

UNIVERSITY OF KOTA

FACULTY OF SCIENCE

SYLLABUS

M.Sc. (Wildlife Science)

Examination- 2012-13

M.Sc. (Wildlife Science) Exam – 2012-13

Eligibility: B.Sc. (under 10+2+3 scheme) with Botany/ Zoology/Agriculture/ Biotechnology/ Biochemistry /Microbiology/ Forestry/Nursing and Veterinary Science/equivalent graduate with science background from any University recognized by UGC with 50% marks.

(45% for candidates belonging to the reserved category SC/ST/OBC/SOBC)

Scheme of Examination and Courses of study

1. The numbers of paper and maximum marks for each theory paper/practical have been shown in the syllabus. It will be necessary for a candidate to pass in the theory part as well as in the practical part (wherever prescribed) separately.
2. The course of study for M.Sc. (Wildlife Science) examination shall spread over a period of four Semesters with written examination at the end of each semester, except IV semester where in he/she will be submitting a Project report/dissertation)
3. Syllabus of each first three semester will be divided into 5 units.
4. Scheme of examination-

M.Sc. Semester III - Wildlife science

Paper Code	Nomenclature of the Paper	Max. Marks	Min. Marks
WLS-13	Physiology and Adaptations	100 (70+30)	36 (25+11)
WLS-14	Wildlife Management and Thematic planning	100 (70+30)	36 (25+11)
WLS-15	Human Ecology	100 (70+30)	36 (25+11)
WLS-16	Modern Tools and Techniques	100 (70+30)	36 (25+11)
WLS-17	Laboratory Practical-III	75	27
WLS-18	Field Practical-III	75	27

M.Sc. Semester IV - Wildlife science

1. Project report/dissertation which will be based on field work on any topic related to wildlife biology/ ecology/environment/habitat study etc. **400 Marks**
(200 Internal+ 200 External assessment)
2. Presentation/seminar (External) **75 Marks**
3. Viva-voce examination based on project work done/Dissertation (External) **75 Marks**

5. There will be four papers in theory, each of three hours duration, 70 mark each (External assessment), Internal Assessment of 30 marks (One hour duration) and two practical carrying 75 marks each. (10 marks are reserved for record, 10 for viva, 10 for project, 10 marks for one seminar in each examination and remaining 35 marks constitute Major and Minor questions).

6. A candidate for a pass at each of the semester examination shall be required to obtain (i) at least 45% marks in the aggregate of all the papers prescribed for the examination and (ii) at least 45% marks in practical wherever prescribed at the examination, provided that if a candidate fails to secure at least 36% marks in each individual paper at the examination and also in the Test/ Dissertation/ Survey Report/ Field works, wherever prescribed, he shall be deemed to have failed at the examination notwithstanding his having obtained the minimum percentage of marks required in the aggregate for that examination.

No division will be awarded at the previous Examination. Division shall be awarded at the end of the final Examination on the combined marks obtained in all the semester Examinations taken together, as noted below

First division with distinction – 75% on the aggregate marks

First Division – 60% of the aggregate marks and

Second Division – 48% in all semesters.

Pass – upto 45%

7. If a candidate clears any paper(s) prescribed at the Semester Examination after a continuous period of two years, then for the purpose of working out his division the

minimum pass marks only viz. 36% (45% in the case of practical) shall be taken into account in respect of such papers(s)/ Practical(s) are cleared after the expiry of the aforesaid period of three years; provided that in case to reach the minimum aggregate as many marks out of those actually secured by him will be taken into account as would enable him/her to make up the deficiency in the requisite minimum aggregate.

8. A total of twelve theory papers (3 hours duration each) are prescribed in (4 in each semester). A combined practical Examination (10 hrs. duration two days) shall be conducted in each semester.

9. The pattern of examination will be similar as adopted in other. P.G. exams of university of Kota along with by means of dissertations / Project Report / Seminar as prescribed in the syllabus.

10. Pattern of Q. Paper will follow the adopted scheme i.e. the Q.P. will be divided in three sections A,B, & C. Section 'A' Will contain 10 short answer type questions and all will be compulsory. Section 'B' will contain 10 questions, 2 from each unit. Candidate will be required to attempt 5 questions selecting 1 from each unit. Section 'C' will contain 4 question set from different units. Candidate will be required to attempt any 2 questions.

11. A candidate may be promoted to III semester if he/she secures at least 36% marks in at least seven out of ten papers (8 theory papers + 2 practical's) prescribed at the I and II semester taken together provided that the aggregate marks in all theory papers of I and II semester taken together is at least 45%. Such candidate shall be required to appear in theory papers in which he/she has secured less than 36% marks of I and II semester along with the theory papers of III and IV (Project) semester respectively, as and when such examinations are held.

12. A candidate may be promoted to second year if he/she has secured at least 36% marks in each theory paper but has failed to secure 45% marks in aggregate (theory and practical separately). He shall be required to appear in some theory papers of I and II semester so as to make his aggregate at least 45% along with III and IV (Project) semester, whenever examination of these courses are held.

13. A candidate may be allowed grace marks at maximum two places up to the extent of 1% of the total marks prescribed for that examination.

Note-: Each Theory Paper –

External Assessment of 70 Maximum Marks (25 Minimum Marks)

Internal Assessment of 30 Maximum Marks (11 Minimum Marks)

M.Sc. Semester III - Wildlife science

Paper Code	Nomenclature of the Paper	Max.Marks	Min. Marks
WLS-13	Physiology, Adaptations and Management	100 (70+30)	36(25+11)
WLS-14	Applied wildlife biology	100(70+30)	36(25+11)
WLS-15	Human Ecology	100(70+30)	36(25+11)
WLS-16	Biodiversity conservation	100(70+30)	36(25+11)
WLS-17	Laboratory and Computer Practical-III	75	27
WLS-18	Field Practical-III	75	27
Field Tours			
Conservation Practices Tour		2 weeks	
Management Practices Tour		2 weeks	

Paper-WLS-13

Physiology, Adaptations and Management

Min Pass Marks-25

Duration- 3 hrs

MM - 70 marks

Note : The question paper will contain three sections as under –

Section A : One compulsory question with 10 parts, having 2 parts from each unit, short answer in 20 words for each part. Total Marks : 10

Section B : 10 question, 2 questions from each unit, 5 questions to be attempted, taking one from each unit, answer approximately in 250 words. Total Marks : 30

Section C : 4 questions (question may have sub division) covering all units descriptive type, answer in about 500 words, 2 questions to be attempted. Total Marks : 30

Unit I

Nutritional and reproductive physiology

Feeding ecology of herbivores-carnivores, insectivores and omnivores food selection, quantity, quality (nutritional value), seasonal variations . Predator-prey interactions. Avoidance of competition for food and shelter.

Reproductive ecology, dispersion, patterns of growth and development. Eco-physiology-water and temperature physiology and its ecological implications. Effects of day length and temperature on reproduction, and migration. Importance of minerals in animal health, growth and reproduction.

Practicals: A study of habitat specificity in birds or small mammals on campus. Field methods of studying diet. Examination and recording of stomach contents of browser, grazer carnivore, insectivore and omnivore. Scat analysis of major herbivores and carnivores of your field visit. Experiments with captive reptiles, mammals in various situations of ambient temperature/isolation. Use of chemical capture equipment. (Note: this will be done in detail on field tour)

Unit II

Adaptations in animals and plants

Origin of adaptive and non adaptive characters, Kind of Adaptation in animals; Structural adaptation: Cursorial adaptations, fossorial adaptations, arboreal adaptations, digging mechanism, Volant adaptations, Cave adaptations, Aquatic adaptations, Desert adaptations, Deep sea adaptations ethological adaptation, parasitic adaptation,; Physiological adaptation; Protective adaptation: mimicry and protective coloration. Adaptations in Plants: Hydrophytes, Xerophytes, Mesophytes.

Practicals: Comparative study of Structural adaptation and Physiological adaptation of some birds and animals. Comparative study of plant adaptation in Hydrophytes, Xerophytes and Mesophytes.

Unit III

Wildlife Management

Principles and practices of wildlife management. Management of special habitats; riparian zones. Grasslands etc. Analysis of wildlife management, problems in plantations and exploited forests; Indian scenario. Species conservation projects; tiger, lion, rhino, crocodile etc.

Management plan for Protected Areas: Need for wildlife management planning. Principles of planning, objectives, resource surveys, analysis of surrounding region,

management zones, theme plans, communications, staff and visitor amenities, monitoring. Financing protected areas.

Practical: Review of forest working plan and maps. Study of nearby forests and grasslands under various management regimes. Classroom based discussion and literature review. Field discussion of management practices in the tour. (Management practices will also be studied on field courses) exercise for preparing management plan

Unit IV

Economics of forest products

Forest Economics–fundamental principles, cost-benefit analyses; estimation of demand and supply; analysis of trends in the national and international market and changes in production and consumption patterns; assessment and projection of market structures; role of private sector and co-operatives; role of corporate financing. Socio-economic analyses of forest productivity and attitudes; valuation of forest goods and service. Forest products marketing, forest capital theory.

Inter-regional and international trade in forest products. Impact of economics and physical variables upon forest appraisal and management decisions. Externalities and property rights.

Practical: Exercises on estimation of demand and supply functions; biodiversity valuation, valuation of non-marketed forest products. Exercises on financial and economic appraisal of forestry projects. Exercises on marketing of forest products and international trade competitiveness. Computer applications for using programming techniques in evaluating forest management alternatives.

Unit V

Thematic planning

Some areas of thematic planning:-High Altitude Ecology:- Ecology of high altitude habitats (alpine, subalpine and upper temperate), species diversity & abundance, vegetation structure and composition, quantification of habitats and animal use, conservation issues and management practices. Mount abu: a special habitat in Rajasthan.

Wetland Ecology: - Ecology of inland wetlands, mangroves and coral reefs. Wetland soil and biogeochemistry. Wetland vegetation and plant production, seed bank and succession.

Landscape Ecology; Fundamentals of Landscape Ecology (genesis, definition and central concepts); Ecological and Spatial Scales; Landscape Pattern and Process; Fragmentation and Habitat Heterogeneity.

Global Warming and Climate Change; Introduction to global warming and climate change - the earth's natural greenhouse effect. Sources of greenhouse gases. The role of CO₂ and Methane. The Carbon cycle. Global and regional drivers of accelerating CO₂ emissions. Climate change and changes in global weather patterns. Climate change Impacts on ecosystems such as wetlands, glaciers, Arctic and Antarctic ecosystems and flora and fauna. Climate change vulnerability, response and adaptations.

Field Exercise: Measuring wetland variables including water quality and biomass production. Wetland fauna with special reference to monitoring of aquatic vertebrates. Wetland water quality and sediment properties.

Paper-WLS-14

Applied Wildlife biology

Min Pass Marks-25

Duration- 3 hrs

MM - 70 marks

Note : The question paper will contain three sections as under –

Section A : One compulsory question with 10 parts, having 2 parts from each unit, short answer in 20 words for each part. Total Marks : 10

Section B : 10 question, 2 questions from each unit, 5 questions to be attempted, taking one from each unit, answer approximately in 250 words. Total Marks : 30

Section C : 4 questions (question may have sub division) covering all units descriptive type, answer in about 500 words, 2 questions to be attempted. Total Marks : 30

Unit I

Man-animal interactions

Anthrozoology: Relation between human and animals. Man animal conflicts: causes and remedial measures to curb the conflicts. Human wildlife conflict: crop damage, livestock

depredation, injuries to people, loss of human life, damage to property, injuries to wildlife, animal death and destruction of habitat.

Unit II Man-vegetation interaction

People Plant Interaction; Ethnobotany: medicinal value of plants, NTFPs and uses of non timber plants in protected areas. Traditional values of tribals and local people of protected area. Pharmacognosy. Wildlife friendly plant. Designing wildlife garden: Nectar Bar. Attracting wildlife with native plants: Native plant landscaping for wildlife. Garden for wildlife: Making wildlife habitat at home. Forest plants and their wildlife uses.

Environmental impacts of plants: Replenishing O₂ supply, preventing soil erosion, Cooling buildings and neighborhoods, Filtering dust, Buffering noise.

Unit III Radio-Telemetry Techniques

Introduction of Wildlife telemetry: transmitters (antenna, power source), transmitter attachments (general protocol, collars etc), receivers, relocating wildlife, study designing; general considerations, sample consideration, habitat utilization study review by species groups; amphibian, reptiles, small mammals, large carnivores.

Unit IV

Techniques to study Hair Structure (Some mammals) And DNA-Mapping

Introduction, Hair Types, Classification of Hair Characteristics, Techniques to Study Hair Structure, Photomicrographs and Descriptions of Hair Characteristics of Argali (*Ovis ammon*), Blackbuck (*Antelope cervicapra*), Chinkara (*Gazella bennettii*), Four-horned antelope (*Tetracerus quadricornis*), Nilgai (*Boselaphus tragocamelus*), Chital (*Axis axis*), Sambar (*Cervus unicolor*),

Caracal (*Caracal caracal*), Jungle cat (*Felis chaus*), Leopard (*Panthera pardus*), Tiger (*Panthera tigris*), Indian Fox (*Vulpes bengalensis*), Jackal (*Canis aureus*), Wolf (*Canis lupus*), Striped hyaena (*Hyaena hyaena*), Sloth bear (*Melursus ursinus*), Small Indian civet (*Viverricula indica*), Common mongoose (*Herpestes edwardsii*), Rufous tailed hare (*Lepus nigricollis ruficaudatus*), Common langur (*Semnopithecus entellus*), Protocols and setting up of infrastructure for identifying species from hair. Use of DNA-mapping in Wildlife. Protocols of Tiger and panther.

Unit V
Sono-Taxonomy.

Modern methods of identification of species: without disturbing the individuals with particular reference to wild life. High resolution images of key features for identification, DNA bar coding. Sono taxonomy- sound based identification of species with particular reference to wild life, principles of bio-acoustics and vocalization, types of calls, sound spectrum and analysis, Karauli, Sound based monitoring of species. Advantage of sound based identification and monitoring of species.

Practicals

Techniques to Study Hair Structure: Slide preparation of hair from scats. Photomicrographs of some wild animals. DNA-mapping protocols of Tiger and Panther. Modern methods of identification of species by sono-taxonomy. Wildlife telemetry: transmitters (antenna, power source), transmitter attachments (general protocol, collars etc), receivers, relocating wildlife. Case study of Man-Animal conflict and Ethnobotany.

Paper-WLS-15
Human Ecology

Min Pass Marks-25

Duration- 3 hrs

MM - 70 marks

Note : The question paper will contain three sections as under –

Section A : One compulsory question with 10 parts, having 2 parts from each unit, short answer in 20 words for each part. Total Marks : 10

Section B : 10 question, 2 questions from each unit, 5 questions to be attempted, taking one from each unit, answer approximately in 250 words. Total Marks : 30

Section C : 4 questions (question may have sub division) covering all units descriptive type, answer in about 500 words, 2 questions to be attempted. Total Marks : 30

Unit I
Man & Environment Interaction

The concept of environment, components of man & environment interaction; Physical environment, The social and cultural environment, Psychological Environment, Social Issues and the Environment: from unsustainable to sustainable development, urban problems related to energy, water conservation, rain water harvesting, Watershed

Management, Water conservation, Rain water harvesting. Acid rain, ozone layer depletion, nuclear accidents and nuclear holocaust. Case studies.

Unit II

Ecosystem People

Role of ecosystem people in protecting wilderness Vishnois of Rajasthan, etymology, socioeconomic profile of ecosystem people, wildlife environmental preservation, tribal outreach program, conservation efforts and support of the tribes or the local inhabitant in protected area.

Environmental ethics: issues and possible solutions: Resource consumption patterns and the need for their equitable utilization. Urban – rural equity issues. The need for Gender Equity and preserving resources for future generations, the rights of animals. The ethical basis of environment education and awareness. The conservation ethic and traditional value systems of India (Case study: Chipko movement).

Unit III

Biopiracy and bioprospecting

Introduction, Patents, Indigenous and Traditional Knowledge. Biopiracy: Implication of Biopiracy for Biological and Cultural Diversity. The Appropriative Aspects of Biopiracy, Patent Regimes and Biopiracy. Bioprospecting or biodiversity prospecting, bioprospector, uses of bioprospecting, limitations of bioprospecting.

Unit IV

Biotechnology in wildlife conservation

Animal cell culture, culture media, transfections of animal cell lines, expression of cloned protein in animal cells, vaccines, transgenic animals, bioreactors, genetic engineering, gene library, tissue culture, plant regenerations, Embryo transfer, PCR, captive breeding and in-situ, ex-situ conservations. Latest techniques used in Biotechnology for ecological and wildlife preservation. Biotechnology use for studying endangered wildlife and plants and the diseases and factors that threaten their survival.

Unit V

Captive breeding and ex-situ gene pool conservation

Captive breeding and Propagation: Founder population, rehabilitation, education, utilization, gene banks, Ex-situ and in-situ linkages, conservation breeding Management Plans, Role of scientific institution and NGOs in Conservation Breeding Programme. Propagation of threatened plants. Case studies on Conservation Breeding Programme of endangered wild animals. Role of ex-situ gene pool conservation in wildlife.

Practicals: Review of forest working plan and maps. Study of nearby forests and grasslands under various management regimes. (Management practices will also be studied on field courses).

Paper-WLS-16

Biodiversity conservation

Min Pass Marks-25

Duration- 3 hrs

MM - 70 marks

Note : The question paper will contain three sections as under –

Section A : One compulsory question with 10 parts, having 2 parts from each unit, short answer in 20 words for each part. Total Marks : 10

Section B : 10 question, 2 questions from each unit, 5 questions to be attempted, taking one from each unit, answer approximately in 250 words. Total Marks : 30

Section C : 4 questions (question may have sub division) covering all units descriptive type, answer in about 500 words, 2 questions to be attempted. Total Marks : 30

Unit I

Biodiversity Conservation in India

Aims of biodiversity conservation, Necessity of conservation, economic value, balance of nature , genetic resources, aesthetic enjoyment, education, the nature of the loss, management and the conservation of wildlife, endangered species, action to save endangered species, research and documentation , habitat preservation and development of wildlife refuges, providing critical resources, legal action for the preservation of the species, breeding and captivity, wildlife conservation, importance of conservation, classification of scarce wildlife, methods of wildlife conservation, history of wildlife conservation, wildlife conservation in India, sanctuaries, various protected wild animals of India.

Unit II

Global Biodiversity Assessment

Introduction, Characterization of biodiversity. Magnitude and distribution of biodiversity, Generation, maintenance and loss of biodiversity, Biodiversity and ecosystem function basic principles. Biodiversity and ecosystem function biome analyses. Inventorying and monitoring of biodiversity Human influences on biodiversity.

Economic values of biodiversity and Measures for conservation of biodiversity and sustainable use of its components.

Unit III

Indian Biodiversity Act 2002

Regulation of access to biological diversity , national biodiversity authority , function and powers of the national biodiversity authority , approval by the national biodiversity authority , state biodiversity board, finance ,accounts and audit of national biodiversity authority and state biodiversity board. Duties of the central and the State Government, Biodiversity management committees, Local biodiversities funds and bodies.

Unit IV

Economics of Biodiversity

Social Development initiatives in India: Review of rural and tribal development programmers, and the impact of resource use practices and development programmers on local people and natural resources of the regions; Reasons for failure/success and lessons learnt; Alternative approaches to development, integrated development, small is beautiful, eco-development.

Working with local communities: Community diversity, beliefs and value systems, and how this relates to resources use and management; community participation-dimensions and typology; Gender concern, importance of gender based role, needs and priorities in relation to resource use and management; Community survey methods.

Unit V

Eco development and biodiversity

Park-people interface, conflict and objectives of human dimensions management; Basic of Eco- development-what, why, where and whether, Stakeholder identification and analysis, problems, and potentials in working with different stakeholders, stakeholders mapping; PA-People Mutual Influence Zone Analysis (MIZA) and demarcation of the influence Zone: Village prioritization for taking up pilot eco-development projects planning-participatory problem analysis (problem tree), objective setting, identifying external factors or assumptions that have impact on the initiative (if-then), log-frame approach, selecting and developing strategy; Monitoring and evolution.

Displacement and Resettlement of local communities with respect to creation of protected Areas: legal Situation, PA manager's role and responsibility in resettlement: Characteristics of an ideal resettlement scheme- what can go wrong and how to forestall these problems.

Practicals: Field based discussions about human aspects of conservation two day during orientation tour); Analysis of pressure and resource dependency of local communities upon PAs; and community survey methods including participatory learning methods.

Elective topics are designed to introduce the student to independent bibliographic search, information collection and interpretation and the formulation of scientific hypotheses and conclusion. This is achieved by a tutorial/directed reading approach on the topic. Examples would include 'Discuss the role of nutritional and day length factors in determining breeding season in Indian ungulates or Develop a population model for a tiger and single herbivore community in an simulated protected areas'. The students will submit a detailed review paper on the topic and make a seminar presentation.

	Practical	
Min Pass Marks-54	Duration- 5 hrs	MM - 150 marks

WLS-17	Laboratory and Computer Practical-III	MM: 75
WLS-18	Field Practical-III	MM: 75

Field Tours

Conservation Practices Tour	2 weeks
Management Practices Tour	2 weeks

M.Sc. Semester IV - Wildlife science

1. Project report/dissertation which will be based on field work on any topic related to wildlife biology/ ecology/environment/habitat study etc. **400 Marks**
(200 Internal+ 200 External assessment)
2. Presentation/seminar (External) **75 Marks**
3. Viva-voce examination based on project work done/Dissertation (External) **75 Marks**