|  |  |
| --- | --- |
| Course title : **Animal Science II** | Full marks : 50 (40T + 10P) |
| Course No. : Sc. Ed. 428 | Pass marks : 14T + 4P |
| Nature of the course : Theory & Practical  Level : B.Ed. (4 Year) | Periods per week : 3T  Practical ( 3P) : 3pds/day/ 2Weeks/gr. |
| Year : Second | Total Periods : 75  Time per period : 45 minutes |

**1. Course Description**

This course is designed to acquaint the students with Animal science. It consists of theory and practical sections. It carries 40 marks in theory and 10 marks in practical. Students are required to secure pass marks independently both in Theory and Practical of Animal Science. The theory part of Animal Science II covers Animal breeding, Embryology, Life processes, Farming of economically important animals, Animal Diseases, Pest and Pest Control, Evolution. Ethology and Zoogeography. The practical part includes practical activities / experiments related to the content courses.

**2. General Objectives**

The general objectives of this course are as follows

* To provide an in-depth knowledge to the students onbreeding, embryology, physiology and diseases of animals ,
* To make the students familiar with Pests, Evolution. Ethology and Zoogeography.
* To enable the students in conducting experiments on different aspects of Animal breeding, Embryology, Life processes, Farming of economically important animals, Animal Diseases, Pest and Pest Control, Evolution. Ethology and Zoogeograp**hy.**

**3. Specific Objectives and Contents**

**Animal Science II : Theory**

|  |  |
| --- | --- |
| **Specific objectives** | **Contents** |
| * Identify various types of animal breeding with their advantages and disadvantages. * Explain types of animal breeding. * Explain inbreeding, out breeding and hybrid vigor and genetic effect of animal breeding. | **Unit I: Animal breeding ( 5)**   * 1. Animal breeding      1. Types of breeding with their advantages & disadvantages      2. Inbreeding and its effect      3. Out breeding & hybrid vigour      4. Genetic effect of animal breeding |
| * Different types of egg and ovulation process. * Explain the structure of egg and sperm. * Demonstrate the process of fertilization. * Identify cleavage and stages of development in mammals. | **Unit II: Embryology (10)**   * 1. Embryology of mammals      1. Types of egg      2. Spermatozoa      3. Fertilization      4. Cleavage and its types      5. different developmental stages (morula, blastula, gastrula, neurula)      6. Theories of development.      7. Development of rabbit |
| * Demonstrate the structure and functions of various sense organs. * Pin point their importance * Describe the structure and functions of excretory organs (kidney, skin) and also their importance. * Demonstrate the structure, types and functions of bones and joints. | **Unit III: Life** **Processes** **( 10)**   * 1. Structure and functions of different sense organs (eye, ear, nose, tongue and skin) of human beings   2. Structure and functions of excretory organs (human kidney), mechanism of urine formation.   3. Structure, types and functions of bones & joints of bones in human beings |
| * Explain apiculture and types of Honeybee. * Describe the types and life cycle of honey bee. * Discuss the modern techniques of bee keeping.. * Explain the economic importance of bee. * Point out the importance of sericulture. * Explain the role of poultry in rural development. * Explain the different types of poultry breeds and the breeding method. * Lit the importance of products and by products of poultry farming. * Collect information on the development of fish farming. * Identify the salient features of culturable fishes. * Collect information about various types of fishes available in Nepal. * Describe different types of ponds necessary for Pisciculture. * List different animal breeds (Indigenous and exotic). * Explain the principles of Animal husbandry. * Point out the importance of sericulture * Explain different types of silkworm with their generic names * Describe life history of silkworm. * Point out the importance of mulberry cultivation * Explain sericulture as agro-industry | **Unit IV: Farming of economically important animals ( 25 )**   * 1. Farming of Bees      1. Types of honey bee      2. Modern bee keeping      3. Life cycle of a honeybee.      4. Ecological notes(economic importance and habit, habitat) of honey bee   2. Farming of Silkworms      1. Different types of silk worm      2. Life history of silk worm      3. Mulberry cultivation      4. Seri culture as agro industry   3. Poultry farming      1. Poultry breeds (indigenous and exotic) & breeding method.      2. Poultry products: egg and meat      3. Byproducts of poultry farm- manure and feathers      4. Role of poultry farming in rural development   4. Farming of Fishes      1. Development of fish farming in Nepal      2. Qualities of culturable fishes      3. Common fishes of Nepal      4. Different types of ponds necessary for Fish farming      5. Types of pisciculture      6. Economic importance of fishes and their role in Nepalese society      7. Animal husbandry      8. Principle of animal husbandry      9. Animal breeds (cow, buffalo, goat, sheep, pig)   + Indigenous   + Exotic |
| * Explain the diseases and parasites of bees and their control. * Explain the diseases and parasites of silk worms and their control. * Explain the diseases and parasites of birds and their control. * Explain the diseases and parasites of fishes and their control. | **Unit V: Animal Diseases ( 5 )**  5.1 Diseases and parasites of bee  5.2 Diseases and parasites of silk worm  5.3 Diseases and parasites of birds  5.4 Diseases and parasites of fishes |
| * Explain the nature of pests. * Explain different types of pests. * Manage different types of control measures of pests including integrated pests management (IPM). | **Unit VI: Pest and Pest Control ( 5 )**   * 1. Animal pests   2. Types of pests   3. Insect Pest control      1. Natural      2. Artificial      3. Integrated pest management(IPM) with ecological approach |
| * Explain the different views supporting origin of life including Oparin Haldane theory * Explain evolution of life. * Describe different evidences which support the biological evolution. * Describe the theory of Inheritance of Acquired Characters * Describe Darwinism or theory of Natural Selection * Describe different types of control measures of pests including integrated pest management (IPM) | **Unit VII: Evolution ( 10 )**   * 1. Origin of life and different theories supporting it   2. .Evidences of organic evolution      1. Biological evidences      2. Anatomical and morphological evidences      3. Embryological evidences      4. Paleontological evidences      5. Physiological evidences      6. Genetic evidences      7. .Evidences of geographical distribution   3. Theories of organic evolution      1. Lamarckism      2. Darwinism |
| * List various types of animal behavior. * Describe instinct behavior. * Explain animal behaviors like social, territorial, migratory and sexual, parental care * Observe parental care in and around animals * Explain learned behavior (Pavlov’s experiment)   . | **Unit VIII : Ethology ( 3 )**   * 1. Types of behavior      1. Instinct behavior * Social behavior, dominancy and leadership * Territorial behavior * Migratory behavior * Courtship ( sexual behavior) * Parental care   + 1. Learned behavior |
| * Concept of Zoogeography. * Types of realms. * Explain Oriental realm. * Explain Palaearctic realm | **Unit IX: Zoogeography ( 2 )**   * 1. Types of different Zoogeographical regions   2. Oriental region or realm   3. Palaearctic region or realm |
|  |  |
|  |  |

*Note: The figures in the parentheses indicate the approximate periods for the respective units.*

**Animal Science II : Practical**

|  |  |
| --- | --- |
| **Specific Objective** | **Content** |
| * To identify different permanent slides of embryology. | **Animal Embryology**   * Egg, sperm, zygote of frog, chick embryo. |
| * To prepare temporary and permanent slides. | **Temporary and Permanent Slides**   * Aphid * Mosquito |
| * To identify different types of legs of worker bee. | **Legs of Worker Bee**   * Pro-thoracic, * Meso-thoracic * Meta- thoracic leg |
| * To identify different economically important insects. | **Insects**   * Bee and silk- worm |
| * To prepare reports on field survey | **Reports on Farming Animals**   * Api-culture * Seri-culture * Pisci-culture |
| * To observe & study different types of life cycle of insects. | **Life Cycle of Insects**   * Bee and silk worm |
| * To observe & identify different types of fishes that can be cultures. | **Different Types of Fishes**   * Labeo * Catla * Channa * Carp-grass |
| * To observe & identify different types of pests. | **Animal Pests**   * Aphid * Bugs * Hoppers * Beetles |
| * To observe & study of common local fishes available in Nepal. Classify & comment on them. | **Common Local Fishes**   * Channa * Anabas * Heteroponeustes * Puntia and Mastacembalis |
| * To observe and identify the type of infested plants. | **Different plants infested by common insect** |

**4. General Instructional Techniques**

* Lecture method
* Discussion method
* Demonstration method
* Problem solving method
* Collaborative method
* Experimental method
  1. **Specific Instructional Techniques**

**Unit I, IV and unit IX:**  Project work and report writing

**5.**      **Evaluation**

**Animal Science II : Theory**

Annual examination will be held by the Office of the Controller of Examinations at the end of the academic session for which 40 percent of total marks will be allocated. The number and types of questions are given below:

|  |  |  |  |
| --- | --- | --- | --- |
| **Types of questions** | **Total questions**  **to be asked** | **Number of questions**  **to be answered and marks allocated** | **Total marks** |
| Group A: Multiple choice items | 7questions | 7x 1 mark | 7 |
| Group B: Short answer questions | 3 with 1 or questions | 3 x 7 | 21 |
| Group C: Long answer questions | 1 with 1 or question | 1 x 12 marks | 12 |
|  |  | Total | 40 Marks |

**Animal Science II : Practical**

The marks allocated to practical part are given in the following table.

|  |  |  |  |
| --- | --- | --- | --- |
| **Practical Examination** | **Area of Examination** | **Marks** | **Total** |
| Internal | Regularity | 1 | 2 |
| Record book | 1 |
| External | Major Experiment | 2 | 8 |
| Minor Experiment | 2 |
| Project work and collection of teaching materials | 2 |
| Viva | 2 |

**Recommended Books and References**

**Recommended Books**

Agarwal, V. K & Gupta, U. (2002). *Animal Behaviour.* New Delhi: S. Chand & Co. Ltd. (**For Unit IX)**

Jordon, E. L & Verma, P. S. (2000). *Chordate Zoology and Animal Physiology*. New Delhi: S. Chand & Co Ltd. **(For unit III)** Verma, P.S. & Agarwal, V. K. (2006). *Cell, Biology,Genetics, Molecular Biology, Evolution and Ecology*. New Delhi: S. Chand & Company Ltd. **(For unit II)**

Vidyarthi, R. D. & Pandey, P. N. (2008). *A Textbook of Zoology.* New Delhi: S. Chand & Co. Ltd **(For units II and IV)**

Viswapremi, K. & Chandra, K.(1995). *Economic Zoology*. New Delhi: Anamol Publication Pvt Ltd. **(For unit VI )**

**Recommended Books For Practical**

Verma, P .S (2001). *A Manual of Practical Zoology ,Vertebrates*. New Delhi: S. Chand & Co. Ltd.

Verma, P .S. (2000). *A Manual of Practical Zoology, Invertebrates.* New Delhi: S. Chand & Co. Ltd.