



Central University of Himachal Pradesh
(ESTABLISHED UNDER CENTRAL UNIVERSITIES ACT 2009)
Dharamshala, Himachal Pradesh-176215



NAAC Criterion-I

Key Indicator –1.1.3

**Skill Development offered by the
institution during last 5 years**

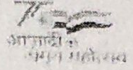
1.1.3 Evidences



**Department of Animal Science
Central University of Himachal Pradesh, Dharamshala,
Kangra**



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INDEX
Department of Animal Science

S.No.	Description	Page No.
1	Syllabus copies of the courses highlighting the focus on the employability/entrepreneurship/ skill development along with their course outcomes	1-4
2	Mapping of the courses to employability/ entrepreneurship/ skill development	5-6

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31/2/22

विभागाध्यक्ष/Head
पशु विज्ञान विभाग/Department of Animal Sciences
जीव विज्ञान स्कूल/School of Life Sciences
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Central University of Himachal Pradesh

Human Making and Skill Development Courses to be offered by the Department of Animal Sciences:-

SEMESTER-I

Human Making Courses (Total Credits =02)			
1	ZOO 409	Sericulture and Apiculture	2
Skill Development Courses (Total Credits = 02)			
1	ZOO 410	Advanced techniques in biology	2

SEMESTER-II

Human Making Course (Total Credits = 02)			
1.	ZOO 460	Aquaculture	2
Skill Development Course (Total Credits = 02)			
1.	ZOO 461	Basics of Wild Life Study	2



निर्भागाध्यक्ष/Head

शुभु विभागा विभाग/Department of Animal Sciences
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Central University of Himachal Pradesh



हिमाचल प्रदेश केन्द्रीय विश्वविद्यालय
Central University of Himachal Pradesh
(Established under Central Universities Act 2009)

अस्थाई शैक्षणिक खण्ड, शाहपुर, ज़िला काँगड़ा, हिमाचल प्रदेश - 176206
Temporary Academic Block, Shahpur, Distt. Kangra (HP) – 176206
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SEMESTER- I

Course Code: ZOO 410 **Course Name: Advanced Techniques in Biology** **Credit: 02**

Programme Outcome: This skill based course will teach the students the various instrumentations that are used in the analytical laboratories. This course covers both fundamental and applications of the instruments that are routinely used for the characterization of biomolecules

Course Outcome: At the end of the course, the student has the basic knowledge on the theory, operation and function of analytical instrument

Course Content:

UNIT –I: Microscopy and Image Analysis

Significance of microscopy, stereoscopic zoom microscope, compound microscope, Bright field microscope; fluorescence microscope; confocal microscope,

UNIT –II: Scanning Electron Microscope (SEM) and Transmission Electron Microscope (TEM). Image acquisition and data analysis.

UNIT –III: Analytical Techniques and Instrumentation

Colorimetry; Spectrophotometry, Atomic Absorption Spectrophotometry (AAS), Basic Lab Instruments Skills using Laminar Air Flow, Incubator, Oven, Autoclave etc. Cell Staining Techniques, Cell Culture of Prokaryote and Eukaryote. Basic Sterilization Techniques in Laboratory. Reagent Preparation in Lab.

UNIT –IV:

Chromatographic Techniques, Thin Layer Chromatography, Paper Chromatography, High Performance Liquid Chromatography, Gas Chromatography, GC Mass Spectroscopy.

UNIT –V:

Electrophoresis and PCR, Immunological techniques like ELISA and RIA, Chromatography – HPLC/GCMS, ICPMS.



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SEMESTER -II

Course Code: ZOO 461

Course Name: Fundamentals of Wild life

Credits: 2

Programme outcomes: The students will be able to understand Wildlife Protection Act. They know how to protect the remaining population of endangered species by banning hunting, giving legal protection to their habitats and finally, restricting wildlife trade.

Course Outcomes: Students will understand about management of wild life include conservation, preservation, consumption, and non-consumptive objectives

Course Content:

Unit 1: Basic Concept of Wildlife Biology:

Definition and importance of wildlife and biodiversity; Values of wildlife- positive and negative; Threatened wildlife and IUCN status - Concept of Extinct, Critically Endangered, Endangered, Vulnerable and rare species ; Red data book; Conservation ethics; Importance of conservation; Causes of depletion; World conservation strategies: WCS, CBD, Agenda 21

Unit 2: Wildlife sampling:

Random sampling, systematic sampling, stratified sampling, cluster sampling.
Habitat analysis: a) Physical parameters: Topography, Geology, Soil and water; b) Biological Parameters: food, cover, forage, browse and cover estimation; Faecal analysis of ungulates and carnivores: Faecal samples, slide preparation, and Hair identification; Pug marks and Census methods
Standard evaluation procedures: remote sensing and GIS.

Unit 3: Wildlife conservation strategies and Policies

Estimation of carrying capacity; Human-wildlife conflict; Eco tourism / wild life tourism in forests; Climax communities: characteristics and theories; Ecology of perturbation.
In situ and *Ex situ* conservation- problems and prospects; Sanctuaries, National parks, Community Reserves and Conservation Reserves; Biosphere Reserve, Concept of corridor; Joint forest management; Case studies



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Environmental Laws- Environment Protection Act, Air act, Water act, Wildlife protection act, Forest conservation act

Unit 4: Wildlife conservation in Indian perspective

Aims & Objectives of wildlife conservation. Wildlife wealth of India; causes for depletion of Indian wildlife; wildlife conservation in India- through age, post-independence initiatives. Different approaches for conservation – *in situ* and *ex situ*, Conservation breeding; Threats to wildlife conservation in India.

Unit 5: Management of important wild animals

Conservation status, habit & habitat, behavioural biology, threats and conservation management of the animals-Himalayan salamander/Olive ridley turtles/Great Indian bustard/Himalayan musk deer/Ganges river dolphin.

- Project tiger
- Project elephant
- Project crocodile
- Project one-horned rhinoceros

Books:

1. Saha, G.K. and Mazumdar, S. (2017). Wildlife Biology: An Indian Perspective. PHIlearning Pvt. Ltd. ISBN: 8120353137, 978-812035313
2. Sinclair, A.R.E., Fryxell, J.M. and Caughley, G. (2006). Wildlife Ecology, Conservation and Management. Wiley-Blackwell, Oxford, UK.
3. Singh, S.K. (2005). Text Book of Wildlife Management. IBDC, Lucknow.
4. Singh, I.K. and Maurya A.K. (2016) Basics of Environmental Studies, Book Age Publications, ISBN: 9789383281411

Mapping of the Courses to employability/entrepreneurship/Skill Development

Class	Course Name	Course Code	Employability / Entrepreneurship
1	Sericulture and Apiculture	ZOO 409	Job opportunities in various state government and central government sectors. Employability in various institutes and starting new industries of sericulture and honey production.
2	Cytogenetic and Principles of Biochemistry Lab	ZOO 454	Students will have the level of expertise information in cytogenetic and biochemistry which will allow studying deep about DNA, RNA, protein and metabolites. The students will become competent for jobs in pharmaceutical industry and research institutes.
3	Aquaculture	ZOO 460	Students will have the level of expertise information in aquaculture production, design, aquaculture health, feed technology and feeding, fishing, fishing management, applied sciences, processing and evaluation.
4	Animal Taxonomy and Histology Techniques Lab	ZOO 405	Jobs in various industries such as pharmaceutical companies and R & D areas in various institutes and companies
5	Fundamental in Microbiology	ZOO 457	The students adapt in the structure and functions of these microbes which in turn will give them confidence to work using these organisms. The students will become competent for jobs in dairy, pharmaceutical, industrial and clinical research.
6	Agricultural Entomology	ZOO 510	Understanding the sustainability of agriculture, the course will help to design new pest control and pest management methods.
7	Genomics and Proteomics	ZOO 517	Students can apply their knowledge of genomics and proteomics in not only performing research at postgraduate level but also in doctorate level. The students can apply their knowledge of particular subject in research related to disease diagnosis and treatment.
8	Advances in Entomology and Pest Management	ZOO 509	The course will help to understand the sustainable agriculture and new approached involved in integrated pest management. Employability in state agricultural department and various agricultural companies.
9	Medical Microbiology	ZOO 555	Understand the concepts of microbiology and the mechanism of cellular and humoral immune response. Students adapt in the structure and functions of these microbes which in turn will give them confidence to work using these organisms.
10	Advances in Molecular Biology	ZOO 516	Students can apply their knowledge of molecular biology in doctoral research and creating regional diagnostic labs.
11	Fisheries and Limnology Lab	ZOO 515	Students will have the level of expertise information in aquaculture production, design, aquaculture health, feed technology and feeding, fishing, fishing management, applied sciences, processing and evaluation.
12	Applied Zoology	ZOO 474	Understanding the sustainability and impact of biodiversity. Understanding of the ethical issues with emphasis on ecology and biology.
13	Advanced Techniques of Biology	ZOO 423	Students will understand various advanced techniques in biology which will provide them platform for research in doctorate level and start new research and diagnostic labs.
14	Structure and Function of Invertebrates	ZOO 416	Students will have the level of expertise information in structure and function of invertebrates. Job opportunities in research institutes and wildlife department.
15	Animal Physiology	ZOO 415	The course gives the students skills in animal growth and behavior. Opportunities in various veterinary sector and animal research institutes.
16	Developmental Biology	ZOO 468	Apply key principles of developmental biology toward evaluating and analyzing primary literature in the field. Be able to explain key concepts, including mechanisms by which differential gene activity controls development, mechanisms that determine cell fate and mechanisms that

			ensure consistency and reliability of development.
17	Role of Artificial Intelligence in Animal Science Research	ZOO 573	The Artificial Intelligence is transforming the whole research in different areas and aspects. The course will provide the advanced knowledge of AI towards animal's science research. The students will able to develop specific software's to tackle animal diseases and reform the animal research.
18	Use of advanced software's like: Biorender, GIS, Mendeley and Turnitin etc in research	ZOO 574	The course is in dual mode, i.e., theoretical and practical. The course will provide deep knowledge about various advanced software's used in biological science research. This will provide opportunity to students to work as creator or investigator in various projects and labs.
19	Histology and Histochemistry	ZOO 475	Jobs in various industries such as pharmaceutical companies and R & D areas in various institutes and companies.
20	Advances in Aquaculture and Fishery	ZOO 517	Students will have the level of expertise information in aquaculture production, design, aquaculture health, feed technology and feeding, fishing, fishing management, applied sciences, processing and evaluation.
21	Medical Biochemistry and Health	ZOO 507	To understand the function and structure of DNA, RNA, proteins and metabolites. The course will provide deep knowledge of biochemistry in health and students will have job opportunities in pharmaceutical and clinical areas.
22	Animal Biotechnology	ZOO 506	To provide in depth knowledge about the central dogma of life. To understanding the structure and function of DNA, RNA and protein. To understand the flow of genetic information and its regulation in cells. The offered course have promising role in animal and dairy sector.
23	Fundamentals of Wildlife	ZOO 461	Employability in wildlife conservation, forest department and vicarious NGO's.
24	Chronobiology	ZOO 408	The course will provide the deep knowledge of biological rhythms and times. This course will provide research opportunities to students in workplace health and security.
25	M.Sc. Dissertation	ZOO 599	Working on a specific assignment to fill the research gap in the specific area. Employability in various Industries and research institutes.