

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	
	BSCZOO0613	Major Core Course XIII	Ecology	3	
	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	
VI (Even)	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	Core – 8 (56) Core / Elective (additional) – 20*
	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	Total 28 (145)
	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	