

Annexure-II

Session 2014-15 & Session 2015-16

HIMACHAL PRADESH UNIVERSITY SHIMLA-171005

**CHOICE BASED CREDIT SYSTEM
(CBCS)-B.Sc. Zoology (Major)**

Syllabus and Examination for B.Sc. Zoology (Major)

Under CBCS

Semester System

Approved in BOS meeting in the
Subject of Zoology held on 7-11-2016

Annexure- I of
BOS Meeting

**DEPARTMENT OF BIOSCIENCES
HIMACHAL PRADESH UNIVERSITY**

SYLLABI AND COURSES IN THE SUBJECT OF ZOOLOGY FOR B.Sc.
WITH MAJOR IN ZOOLOGY AND MINOR ELECTIVE IN ZOOLOGY

(A) Structure Outline of Major in Zoology (Minimum Credits to be Earned=48)

| Semester | Course Code | Course Type | Course Name | Credit(s)/ week | Cumulated Credits Category-wise |
|------------|----------------------|--|---|--------------------|--|
| I (Odd) | | Compulsory Course I | To be Selected from the list of Compulsory Courses | 3 | Compulsory – 6 Core – 8 Elective – 8 GI & H – 1 Total – 23 |
| | | Compulsory Course II (Skill Based) | To be Selected from the list of Compulsory Courses (Skill Based) | 3 | |
| | BSCZOO0101 | Major Core Course I | Invertebrates I | 3 | |
| | BSCZOO0102 | Major Core Course II | Invertebrates II | 3 | |
| | | Minor Elective Course I (a) | To be Selected from the list for Minor Elective Subject other than zoology | 3 | |
| | | Minor Elective Course I (b) | To be Selected from the list for Minor Elective Subject other than zoology | 1 | |
| | BSCZOO0101(P) | Major Core Lab Course I | Invertebrates I | 1 | |
| | BSCZOO0102(P) | Major Core Lab Course II | Invertebrates II | 1 | |
| | | Minor Elective Lab Course I (a) | To be Selected from the list for Minor Elective Subject other than zoology | 1 | |
| | | Minor Elective Lab Course I (b) | To be Selected from the list for Minor Elective Subject other than zoology | 1 | |
| | | GI and H Course I | To be Selected from the list GI and Hobby Courses | 1 | |

| | | | | | |
|----------------------|----------------------|---|---|----------------------------|---|
| II (Even) | | Compulsory Course III | To be Selected from the list of Compulsory Courses | 3 | Compulsory – 6 (12) Core – 8 (16) |
| Semester | Course Code | Course Type | Course Name | Credit(s)/ week | Cumulated Credits Category-wise |
| | | Compulsory Course IV(Skill Based) | To be Selected from the list of Compulsory Courses (Skill Based) | 3 | Elective – 8 (16) GI & H – 1 (2) Total 23 (46) |
| | BSCZOO0203 | Major Core Course III | Biology of Chordates I | 3 | |
| | BSCZOO0204 | Major Core Course IV | Biology of Chordates II | 3 | |
| | | Minor Elective Course II (a) | To be Selected from the list for Minor Elective Subject other than zoology | 3 | |
| | | Minor Elective Course II (b) | To be Selected from the list for Minor Elective Subject other than zoology | 3 | |
| | BSCZOO0203(P) | Major Core Lab Course III | Biology of Chordates I | 1 | |
| | BSCZOO0204(P) | Major Core Lab Course IV | Biology of Chordates II | 1 | |
| | | Minor Elective Lab Course II (a) | To be Selected from the list for Minor Elective Subject other than zoology | 1 | |
| | | Minor Elective Lab Course II () | To be Selected from the list for Minor Elective Subject other than zoology | 1 | |
| | | GI and H Course II | To be Selected from the list GI and Hobby Courses | 1 | |
| III (Odd) | | Compulsory Course V | To be Selected from the list of Compulsory Courses | 3 | Compulsory – 6 (18) (Complete) Core – 8 (24) Elective – 8 (24) GI & H – 1 (3) (Complete) Total 23 (69) |
| | | Compulsory Course VI | To be Selected from the list of Compulsory Courses (Skill Based) | 3 | |
| | BSCZOO0305 | Major Core Course V | Developmental Biology | 3 | |
| | BSCZOO0306 | Major Core Course VI | Animal Physiology | 3 | |
| | | Minor Elective Course III (a) | To be Selected from the list for Minor Elective Subject other than zoology | 3 | |
| | | Minor Elective Course III(b) | To be Selected from the list for Minor Elective Subject other than zoology | 3 | |

| Semester | Course Code | Course Type | Course Name | Credit(s)/week | Cumulated Credits |
|------------------|----------------------|----------------------------------|--|----------------|--|
| | | | | | Category-wise |
| | BSCZOO0305(P) | Major Core Lab Course V | Developmental Biology | 1 | |
| | BSCZOO0306(P) | Major Core Lab Course VI | Animal Physiology | 1 | |
| | | Minor Elective Lab Course III(a) | To be Selected from the list for Minor Elective Subject other than zoology | 1 | |
| | | Minor Elective Lab Course III(b) | To be Selected from the list for Minor Elective Subject other than zoology | 1 | |
| | | GI and H Course III | To be Selected from the list GI and Hobby Courses | 1 | |
| IV (Even) | BSCZOO0407 | Major Core Course VII | Cytogenetics | 3 | Core – 12 (36) Elective – 8 ((32) Core / Elective (additional) - 4 Total 24 (93) |
| | BSCZOO0409 | Major Core Course IX | Cell Biology | 3 | |
| | | Minor Elective Course IV (a) | To be Selected from the list for Minor Elective Subject other than Physics | 4 | |
| | | Minor Elective Course IV (b) | To be Selected from the list for Minor Elective Subject other than Physics | 4 | |
| | BSCZOO0407(P) | Major Core Lab Course VII | Cytogenetics | 1 | |
| | BSCZOO0409(P) | Major Core Lab Course IX | Cell Biology | 1 | |
| | | Minor Elective Lab Course IV (a) | To be Selected from the list for Minor Elective Subject other than zoology | 1 | |
| | | Minor Elective Lab Course IV(b) | To be Selected from the list for Minor Elective Subject other than zoology | 1 | |
| | | Core / Elective | | | |

| | | | | | |
|----------------------------|---|--|---|----------------------------|--|
| V (Odd) | BSCZOO0510 | Major Core Course X | Biochemistry | 3 | Core – 12 (48) Elective – 8 |
| | BSCZOO0511 | Major Core Course XI | Biotechnology | 3 | |
| Semester | Course Code | Course Type | Course Name | Credit(s)/ week | Cumulated Credits Category-wise |
| | | Minor Elective Course V(a) | To be Selected from the list for Minor Elective Subject other than Physics | 3 | |
| | | Minor Elective Course V(b) | To be Selected from the list for Minor Elective Subject other than Physics | 3 | |
| | BSCZOO0510(P) | Major Core Lab Course X | Biochemistry | 1 | |
| | | Minor Elective Lab Course V (a) | To be Selected from the list for Minor Elective Subject other than zoology | 1 | |
| | | Minor Elective Lab Course V (b) | To be Selected from the list for Minor Elective Subject other than zoology | 1 | |
| | | Core / Elective Course (Additional)* | Any one of the Additional or open elective courses | 4 | |
| VI (Even) | BSCZOO0613 | Major Core Course XIII | Ecology | 3 | Core – 8 (56) Core / Elective (additional) – 20* Total 28 (145) |
| | BSCZOO0614 | Major Core Course XIV | Applied Zoology | 3 | |
| | BSCZOO0613(P) | Major Core lab Course XIII | Ecology | 1 | |
| | BSCZOO0614(P) | Major Core lab Course XIV | Applied Zoology | 1 | |
| | BSC(Or Other than Science) (Zoo or other than zoology) 06** | Core / Elective Course (Additional)* | Any one of the Additional or open elective courses | 4 | |
| | BSC(Or Other than Science) ZOO(or other than zoology) 06** | Core / Elective Course (Additional)* | Any one of the Additional or open elective courses | 4 | |
| | BSC(Or Other than Science) ZOO(or other than zoology) 06** | Core / Elective Course (Additional)* | Any one of the Additional or open elective courses | 4 | |
| | BSC(Or Other than Science) ZOO(or other than zoology) 06** | Core / Elective Course (Additional)* | Any one of the Additional or open elective courses | 4 | |
| Semester | Course Code | Course Type | Course Name | Credit(s)/ week | Cumulated Credits Category-wise |
| | BSC(Or Other than Science) ZOO(or other than zoology) 06** | Core / Elective Course (Additional)* | Any one of the Additional or open elective courses | 4 | |

Note: Students in VI th semester can opt any of the following courses.

***Additional Elective Courses offered by ZOOLOGY Department (can be chosen for earning credits over and above 48 Major subject credits, 48 Minor elective credits, 9 (Min.) Compulsory course credits and 1 (Min.) 3G I&H Course credits i.e. total 106 credits; for getting B.Sc. Degree a learner has to earn a minimum of 120 credits.)**

| Semester | Course Code | Course Type | Course Name | Credit(s)/ week | Cumulated Credits Category wise |
|----------|--|---|---------------------------------------|-----------------|---------------------------------|
| VI | BSCZOO0408 | Core / Elective Course (Additional)* | Evolutionary Biology | 3 | |
| VI | BSCZOO0408(P) | | Evolutionary Biology | 1 | |
| VI | BSCZOO0512 | Core / Elective Course (Additional)* | Molecular Biology | 3 | |
| VI | BSCZOO0512(P) | | Molecular Biology | 1 | |
| VI | BSCZOO0615 (also open in IV semester) | Core / Elective Course (Additional)* | Parasitology | 4 | |
| VI | BSCZOO0616 | Core / Elective Course (Additional)* | Radiation Biology | 4 | |
| VI | BSCZOO0617 (also open in V Semester) | Core / Elective Course (Additional)* | Entomology | 4 | |
| VI | BSCZOO0618 | Core / Elective Course (Additional)* | Wild Life and conservation Biology | 4 | |
| VI | BSCZOO0619 | Core / Elective Course (Additional)* | Human Biology | 4 | |
| VI | BSCZOO0620 | Core / Elective Course (Additional)* | Animal Behaviour | 4 | |
| VI | BSCZOO0621 | Core / Elective Course (Additional)* | Fish Biology | 4 | |

***Open Elective Courses offered by ZOOLOGY Department**

| Semester | Course Code | Course Type | Course Name | Credit(s)/ week | Cumulated Credits Categorywise |
|-----------------|--------------------|--|------------------------|------------------------|---------------------------------------|
| VI | BSZOO0622 | Open /Core Elective Course (Additional)* | Environment Management | 4 | |
| VI | BSCZOO0623 | Core / Elective Course (Additional)* | Biodiversity | 4 | |

(B) Structure Outline of Minor Elective in ZOOLOGY for other than Major Zoology Students (Minimum Credits to be Earned=24). Other than Zoology Major learner can do Double major by earning 34 more credits over and above 24 credits of Minor.

| Semester | Course Code | Course Name | Course Name | Credit(s)/week | Cumulated Credits Category-wise |
|--------------|----------------------|---|-------------------------------|----------------|--|
| I (Odd) | | Compulsory Course I | | 3 | Compulsory – 6 Core – 8 Minor Elective 1(a) – 4(4) Minor Elective 1(b)=4 Total Minor Electives – 8 (8) GI & H – 1 Total – 23 |
| | | Compulsory Course II (Skill Based) | | 3 | |
| | | Major Core Course I | | 3 | |
| | | Major Core Course II | | 3 | |
| | BSCZOO0101 | Minor Elective Course I (a) | Invertebrates I | 3 | |
| | | Minor Elective Course I (b) | | 1 | |
| | | Major Core Lab Course I | | 1 | |
| | | Major Core Lab Course II | | 1 | |
| | BSCZOO0101(P) | Minor Elective Lab Course I (a) | Invertebrates I | 1 | |
| | | Minor Elective Lab Course I (b) | | 1 | |
| | GI and H Course I | | 1 | | |
| II (Even) | | Compulsory Course III | | 3 | Compulsory – 6 (12) Core – 8 (16) Minor Elective II(a) – 4 (8) Minor Elective II(b) – 4 (8) Total Minor Electives – 8 (16) GI & H – 1 (2) Total 23 (46) |
| | | Compulsory Course IV(Skill Based) | | 3 | |
| | | Major Core Course III | | 3 | |
| | | Major Core Course IV Optics | | 3 | |
| | BSCZOO0203 | Minor Elective Course II (a) | Biology of Chordates I | 3 | |
| | | Minor Elective Course II (b) | | 3 | |
| | | Major Core Lab Course III | | 1 | |
| | | Major Core Lab Course IV | | 1 | |
| | BSCZOO0203(P) | Minor Elective Lab Course II (a) | Biology of Chordates I | 1 | |
| | | Minor Elective Lab Course II () | | 1 | |
| | GI and H Course II | | 1 | | |

| III (Odd) | | Compulsory Course V | | 3 | Compulsory – 6 (18) |
|--------------|-------------------|--|------------------------------------|--------------------|---|
| Semester | Course Code | Course Name | Course Name | Credit(s)/ week | Cumulated Credits Category-wise |
| | | Compulsory Course VI | | 3 | (Complete) Core – 8 (24) |
| | | Major Core Course V | | 3 | Minor Elective III(a) – 4 (12) Minor Elective III(b) – 4 (12) Elective – 8 (24) GI & H – 1 (3) (Complete) Total 23 (69) |
| | | Major Core Course VI | ----- | 3 | |
| | BSCZOO0102 | Minor Elective Course III (a) | Invertebrates II | 3 | |
| | | Minor Elective Course III(b) | ----- | 3 | |
| | | Major Core Lab Course V | ----- | 1 | |
| | | Major Core Lab Course VI | ----- | 1 | |
| | BSCZOO0102 (P) | Minor Elective Lab Course III(a) | Invertebrates II | 1 | |
| | | Minor Elective Lab Course III(b) | ----- | 1 | |
| | | GI and H Course III | ----- | 1 | |
| IV (Even) | | Major Core Course VII | ----- | 4 | |
| | | Major Core Course VIII Nuclear Physics | ----- | 4 | |
| | | Major Core Course IX Particle Physics | ----- | 4 | |
| | BSCZOO0204 | Minor Elective Course IV (a) | Biology of Chordates II | 4 | |
| | | Minor Elective Course IV (b) | ----- | 4 | |
| | | Major Core Lab Course VII | ----- | 1 | |
| | | Major Core Lab Course VIII | ----- | 1 | |
| | BSCZOO0204(P) | Minor Elective Lab Course IV (a) | Biology of Chordates II | 1 | |
| | | Minor Elective Lab Course IV(b) | ----- | 1 | |
| | | Core / Elective Course (Additional)* | ----- | 4 | |
| V (Odd) | | Major Core Course X | ----- | 3 | Core – 12 (48) Minor Elective V(a) – 4 (20) Minor Elective V(b) – 4 (20) Total Minor Electives – 8 |
| | | Major Core Course XI | ----- | 3 | |
| | | Major Core Course XII | ----- | 3 | |
| | BSCZOO0305 | Minor Elective Course V(a) | Developmental Biology | 3 | |
| | | Minor Elective Course V(b) | ----- | 3 | |

| Semester | Course Code | Course Name | Course Name | Credit(s)/week | Cumulated Credits Category-wise |
|--------------|----------------------|--------------------------------------|------------------------------|----------------|--|
| | | Major Core Lab Course X | ----- | 1 | (40) (Complete) Core / Elective (additional) - 4 Total 24 (117) |
| | | Major Core Lab Course XI | ----- | 1 | |
| | | Major Core Lab Course XII * | ----- | 1 | |
| | BSCZOO0305(P) | Minor Elective Course V | Developmental Biology | 1 | |
| | | Minor Elective Lab Course V (b) | ----- | 1 | |
| | | Core / Elective Course (Additional)* | ----- | 4 | |
| VI (Even) | | Major Core Course XIII | ----- | 4 | Core – 8 (56) Core / Elective (additional) – 20* Total 28 (145) |
| | BSCZOO0614 | Minor Elective Course VI(a) | Applied Zoology | 3 | |
| | | Core / Elective Course (Additional)* | ----- | 4 | |
| | | Core / Elective Course (Additional)* | ----- | 4 | |
| | | Core / Elective Course (Additional)* | ----- | 4 | |
| | | Core / Elective Course (Additional)* | ----- | 4 | |
| | | Core / Elective Course (Additional)* | ----- | 4 | |
| | BSCZOO0614(P) | Minor Elective course VI | Applied Zoology | 1 | |

Human Diseases**15hrs**

Epidemiology, transmission, prevention and control of common human diseases: TB, dengue, cholera, typhoid, small pox and AIDS. Brief account of life history, mode of infection and pathogenicity of following pathogens: *entamoebahistolitica*, *trypanosoma*, *Echinococcus*, *Wuchereria*, *Dracunculus* and *oxyuris*. Non communicable diseases diabetes, arthritis, gout, hypertension, cardiovascular diseases. Vectors : Examples, structures associated with disease transmission and names of diseases transmitted by fleas, ticks and mosquitoes; management of these vectors. Brief introduction to human defense mechanism- antigens, immunoglobulins-structure, types and functions. Allergies. Auto immune diseases.

Community health and welfare.**6hrs**

Mental health causes and remedy. Addictions-tobacco, alcohol, drugs, stimulants. Effect of addictions on adolescent health. National immunization programme. Implantation, pregnancy and infertility. Assisted reproductive techniques (IVF, IVT). Family planning.

Animal Husbandry**9hrs**

Livestock-concept, breeds of cattle in India. Exotic breeds, common diseases in animals, preservation and artificial insemination in cattle. Cattlebreeding. Role of biotechnology in animal husbandry. Embryo transfer technique, cryopreservation. Knockout animals.

Applied Entomology**10hrs**

Bionomics and control of crop pest of rice, wheat, sugarcane, cotton. Pesticides: types, advantages and hazards of chemical pesticides. Biological methods of pest control, benefits. IPM, Apiculture w.r.t. apiculture in H.P. Lac culture, sericulture-w.r.t. H.P. Pisciculture-edible food fish of India and HP. Poultry farming. Zebra fish as a model for biotechnology.

BSCZOO0614(P) APPLIED ZOOLOGY PRACTICALS**Marks 50****credits 1**

- Study of permanent slides and specimens of protozoan, helminthic parasites associated with human diseases.
- Economic importance of insect pests of rice, wheat, sugarcane and cotton-identification of their adults and preparation of their life cycles.
- Study of beneficial insects their life cycles and their products
- Visit to veterinary centre/ poultry farm/ apiary/ fish farm and prepare visit report.
- Project report on any topic of the theory paper.

Suggested readings:

1. Park, K. (2007) Preventive and social medicine. XVI Edition. B.B Publisher.
2. Arora, D.R and Arora, B. (2001) Medical Parasitology. II Edition. CBS Publications and Distributers.
3. Chaudhury, S.K. (1996) Practice of fertility Control, A Comprehensive Textbook. B.I.Churchill Livingston Pvt Ltd, India.
4. Hafez, E. S. E. (1962). Reproduction in Farm Animals. Lea & Fabiger Publisher.

Annexure-III

For the Session 2014-15

Scheme of Examinations for every major /minor and additional course:

| | | |
|---|----------|--------------|
| End semester examination | 50 marks | Time 3 hrs |
| Mid-term test after 48 teaching days | 15 marks | |
| Mid-term test after 90 teaching days | 15 marks | |
| Assignments/seminar (with power point presentation) | 15 marks | Time 30 mins |
| Minimum 30 min. duration | | |
| Class Room Attendance | 05 marks | |
| Practicals of every major/minor/additional course | 50 marks | Time 3 hrs |

For the session 2015-16

Scheme of Examinations for every major /minor and additional course:

| | | |
|---|--|------------|
| End semester examination | = 40 marks | Time 3 hrs |
| Internal Assessment= | 30 Marks (Unit Test= 15 Marks, Assignment=10 Marks & Attendance= 5 Marks) | |
| Practicals of every major/minor/additional course | 30 Marks | Time 3 hrs |
| GI/Hobby Courses | 25 Marks | |