Ed. J. Sasikumar and Paul Gunashekar (Oreint Black Swan)

From chapter number seven to chapter number twelve from the above mentioned book.

UNIT-II

1 Report Writing

2 Blog Writing

3 Question Tag

4 Proverbs and Idioms-

Once in a blue moon, Beating around the bush, Cry over spilled milk, Spill the beans, Piece of cake, Blessing in disguise, Golden Handshake, The best of the both worlds, Icing on the cake, Jump the bandwagon, Don't judge a book by its cover, Last straw, Feel under the weather, When pigs fly, To add insult to injury.

5 Tenses

UNIT- III

1 CV/ Resume Writing

2 Letter Writing (Official Request/ Acknowledgement/ Apology/ Order Letter)

3 Unseen Passage

4 Synonyms and Antonyms

5 Common Errors in English

6 Jumbled Sentences

Continuous Assessment (CA) i.e. internal examination, will be based on above mentioned three units:

M.M.30

Project Work and Viva voce-

30 Marks

Books Recommended:

1. A.J. Thomson and A.V. Martinet: *A Practical English Grammar* (Oxford Paper Back)
2. S. Pit. Corder: *Intermediate English Practice Book* (Orient Longman)
3. Bhaskaran and Horburg: *Strengthen Your English* (OUP 1973)
4. T.L.H.Smith-Pearse: *The English Errors of Indian Students* (OUP)
5. I.K. Sharma and V.D. Singh: *A Practical Course of English* (Ramesh Book Depot, Jaipur)
6. *Common Errors in Everyday English* (OUP)
7. *Cambridge Grammar and Writing Skills*- Mike Gould and Eoin Higgins
8. *Communication Skills*- Sanjay Kumar and Pushp Lata (OUP)
9. *Oxford Dictionary of Synonyms and Antonyms* (OUP)
10. *Oxford Learner's Pocket Verbs and Tenses*- Joe Hird (OUP)

Course outcomes-

- 1 Students will be equipped with better understanding of English prose and grammar.
- 2 Students will be equipped with better writing skills.
- 3 They will be equipped with better communication skills.
- 4 They will be equipped with enhanced employability skills.



महर्षि दयानन्द सरस्वती विश्वविद्यालय, अजमेर
स्नातक - पास कोर्स
विषय:- सामान्य हिन्दी
सत्र:- 2023-24

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 question. 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. At least three questions from each unit be set and student will have to answer five question, selecting at least one question from each unit. The answer to each question shall be limited to 400 words. Each question carries 10 Marks. Total 50 Marks.

Note: - the students have to pass external theory paper and internal continuous assessment separately.

N E W
MDSU 2023
UG-HINDI- PASS COURSE
Sem-I

YEA R	SE M	DSCC / DSEC/ AEC/ SEC/ VAC	COURS E CODE	COURSE NOMENTATUR E	THEORY/ PRACTICA L	CREDI T	EOSE/C A	
I	I	A E C	Hin 5.I--002	सामान्य हिन्दी भाषा	THEORY	02	70+30	02 व्याख्या न प्रति सप्ताह

महर्षि दयानन्द सरस्वती विश्वविद्यालय, अजमेर
स्नातक (कला संकाय)
विषय:- हिन्दी

sem-1

AEC5.1002

AEC/course code Hin5.1-002/ सामान्य हिन्दी

उद्देश्य-

- विद्यार्थियों को हिन्दी भाषा एवं काव्य से अवगत कराना
- व्याकरण का सामान्य परिचय
- व्याकरण का व्यावहारिक प्रयोग

Eose (अंक विभाजन)

समय:- 3 घण्टे

अधिकतम अंक -70

इकाई - I

(अ) पद्य संकलन -

1. गंगावतरण, भारतेन्दु हरिश्चन्द्र 'भारतेन्दु समग्र' संपादक, हेमंत भार्मा हिन्दी प्रकाशन संस्थान, वाराणसी (उ.प्र.)
2. गोवर्धन धारण, हरिऔध 'प्रिय प्रवास' महाकाव्य हिन्दी साहित्य कुटीर, वाराणसी (उ.प्र.)
3. भारत वन्दना मैथिलीशरण गुप्त 'मंगल-घट' काव्य ग्रंथ साहित्य (नीलाम्बर परिधान) सदन चिरगाँव, झाँसी (उ.प्र.)
4. समर शेष है, रामधारी सिंह दिनकर 'परशुराम की प्रतीक्षा' ग्रंथ से राजपाल एण्ड संस, दिल्ली

5. वीरों का कैसा हो बसन्त, सुभद्रा कुमारी चौहान 'सुभद्रा कुमारी चौहान,
सम्पादक: सुधा चौहान
साहित्य अकादमी, नई दिल्ली
उपर्युक्त पाठ्यक्रम में अंकित योजना के अनुसार ही बी.ए. पार्ट प्रथम (कला,
वाणिज्य एवं विज्ञान)

इकाई - II

(अ) संज्ञा, सर्वनाम, विशेषण, क्रिया, क्रिया विशेषण, संधि, समास, मुहावरें,
लोकोक्तियाँ

इकाई - III

संक्षेपण, पल्लवन, शब्द शुद्धि, वाक्य शुद्धि

CA (उपर्युक्त तीन इकाइयों के आधार पर)

MM 30

प्रोजेक्ट - 15

मौखिक परीक्षा -15

सहायक ग्रंथ

- हिन्दी व्याकरण - कामता प्रसाद गुरु
- हिन्दी शब्द -अर्थ प्रयोग - .. डॉ. हरदेव बाहरी
- आधुनिक हिन्दी व्याकरण और रचना- डॉ. वासुदेव नंदन प्रसाद

MDSU 2023
UG-HINDI- PASS COURSE
Sem-II

YEAR	SEM	DSCC/ DSEC/ AEC/ SEC/VAC	COURSE CODE	COURSE NOMENTATURE	THEORY/ PRACTICAL	CREDIT	EOSE/CA	
I	II	A E C	Hin 5.II--002	सामान्य हिन्दी संप्रेषण	THEORY	02	70+30	02 व्याख्यान प्रति सप्ताह

महर्षि दयानन्द सरस्वती विश्वविद्यालय, अजमेर

स्नातक (कला संकाय)

विषय:- हिन्दी

sem-II

AEC/ course code HIN 5.2-002/ सामान्य हिन्दी संप्रेषण

उद्देश्य-

- हिन्दी भाषा एवं गद्य से अवगत कराना
- हिन्दी भाषा का व्यावहारिक प्रयोग
- हिन्दी भाषा के मानकीकरण से अवगत कराना
- रोजगारोन्मुखी अध्ययन

Eose (अंक विभाजन)

समय:- 3 घण्टे

अधिकतम अंक -70

इकाई - I

गद्य संकलन -

1. ग्रामोत्थान-नानाजी देशमुख, दीनदयाल शोध संस्थान, चित्रकूट
2. पर्यावरण और सनातन दृष्टि, छगन मेहता, संक्रान्ति और सनातनता, संकलन से वागदेवी प्रकाशन बीकानेर
3. ठिठुरता हुआ गणतंत्र (व्यंग्य)- हरिशंकर परसाई, तिरछी रेखाएँ, वाणी प्रकाशन दिल्ली
4. लछमा (रेखाचित्र) महोदवी वर्मा, अतीत के चल चित्र, वाणी प्रकाशन, नई दिल्ली
5. अग्नि की उड़ान (परिच्छेद 16) ए.पी.जे. अब्दुल कलाम, प्रभात प्रकाशन, नई दिल्ली
6. फुलवा - स्त्री विमर्श : रत्न कुमार सांभरिया की चयनित कहानियाँ संपादन- डॉ. अनामिका प्रकाशन- अनामिका पब्लिशर्स एंड डिस्ट्रीब्यूटर (प्रा.) लिमिटेड, 21-ए,अंसारी रोड, दरियागंज, नई दिल्ली -110002

इकाई - II

- (अ) पारिभाषिक शब्दावली (अंग्रेजी शब्दों के हिंदी समानार्थक शब्द)
- (ब) शब्द युग्म-अर्थ भेद
- (सपर्यायवाची शब्द (, उपसर्ग, प्रत्यय
- (द) पत्र-लेखन

इकाई - III

- (अ) निबंध लेखन
 - (ब) प्रारूप -विज्ञापन, निविदा, परिपत्र, अधिसूचना
- CA (उपर्युक्त तीन इकाइयों के आधार पर)

MM 30

प्रोजेक्ट - 15

मौखिक परीक्षा -15

सहायक ग्रंथ

- हिन्दी व्याकरण - कामता प्रसाद गुरु
- हिन्दी शब्द -अर्थ प्रयोग - .. डॉ. हरदेव बाहरी
- आधुनिक हिन्दी व्याकरण और रचना- डॉ. वासुदेव नंदन प्रसाद



महर्षि दयानन्द सरस्वती विश्वविद्यालय, अजमेर

MAHARSHI DAYANAND SARASWATI UNIVERSITY, AJMER

NAAC Accredited 'B++' Grade State University

Syllabus of B.Sc. Mathematics Semester I & Semester II

Session 2023-2024

Scheme of examination

- 1-The teaching and examination of Under Graduate Part-I will be on semester basis (Semester-I & Semester-II).
- 2-The student/faculty are advised to consider the content of the syllabus only for teaching and examination in all Under Graduate Part-I courses.
- 3-The scheme of the examination for each **External Course** examination in all Under Graduate Part-I semester scheme will be as follow:-

"Scheme of examination for end of semester examination applicable to all undergraduate courses (Pass course as well as Honours course).

The question paper of semester Exam for the discipline specific core courses (DSC), 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 upto 50 words. Each question will carry two marks. Total 20 Marks.

Part-B will consist of 10 questions. Atleast three questions 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.



महर्षि दयानन्द सरस्वती विश्वविद्यालय, अजमेर

MAHARSHI DAYANAND SARASWATI UNIVERSITY, AJMER

NAAC Accredited 'B++' Grade State University

B.Sc. Mathematics Syllabus

Certificate Course (2023-2024)

Total Credit-12

Semester I

Major (Discipline Specific Core Course-DSCC)-4 + (Practical)- 2 = 06 Credits

Scheme of Credit & Marks	Paper & Practical
DSCC -04 Credit 100 (70 External+30 Internal) Marks	Mathematical Calculus
Practical - 02 Credit 50 (35 External+15 Internal) Marks	GeoGebra

Semester II

Major (Discipline Specific Core Course-DSCC)-4 + (Practical)- 2 = 06 Credits

Scheme of Credit & Marks	Paper & Practical
DSCC -04 Credit 100 (70 External+30 Internal) Marks	Mathematical Theory
Practical - 02 Credit 50 (35 External+15 Internal) Marks	Advanced GeoGebra



महर्षि दयानन्द सरस्वती विश्वविद्यालय, अजमेर

MAHARSHI DAYANAND SARASWATI UNIVERSITY, AJMER

NAAC Accredited 'B++' Grade State University

B.Sc. Mathematics Syllabus Certificate Course (2023-2024)

Semester I **MATHEMATICS** **Credits – 4**

Theory and Tutorial: 4 Classes/Week/Hour (Total 60 Hours per Semester) of Paper of 4 Credits.
One Paper of 100 Marks (External-70 Marks + Internal – 30 Marks)

MATHEMATICAL CALCULUS

Max Marks: 70

UNIT-I Differential Calculus:

Curvature, Asymptotes, Singular points, Tracing of curves. Parametric representation of curves
Polar coordinates and tracing of curves in polar coordinates. Partial Differentiation, Euler Theorem.

(हिन्दी अनुवाद)

वक्रता, अनन्तस्पर्शी, विचित्र बिन्दु, वक्र अनुरेखण, वक्रों का प्राचलिक निरूपण, ध्रुवीय निर्देशांक एवं ध्रुवीय निर्देशांको में वक्रों का अनुरेखण, आंशिक अवकलन, आयलर प्रमेय |

UNIT -II Integral Calculus:

Fundamental theorem of integral calculus, Mean value theorems of integral calculus, Pappus theorem, Quadrature. Rectification, Volumes and Surfaces generated by Solid of revolution, Multiple integrals, Change of order of double integration, Dirichlet's theorem and Liouville's theorem (Only statement of theorems)

(हिन्दी अनुवाद)

समाकलन गणित का मूलभूत प्रमेय, समाकलन गणित का मध्यमान प्रमेय, पप्पस प्रमेय, क्षेत्रकलन, चापकलन, ठोसों के परिक्रमण द्वारा जनित आयतन एवं पृष्ठ, बहु समाकलन, द्विसमाकल का क्रम परिवर्तन, दिरिचलेट एवं ल्युवेल का प्रमेय (केवल प्रमेय के प्रकथन)|

UNIT-III Vector Calculus:

Differentiation and partial differentiation of a vector function. Derivative of sum, dot product and cross product of two vectors. Gradient, divergence and curl. Gauss, Green's & Stoke's theorems (Only statement of theorems)

(हिन्दी अनुवाद)

एक सदिश फलन का अवकलन एवं आंशिक अवकलन, दो सदिशों के योग, अदिश गुणन तथा सदिश गुणन का अवकलन, प्रवणता, अपसरण एवं कुन्तल, गॉस, ग्रीन और स्टॉक्स प्रमेय (केवल प्रमेय के प्रकथन)|

Internal Assessment

Max Marks: 30

Three objective test conduct by Department of Mathematics at College level after completing each Unit.

I test from I Unit containing 10 Objective questions of 10 Marks

II test from II Unit containing 10 Objective questions of 10 Marks

III test from III Unit containing 10 Objective questions of 10 Marks

*Records of test is maintained by college and internal marks obtained by students are submitted to University before semester examination start.



B.Sc. Mathematics Syllabus

Certificate Course (2023-2024)

Semester I	MATHEMATICS (PRACTICAL)	Total Credits – 2
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One practical paper of 50 Marks (External-35 Marks + Internal – 15 Marks)

Theory and Tutorial: 2 Classes/Week/Hour (Total 30 Hours per Semester) of Paper of 2 Credits.

GeoGebra

Max Marks: 50

About GeoGebra for Teaching and Learning Mathematics:

Free digital tools for class activities, graphing, geometry, collaborative whiteboard and more

GeoGebra is available on multiple platforms, with apps for desktops, tablets and mobile web etc.

GeoGebra is an interactive **geometry, algebra, and calculus (Based on Mathematics Syllabus)** application, intended for learning and teaching mathematics and science from primary school to university level.

Practical Syllabus:

Conduct 10 practical of following GeoGebra tools, 02 from each tools:

- Graphing Calculator
- Scientific Calculator
- Basic tools
- Edit tools
- Construct tools

The marks distributions in practical exam is as follows:

• Practical exercise 1	Marks- 15
• Practical exercise 2	Marks - 15
• Viva-Voce	Marks – 05
• Practical Record (Internal)	<u>Marks – 15</u>
Total:	<u>Marks – 50</u>



B.Sc. Mathematics Syllabus
Certificate Course (2023-2024)

Semester II **MATHEMATICS** **Credits – 4**

Theory and Tutorial: 4 Classes/Week/Hour (Total 60 Hours per Semester) of each Paper of 4 Credits.

One Paper of 100 Marks (External-70 Marks + Internal – 30 Marks)

MATHEMATICAL THEORY

Max Marks: 70

UNIT - I Theory of Equations:

Maximum and minimum values of a polynomials, General properties of equations, Descarte's rule of signs positive and negative rule, Relation between the roots and the coefficients of equations. Symmetric functions, Applications of symmetric function of the roots.

(हिन्दी अनुवाद)

बहुपद के अधिकतम एवं निम्नतम मान, समीकरण के सामान्य गुणधर्म, देकार्त के धनात्मक एवं ऋणात्मक चिन्हों का नियम, समीकरण के मूलों एवं गुणांकों के मध्य सम्बन्ध, सममित फलन, मूलों के सममित फलन के अनुप्रयोग।

UNIT -II Number Theory

Division algorithm, Lame's theorem, Diophantine equation, prime counting function, binary and decimal representation of integers, linear congruences, complete set of residues. Number theoretic functions, sum and number of divisors, totally multiplicative functions, greatest integer function.

(हिन्दी अनुवाद)

विभाजन एलगोरिथ्म, लेम का प्रमेय, डायोफैंटाइन समीकरण, अभाज्य गणनीय फलन, पूर्णांकों का द्विआधारी एवं दशमलव निरूपण, रेखीय समरूपता, अवशेषों का पूर्ण समुच्चय, सैद्धांतिक संख्या फलन, योग एवं भाजकों की संख्या, पूर्ण गुणात्मक फलन, महत्तम पूर्णांक फलन।

UNIT -III Theory of Coordinate Geometry:

Techniques for sketching parabola, ellipse and hyperbola. Reflection properties of parabola, ellipse and hyperbola. Conic sections and standard equations for parabola, ellipse and hyperbola. Spheres, Cylindrical surfaces. Illustrations of graphing standard quadric surfaces cone.

(हिन्दी अनुवाद)

परवलय, दीर्घवृत्त और अतिपरवलय अनुरेखण हेतु तकनीक, परवलय, दीर्घवृत्त और अतिपरवलय का परावर्तन गुणधर्म, शंकु परिच्छेद और परवलय, दीर्घवृत्त और अतिपरवलय का मानक समीकरण, गोला, बेलनीय पृष्ठ, मानक द्विघात सतहों शंकु को रेखांकित करने के उदाहरण।

Internal Assessment

Max Marks: 30

Three objective test conduct by Department of Mathematics at College level after completing each Unit.

I test from I Unit containing 10 Objective questions of 10 Marks

II test from II Unit containing 10 Objective questions of 10 Marks

III test from III Unit containing 10 Objective questions of 10 Marks

*Records of test is maintained by college and internal marks obtained by students are submitted to University before semester examination start.



B.Sc. Mathematics Syllabus

Certificate Course (2023-2024)

Semester II MATHEMATICS (PRACTICAL) Total Credits – 2

One practical paper of 50 Marks (External-35 Marks + Internal – 15 Marks)

Theory and Tutorial: 2 Classes/Week/Hour (Total 30 Hours per Semester) of Paper of 2 Credits.

Advanced GeoGebra

Max Marks: 50

About GeoGebra for Teaching and Learning Mathematics:

Free digital tools for class activities, graphing, geometry, collaborative whiteboard and more

GeoGebra is available on multiple platforms, with apps for desktops, tablets and mobile web etc.

GeoGebra is an interactive **geometry, algebra, and calculus (Based on Mathematics Syllabus)** application, intended for learning and teaching mathematics and science from primary school to university level.

Practical Syllabus:

Conduct 10 practical of following GeoGebra tools, 02 from each advance tools:

- Measure
- Circle
- Polygon
- Transform
- 3 D Calculator

The marks distributions in practical exam is as follows:

• Practical exercise 1	Marks - 15
• Practical exercise 2	Marks - 15
• Viva-Voce	Marks – 05
• Practical Record (Internal)	<u>Marks – 15</u>
Total:	<u>Marks – 50</u>

Maharishi Dayanand Saraswati University Ajmer
B.Sc. (Multidisciplinary)
Zoology Syllabus

B.Sc. (Multidisciplinary) Programme

(ZOOLOGY DISCIPLINE)

SEMESTER –I and II

Scheme:

Core Course	Semester	Credits	Duration of Exam	Maximum Marks		Minimum Marks	
				Semester Exam	Continuous Assessment [#]	Semester Exam	Continuous Assessment [#]
ZOO5101T-C	I	4	3 hrs	70	30	25	11
ZOO5102P-C		2	3 hrs	50*		18	
Total		6			150		54
ZOO5201T-C	II	4	3 hrs	70	30	25	11
ZOO5202P-C		2	3 hrs	50*		18	
Total		6			150		54

**See scheme of Examination*

Scheme of examination

"Scheme of examination for end of semester examination applicable to undergraduate courses (Pass course)"

The question paper of Theory Paper for the 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 upto 50 words. Each question will carry two marks. Total 20 Marks.

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

Score for continuous assessment for Discipline Specific Theory Core Course includes: Maximum six marks for attendance (**06**) and maximum twelve marks for each of the two class tests (**12+12**) conducted by the subject teacher (s). These marks to be submitted by the subject teacher (s) to HoD (in case of University Department) / Principal and finally to the MDS University, Ajmer or any guideline given by the University to be followed.

***Score for continuous internal assessment for Discipline Specific Practical Core Course includes:** Maximum three marks for attendance (**03**), maximum five marks for a class test (**5**) conducted by the subject teacher (s) and maximum two marks for performance of the student in laboratory (**02**) assessed by the subject teacher (s). These marks to be submitted by the subject teacher (s) to HoD (in case of University Department) / Principal and finally to the Practical Internal Examiner before Semester Practical Examination to award in the Semester Practical Examination. It has been included in the Scheme of Practical Examination given along with syllabus of Practical Paper. Semester Practical Exam will be Jointly conducted by the External (from the External Examiner Panel of the University) and Internal Examiners.

Note: A student will have to pass in theory Exam, Practical Exam and Continuous Assessments Separately

- **For attendance**, the distribution of marks is as follow:

		For Theory	For Practical	
▪	75 to 85% attendance	-	2 Marks	1 Marks
▪	85 to 90% attendance	-	4 Marks	2 Marks
▪	90 to 95% attendance	-	6 Marks	3 Marks

Year	Semester	Discipline Specific Core (DSC) Course	Discipline Specific Elective (DSE) Course	Ability Enhancement Course (AEC)	Skill Enhancement Course (SEC)	Multidisciplinary (courses from any other discipline)	Value Addition Course	Total credits	
1 st	I	Discipline-I (i) Non-chordate Biology and Cell Biology (4) (ii) Practical (2)	--	English / Hindi / Modern Indian Language (MIL) and	--	--	--	20	
		Discipline -II (6)	--	Communication					
		Discipline -III (6)	--	(It will be as per decided by the University) (2)					
	II	Discipline -I (i) Chordate Biology and Developmental Biology(4) (ii) Practical(2)	--	English / Hindi / Modern Indian Language (MIL) and	--	--	--		20
		Discipline -II (6)	--	Communication					
		Discipline -III (6)	--	(It will be as per decided by the University) (2)					
EXIT - Undergraduate Certificate in Science will be awarded as per University Norms								40	
2 nd	III	Discipline -I (i) Genetics, Evolutionary Biology and Ecology (4) (ii) Practical (2)	--	--	Skill Enhancement Course (i) Environmental Impact Analysis or (ii) Basics of wetland conservation or (iii) Bio-fertilizer(2)	--	--	20	
		Discipline -II (6)	--						
		Discipline -III (6)	--						
	IV	Discipline -I (i) Biochemistry,	--	--	Skill Enhancement Course	--	--		20

		Physiology and Ethology (4) (ii) Practical (2)			(i) Human Health and Hygiene or (ii) Toxicology or (iii) Dairy Production and Technology (2)			
		Discipline –II (6)	--					
		Discipline -III (6)	--					
EXIT -Undergraduate Diploma in Science will be awarded as per University Norms								
80								
3 rd	V	--	Elective of Discipline - I (i) Microbiology, Parasitology & Immunology / Molecular Biology/ Vectors, Diseases & Management / Wildlife Conservation & Management/ Structure and Functions of Invertebrates (3) (ii) Practical (2)		Skill Enhancement Course (i) Vermi-composting or (ii) Poultry Farming or (iii) Apiculture or (iv) Ecotourism in Rajasthan (2)	Core or elective course of any other discipline <i>(not any that has already been chosen)</i> (5)	Environmental Wisdom in Indian Knowledge System / Animal Conservation in Indian Knowledge System (3)	20
	VI	--	Elective of Discipline - I (i) Biostatistics & Bioinformatics / Aquatic Biology / Food Nutrition & Health / Applied Zoology/ Biotechniques/ Biotechnology/ Structure and Functions of Vertebrates(3) (ii) Practical(2)		Skill Enhancement Course (i) Aquaculture or (ii) Computer Application in Biology or (iii) Intellectual Property Right or (iv) Biosafety Measures (2)	Core or elective course of any other discipline <i>(not any that has already been chosen)</i> (5)	Traditional ways of water conservation in India / Bio-Ethics (3)	20

			<i>Elective of Discipline – II or III or any other discipline (5)</i>					
EXIT - Award of Bachelor of Science								120

Note: Number in parenthesis depict credits.

B.Sc. (Multidisciplinary) Programme

(ZOOLOGY DISCIPLINE)

(i) Title of the Program of Learning:

- **Undergraduate Certificate in Science:**
 - *Minimum 40 credits* :1 year (2 semesters) of UGDP (Undergraduate Degree Program) + An Exit 4 credit SEC (Skill Enhancement Course)
- **Undergraduate Diploma in Science:**
 - *Minimum 80 credits* :2 years (4 semesters) of UGDP + An Exit 4 credit SEC
- **Bachelor's Degree in Science (B.Sc.):**
 - *Minimum 120 credits* : 3 years (6 semesters) of multidisciplinary UGDP with 3 major disciplines of choice

(ii) Introduction about the Program(Zoology Discipline):

With ever evolving understanding in the biological paradigm, upto the level of atomic interactions, study of various living organisms and their comparative study through the prism of integrated chemical, physical, mathematical, and molecular entities to appreciate the inner working of different organisms at morphological, cellular, molecular, interactive and evolutionary levels became necessary. The syllabi of zoology discipline of this programme cater learners with all these needs in an integrated and cross-disciplinary manner with comprehensive understanding of living systems.

(iii) Objectives of the Program (Zoology Discipline):

Key objectives in the zoology discipline are

1. to impart and assess the quality of critical thinking, analytical and scientific reasoning, reflective thinking, information and digital literacy, and problem-solving capacity of the learner.
2. to enable learner to understand inner working of living-beings.
3. to develop a comprehensive understanding and appreciation of the differences through various tools (including ICT) and well-designed hands-on practical exposures

(iv) Employment and Entrepreneurial Scope :

1. The program help learner to understand socio-economic capital of biological diversity and to explore possibilities of entrepreneurship through applied aspects
2. With the Courses and their practicals, the learner will be able to develop a range of generic skills that are relevant to wage employment, self-employment, and entrepreneurship.

(v) Learning outcome of the Program (Zoology Discipline):

1. The learner will be able to understand various concepts, mechanisms, biological designs & functions, interactions and evolutionary significance across organisms of various groups at different hierarchical levels.
2. Courses in Zoology discipline and their practicals demonstrate procedural knowledge, that aid in creating different types of professionals in the field of Zoology related fields such as, apiculture, aquarium fish keeping, medical diagnostics etc.
3. With the knowledge and skill base catered in the program, the learner will be able to undertake further studies in Zoology and related areas or in multidisciplinary areas that involve advanced or modern biology

(vi) Minimum Eligibility:

As per University/ State Government Guidelines OR Senior Secondary School Leaving Certificate or Higher Secondary (12th Grade) Certificate obtained after successful completion of Grade 12th or equivalent stage of education corresponding to Level-4 with minimum 50% of OGPA/CGPA on any Grade Point Scale. It will be 5% lower for SC and ST category and

Persons with Different Abilities. Student must have Biology / Agriculture / Mathematics as a course in Senior Secondary or Higher Secondary (12th Grade) or equivalent stage.

(vii) **Criteria for Selection of Students for Admission:** Based on Merit (as per CCE / University rules / institute prospectus)

(viii) **Permissible Number of Seats for one section:** as per CCE / University rules / institute prospectus

Semester wise scheme

Course Code	Course Title	Credits	Contact Teaching Hours per Week
YEAR 1 SEMESTER I			
ZOO5101T-C	Non-chordate Biology and Cell Biology	4	As Per University/ State Govt. guidelines/NEP Guidelines
ZOO5102P-C	Practical	2	As Per University/ State Govt. guidelines/NEP guidelines
DSCC of Discipline 2		6	
DSCC of Discipline 3		6	
Ability Enhancement Course: English / Hindi / MIL		2	
Total Credits		20	
YEAR 1 SEMESTER II			
ZOO5201T-C	Chordate Biology and Developmental Biology	4	As Per University/ State Govt. guidelines/NEP Guidelines
ZOO5202P-C	Practical	2	As Per University/ State Govt. guidelines/NEP guidelines
DSCC of Discipline 2		6	
DSCC of Discipline 3		6	
Ability Enhancement Course: English / Hindi / MIL		2	
Total Credits		20	
YEAR 2 SEMESTER III			
ZOO6301T-C	Genetics, Evolutionary Biology and Ecology	4	
ZOO6302P-C	Practical	2	
DSCC of Discipline 2		6	
DSCC of Discipline 3		6	
One Skill Enhancement Course from the pool, including ZOO6304-S (Environmental Impact Analysis) / ZOO6305-S (Basics of wetland conservation) / ZOO6306-S (Biofertilizer)		2	
Total Credits		20	

YEAR 2 SEMESTER IV			
ZOO6401T-C	Biochemistry, Physiology and Ethology	4	
ZOO6402P-C	Practical	2	
DSCC of Discipline 2		6	
DSCC of Discipline 3		6	
One Skill Enhancement Course from the pool, including ZOO6404-S (Human Health and Hygiene) / ZOO6405-S (Toxicology) / ZOO6406-S (Dairy Production and Technology)		2	
Total Credits		20	
YEAR 3 SEMESTER V			
Any one Discipline Specific Elective Course of Discipline 1 among the following along with corresponding practical			
ZOO7501T-E	Microbiology, Parasitology & Immunology	3	
ZOO7502T-E	Biotechniques		
ZOO7503T-E	Vectors, Diseases & Management		
ZOO7504T-E	Wildlife Conservation & Management		
ZOO7501P-E	Practical - Microbiology, Parasitology & Immunology	2	
ZOO7502P-E	Practical – Biotechniques		
ZOO7503P-E	Practical - Vectors, Diseases & Management		
ZOO7504P-E	Practical - Wildlife Conservation & Management		
Discipline Specific Elective Course of Discipline 2 / 3/ any other discipline		5	
One Skill Enhancement Course from the pool, including ZOO7505-S (Vermi-composting) / ZOO7506-S (Poultry Farming) / ZOO7507-S (Apiculture) / ZOO7508-S (Ecotourism in Rajasthan)		2	
Core or elective course of any other discipline		5	
One Value Added Course from the pool, including ZOO7609-V (Environmental Wisdom in Indian Knowledge System) / ZOO7610-V (Animal Conservation in Indian Knowledge System)		3	
Total Credits		20	
YEAR 3 SEMESTER VI			
Any one Discipline Specific Elective Course of Discipline 1 among the following along with corresponding practical			
ZOO7601T-E	Biostatistics & Bioinformatics	3	

ZOO7602T-E	Aquatic Biology		
ZOO7603T-E	Food Nutrition & Health		
ZOO7604T-E	Applied Zoology		
ZOO7601P-E	Practical - Biostatistics & Bioinformatics	2	
ZOO7602P-E	Practical - Aquatic Biology		
ZOO7603P-E	Practical - Food Nutrition & Health		
ZOO7604P-E	Practical - Applied Zoology		
Discipline Specific Elective Course of Discipline 2 / 3/ any other discipline		5	
One Skill Enhancement Course from the pool, including ZOO7605-S (Aquaculture) / ZOO7606-S (Computer Application in Biology) / ZOO7607-S (Intellectual Property Right)/ ZOO7708-S (Biosafety Measures)		2	
Core or elective course of any other discipline		5	
One Value Added Course from the pool, including ZOO7609-V (Traditional ways of water conservation in India) / ZOO7610-V (Bio- Ethics)		3	
Total Credits		20	

Note: 15 hours to be allotted per semester for 1 credit for theory classes; the hours will be double in case of Practical classes.

Core Course

ZOO5101T-C: Non-chordate Biology and Cell Biology

Course Description:

Non- chordate Biology part of the course enables students to study diversity of non-chordates. The course offers understanding to the animal architecture including bauplan, morphological concepts, various life support mechanisms and processes. The course also focus on classification and type study of some important non-chordate animals.

Cell Biology part of the course provides a detailed insight into basic concepts of cellular structure and function. It also gives an account of the complex regulatory mechanisms that control cell function.

Course Learning Outcome: the learner will be able to

1. Understand fundamental principles and concepts of animal body plan
2. Understand life support processes in non-chordates
3. Understand diversity of non-chordates at both local and global level
4. Understand classification and phylogenetic significance of various non-chordate groups
5. Realize that very similar physiological mechanisms are used in very diverse organisms.
6. Understand the functioning of nucleus & cell organelles and understand the intricate cellular mechanisms involved.
7. Acquire the detailed knowledge of pathways related to cell division and apoptosis thus enabling them to understand the anomalies in cancer.
8. Develop an understanding how cells work
9. Get new avenues of joining research in areas such as genetic engineering of cells, cloning, vaccines development, human fertility programme, organ transplant, etc.
10. Understand how tissues are produced from cells in a normal course and about any malfunctioning, which may lead to benign or malignant tumor.

Course Content

Theory (Credits : 4)

UNIT – I

Non-chordate Biology

1. Taxonomy: Principal of Classification and Nomenclature, Binomial Nomenclature; Study of Kingdom Classification from two Kingdom to Six Kingdom. **Classification** of non-chordates with key characteristics and suitable examples (uptoechinodermata; uptoClass level with elementary Idea of Orders)
2. **Elementary idea of Morphological Concepts:**Basis of Classification: Symmetry, Cellularity,Germ Layers and Body Cavities, Segmentation, Affinities among major non-chordate groups.
3. **Habitat, habit, morphology, Salient features, lifecycle (excluding anatomy)and economic importance of** following:
 - i. *Amoeba, Paramecium, Sycon, Obelia,Aurelia, Fasciola hepatica, Taenia solium, Ascaris, Neanthes (Nereis), Paleomon, Pila, Asterias.*

UNIT – II

4. **Elementary Idea of**
 - i. Types of canal system in porifers
 - ii. Polymorphism in cnedarians,
 - iii. Types of corals and coral reefs.
 - iv. Parasitic adaptations in helminths
 - v. Social organization in honey bees
 - vi. Torsion in Gastropoda
 - vii. Water Vascular system of Starfish

Cell Biology

1. Cell biology, its scope in modern perspective.
2. Cell theory and its modern version and interpretation.
3. General structure of prokaryotic, bacterial and eukaryotic Cell.
4. Ultrastructure and functions of endoplasmic reticulum, ribosome, Golgi apparatus, lysosome, peroxisomes.
5. Mitochondria: Origin, structure, composition, genome organization and function.

6. Cytoskeleton: composition and functions; microtubules and microfilaments.
7. Nucleus: size, shape, structure and functions of interphase nucleus. Ultrastructure of nuclear membrane and pore complex. Nuclear sap/ nuclear matrix, nucleocytoplasmic interactions.
8. Nucleolus: general organization, chemical composition and functions,

UNIT – III

9. Cell membrane organization: cell membrane: origin, structure, composition, models and function. Fluid mosaic model. Lipid Composition, inner and outer leaflets. Structure and functions of membrane proteins: Integral, peripheral and lipid-anchored membrane proteins
10. Transport across membrane: diffusion and osmosis. Active and passive transport, endocytosis and exocytosis
11. Cell cycle, cell division- mitosis and meiosis. Formation and fate of chiasmata and significance of crossing over, Programmed cell death (Apoptosis).
12. Chromosomes: Morphology, chromonema, chromomeres, telomeres, primary and secondary constrictions, chromatids, prokaryotic chromosome: Giant Chromosomes: Lamp-brush and Polytene chromosome
13. DNA Structure, polymorphism (A, B and Z type) and replication (semi-conservative mechanism),
14. RNA structure and types (mRNA, rRNA and tRNA);

Core Course

ZOO5102P-C:Practical

Practical (Credits : 2)

I. Microscopic Techniques:

- I. Organization and working of Optical Microscope: Dissecting and compound microscopes.
- II. General methods of microscopic slide preparations: Narcotization; fixing and preservation; washing; staining; destaining; dehydration; clearing and mounting.
- III. General idea of composition, preparation and use of:
 - a. Fixatives: Formalin, Bouin's fluid.
 - b. Stains: Aceto-carmin, Aceto-orcin, Haematoxylin, Eosin.
 - c. Common reagents: Normal saline, Acid water, Acid alcohol and Mayer's albumin.
- IV. Collection and Culture Methods:
 - a. Collection of animals from their natural habitat during field trips such as *Amoeba*, *Paramecium*, *Euglena*, *Daphnia*, *Cyclops*, etc.
 - b. Culture of *Paramecium* in the laboratory and study of its structure, life – processes and behavior in live state.

II. Study of Microscopic Slides and Museum Specimens:

Protozoa: *Amoeba*, *Euglena*, *Elphidium* (*Polystomella*), *Plasmodium*, *Paramecium*, *Leishmania*, *Paramecium* showing binary fission and conjugation, *Balantidium*, *Vorticella*.

Porifera: *Leucosolenia*, *Euplectella*, *Spongilla*, T. S. Sycon, L.S. Sycon, Gemmules.

Coelenterata: *Millepora*, *Physalia*, *Aurelia*, *Alcyonium*, *Gorgonia*, *Pennatula*, Sea anemone, *Obelia* colony and medusa.

Ctenophora: Any Ctenophore

Platyhelminthes: *Taenia*, *Planaria*, *Fasciola* (wm), T. S. body through various regions of *Fasciola*, *Fasciola – Larval Forms:* Miracidium, Sporocyst, Redia and Cercaria, *Taenia - Scolex*, *Cysticercus* larva.

Aschelminthes: *Ascaris*, *Wuchereria*, *Dracunculus*

Annelida: *Neries*, *Heteroneries*, *Arenicola*, *Aphrodite*, *Chaetopterus*, *Glossiphonia*, *Pontobdella*, *Polygordius*.

Onychophora: *Peripatus*

Arthropoda: *Limulus*, Spider, Scorpion, Centipede, Millipede, *Lepas*, *Balanus*, *Eupagurus*, Crab, *Mantis*, Honey-bee, (queen, king, worker) Locust, Silkworm Moth, Beetle, White grub. *Pediculus*, Bedbug, Termite and its castes, *Cyclops*, *Daphnia*, crustacean larvae (*Nauplius*, *Metanauplius*, *Zoea*, *Mysis*, *Megalopa*, *Phyllosoma*),

Mollusca: *Chiton*, *Aplysia*, *Cypraea*, *Mytilus*, Pearl Oyster, *Dentalium*, *Loligo*, *Nautilus*. Glochidium larva

Echinodermata: *Pentaceros*, *Echinus*, *Ophiothrix*, *Cucumaria*, *Antendon*.

Hemichordata: *Balanoglossus*.

III. Anatomy:

Earthworm: External features, general viscera, alimentary canal, reproductive system and nervous system.

Cockroach: External features, general viscera, alimentary canal, reproductive system and nervous system.

Prawn: External features, appendages, alimentary canal and nervous system; Hastate Plate

Pila: External features, pallial organs and nervous system; osphradium, radula.

Only culturable species / pest / vermin and animal that are not included in schedules of Wildlife Act, are to be dissected.

IV. Study of the following through permanent slide preparation: *Paramecium, Euglena, Foraminiferous shells, Sponge spicules, Spongin fibres, Gemmule, Hydra, Obelia* colony and Medusa; Parapodium of Nereis.

V. Study of wildlife of Rajasthan with the help of charts / models / photographs / digital alternatives / and visit of students to established museums / natural parks / natural reserves etc. (invertebrate only).

VI. Cell Biology:

1. Squash preparation of onion root tip for the study of mitosis.
2. Squash preparation for the study of meiosis in grasshopper or cockroach testes. (students can use Onion buds in case of non-availability of Grasshopper or Cockroach)
3. Study of giant chromosomes in salivary glands of Chironomous or Drosophila larva.
4. Study of DNA by separation using any detergent followed by staining.
5. Study of Cell permeability.

**Note: UGC Notification No. F.14-6/2014(CPP-II), dated 1st Aug, 2014 regarding Dissection and Animal Experimentation in Zoology/ Life Sciences and allied disciplines in undergraduate, postgraduate and research programmes, will be followed*

Scheme of Practical Examination and Distribution of Marks

(along with skeleton paper)

Time: 3 hrs. Min. Pass Marks: 18 Max. Marks: 50

Regular

1	Anatomy (Major Dissection)	06
2	Microscopic Techniques (Microscope / General Methods & chemicals / Culture)	03
3	Permanent Preparation (Preparation, identification and diagram of the material)	04
4	Exercise in Cell Biology	05
5	Identification and Comments on Spots (1 to 6)	12
6	Study of wild animal of Rajasthan (report)	03
7	Viva voce	04
8	Class Record	03
9	Internal Assessment	10

Total 50

Reference Books

1. **R.C. Brusca and G.J. Brusca.** Invertebrates. *Sinauer Associates Inc. Publishers*
2. **D.T. Anderson (Editor).** Invertebrate Zoology. *Oxford University Press.*
3. **E.N.K. Clarkson.** Invertebrate Palaeontology and Evolution. *Blackwell Science.*
4. **Karp, G.** Cell and Molecular Biology: Concepts and Experiments. John Wiley & Sons. Inc.
5. **Cooper, G.M. and Hausman, R.E.** The Cell: A Molecular Approach. ASM Press & Sunderland, Washington, D.C.; Sinauer Associates, MA.
6. **Becker, W.M.; Kleinsmith, L.J.; Hardin. J. and Bertoni, G. P.** The World of the Cell. Pearson Benjamin Cummings Publishing, San Francisco.

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|---|
| <p>7. P.S. Verma Cell Biology S.ChandPublishing
8. C.B. Power Cell Biology Himalaya Publishing House
9. RL KotpalInvertebrates Rastogi Publications</p> |
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B.Sc. (Multidisciplinary) Programme

(ZOOLOGY DISCIPLINE)

SEMESTER –II

Core Course

ZOO5201T-C :Chordate Biology and Developmental Biology

Course Description:

Chordate Biology part of the course provide foundation for students interested in natural history of chordates, particularly vertebrates. The course focus on general characters and classification of main chordate groups. Anatomical and developmental Study of representative fauna of various groups of vertebrate is also emphasized to understand evolutionary development. Additionally some important topics related to structure and function of vertebrates are also included.

Developmental Biology part of the course explains the sequence of events starting with a single cell to the production of very complex organs. The course not only describes how embryos develop (embryology), but also highlights how the processes of development are brought about by changing individual cells into specialized cells with specific functions (the cellular level), and how genes within the genome of the organism drive and guide these changes (the molecular level). It also deals with a comparative account of development in some select groups of animals.

Course Learning Outcome: the learner will be able to

1. Understand chordate characteristics and body plan
2. Understand diversity of chordates at both local and global level
3. Understand classification and phylogenetic significance of various chordate groups
4. Understand significant structure and functional aspects of vertebrate life.
5. Realize that very similar physiological mechanisms are used in very diverse organisms.
6. Develop critical understanding how development of an embryo take place through the processes of cell division, cell differentiation and morphogenesis.
7. Understand how developmental processes and gene functions within a particular tissue or organism
8. Understand how variation in the gene expression and function of gene governs development.

Course Content

Theory (Credits : 4)

UNIT – I

Chordate Biology

1. Chordate Characteristics (Notochord, Pharyngeal slits, Endostyle or Thyroid Gland, Dorsal and Tubular Nerve Cord, Postanal Tail), Chordate Body Plan. Chordate Innovations (Vertebral Column, Cranium)
2. General Characteristics, Classification and suitable examples of Protochordates: Cephalochordata, Urochordata, Cyclostomata; Chondrichthyes (Elasmobranchs, holocephalans); Teleostomi: Osteichthyes (Actinopterygii, Sarcopterygii), Dipnoi; Modern amphibian; Reptilia; Dinosaur; Aves and Mammals
3. Habitat, Habit, Salient Features and anatomy of *Herdmania*, *Branchiostoma*.
4. Ascidian Tadpole Larva and retrogressive metamorphosis.
5. Habitat, Habit and salient features of *Petromyzon* and *Myxine*, Ammocoete Larva
6. Habitat, Habit, Salient Features and anatomy of *Scoliodon* and *Labeo*
7. Types of vertebrae among vertebrates,
8. Tooth replacement in Elasmobranchs, Electric Organs,
9. Swim Bladders and its distribution within fishes,
10. Scale types in fishes,
11. Fin types in Fishes, Fish tail Types
12. Parental Care and Migration in Fishes.
13. Origin of tetrapoda
14. Habitat, Habit, anatomy and development of *Rana*
15. Tadpole larva and metamorphosis,
16. Neoteny and Parental care in Amphibians.

UNIT – II

17. Amniotes, Cleidoic egg, Skull Fenestration in Reptilia,
18. Poisonous and non-poisonous snakes, poison apparatus.
19. Habitat, Habit, anatomy and development of *Varanus*.
20. Habitat, Habit, anatomy and development of Fowl,
21. Feather types, their development and function in birds,
22. Flight Adaptations, Bird Migration
23. Mammalian adaptive radiation,
24. Habitat, Habit, anatomy and development of *Rabbit*.

Developmental Biology

1. Gametogenesis - spermatogenesis and oogenesis, vitellogenesis, egg membranes
2. Fertilization - sperm-egg interactions - biochemical events,
3. Post fertilization events
4. Parthenogenesis
5. Types of animal eggs; patterns of cleavage;
6. Germ layers, gastrulation, fate maps and cell lineage

UNIT- III

1. Organizer - concept, induction process
2. Extra embryonic membranes,
3. Types and physiology of placenta
4. Organogenesis of heart,
5. Organogenesis of kidney
6. Organogenesis of nervous system & sense organs
7. Post-embryonic developments - insects & amphibians
8. Regeneration in invertebrates and vertebrates
9. Development of immune system in vertebrates
10. Ageing concepts and models.

Core Course

ZOO5202P-C:Practical

Practical

(Credits : 2)

- I. Study of Microscopic Slides:** Whole mounts of oral hood, velum and pharyngeal wall of *Amphioxus*; T. S. of *Amphioxus* through various regions; tadpole larva of *Ascidia*; whole mounts of *Salpa*, *Doliolum* and *Oikopleura*.
- II. Study of Museum Specimens:** *Ascidia*, *Ciona*, *Botryllus*, Ammocoete larva, *Petromyzon*, *Myxine* or *Bdellostoma*, *Zygaena* (*Sphyrna*), *Torpedo*, *Chimaera*; *Acipenser*, *Amia* or *Lepidosteus*, *Labeo*, *Clarias*, *Anguilla*, *Hippocampus*, *Exocoetus*, *Echeneis*, any flat-fish, Protopterus, *Icthyophis* or any blind-worm, *Proteus*, *Ambystoma*, Axolotl, Siren, *Alytes*, *Hyla*, *Testudo*, *Chelone*, and Fresh Water Tortoise, *Sphenodon*, *Hemidactylus*, *Phrynosoma*, *Draco*, *Chameleon*; *Eryx*, *Hydrophis*, *Naja*, *Viper*, *Crocodylus*, *Alligator*, *Archaeopteryx*, any Running Bird, *Pavo cristatus*, *Choriotisnigriceps*, *Ornithorhynchus*, *Tachyglossus*, *Didelphys*, *Macropus*, Bat, *Loris*, Scaly anteater.
- III. Study of the following through Permanent Slide preparations:** Striped muscle fibers; Smooth muscle fibers, scales of edible fish, feather of birds, hair of different animals, blood film of any vertebrate.
- IV. Anatomy: Any edible fish (*Wallago* / *Labeo*):** External features, general viscera, afferent and efferent branchial blood vessels, eye muscles and their innervations, brain, cranial nerves and internal ear.
- V. Developmental Biology:**
- I. Study of development of frog/toad with the help of Observation in Nature/ charts/ models/ digital techniques:** Eggs, cleavage, blastula, gastrula, neurula, tail-bud, hatching, mature tadpole larvae, metamorphic stages, toadlet /froglet; **Histological slides:** Cleavage, blastula, gastrula, neurula and tail bud stage; **Study of limb/tail regeneration** with the help of histological slides.
- II.** Study of development of chick with the help of **Whole mounts:** 18 hrs, 21 hrs, 24 hrs. 33 hrs, 72 hrs and 96 hrs. of incubation period embryos; **Study of primitive streak** stage in living embryo after removal of the blastoderm from the egg, may be demonstrated; **Study of the embryo at various stages** of incubation in vivo by making a window in the egg shell; **Study of various foetal envelopes** in a 10-12 day old chick embryo (amnion, chorion, allantois and yolk sac).
- III. Study of development of human with the help of charts/ models/ digital techniques**
- IV. Field Visit:** Visit to a Zoo/ Museum of Natural History /Wild life Sanctuary and/or Study of local vertebrate faunal diversity (Candidates are expected to submit a detailed report of such visit).

***Note:** UGC Notification No. F.14-6/2014(CPP-II), dated 1st Aug, 2014 regarding Dissection and Animal Experimentation in Zoology/ Life Sciences and allied disciplines in undergraduate, postgraduate and research programmes, will be followed

Scheme of Practical Examination and Distribution of Marks

(along with skeleton paper)

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		Regular
1	Anatomy (Major Dissection)	07
2	Permanent Preparation (Preparation, identification and diagram of the material)	04
3	Exercise in Developmental Biology	06
4	Identification and Comments on Spots (1 to 6)	12
5	Field Visit (report)	04
6	Viva voce	04
7	Class Record	03
9	Internal Assessment	10
Total	50	

Reference Books

1. **K.V. Kardong.** Vertebrates: Comparative Anatomy, Function, Evolution. *The McGraw-Hill Companies.*
2. **D.W. Linzey.** Vertebrate Biology. *The McGraw-Hill Companies.*
3. **J.Z. Young.** The life of vertebrates. *The Oxford University Press.*
4. **E.L. Jordan and P.S. Verma.** Chordate Zoology. *S. Chand and Co.*
5. **S.F. Gilbert.** Developmental Biology, *Sinauer Associates Inc.*