



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



NAAC Criterion-I

Key Indicator –1.3.2

**Value added courses offered during last
5 years**

1.3.2 Evidences



Department of Animal Science

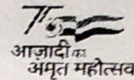
**Central University of Himachal Pradesh, Dharamshala,
Kangra**



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INDEX

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S.No.	Description	Page No.
1	List of value-added courses which are optional and offered outside the curriculum of the programs as endorsing by the appropriate authority.	1
2	Brochure and Course content or syllabus along with course outcome of value-added courses offered.	2-8

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31/2/23

विभागाध्यक्ष/Head

पशु विज्ञान विभाग/Department of Animal Sciences

जीव विज्ञान स्कूल/School of Life Sciences

हिमाचल प्रदेश केंद्रीय विश्वविद्यालय धर्मशाला

Central University of Himachal Pradesh



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Temporary Academic Block, Shahpur, Distt. Kangra (HP) – 176206

Website: www.cuhimachal.ac.in

Ref. No. Animal Science/2-5/(Headfile)/CUHP/2021-743

Date: 27/3/23

TO WHOM IT MAY CONCERN

This is certified that department of Animal Science offer following value added course for master's students for session 2020-2021. Name of courses are as follows:

- | | |
|-------------------------|---|
| 1. Course Code: ZOO 409 | Course Name: Sericulture and Apiculture |
| 2. Course Code: ZOO 410 | Course Name: Advanced Techniques in Biology |
| 3. Course Code: ZOO 460 | Course Name: Aquaculture |
| 4. Course Code: ZOO 461 | Course Name: Fundamentals of Wild life |

The detailed course content are attached herewith.

Thanking you

Prof. Sunil Kumar

HOD, Department of Animal Science

School of Life Science

Central University of Himachal Pradesh

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SEMESTER- I

Course Code: ZOO 409

Course Name: Sericulture and Apiculture

Credit: 02

Programme Outcome: By the end of the program the students will be able to acquire competency in the discipline with sound knowledge and skill in Sericulture and Apiculture.

Course Outcome: The learner will be able to understand the basics of beekeeping and silkworm tools, equipment, and managing beehives. They will be able to understand the primary life cycle of the honeybees, beekeeping tools and equipment and silkworm techniques.

Course Content:

Unit-I

Silk and Silk Production: Origin and history of Sericulture, Different types of silk and silkworms in India; Rearing of *Bombyx mori* – Rearing racks and trays, disinfectants, rearing appliances, black boxing, Chawki rearing, bed cleaning, mountages, harvesting of cocoons. Topography and climate for mulberry cultivation – latitude, temperature, humidity, rain fall, elevation and sun shine.

Silkworm diseases and Pest: Pebrine, Flacherie, Grasserie, Muscardine and Aspergillosis, and their management;

Unit-II

Beneficial and harmful insects: Rearing of silkworm, honey bee and lac insects. Silkworm rearing appliances and their uses. Disinfection of rearing house and appliances. Incubation and black boxing of silkworm eggs. Brushing of silkworm larvae. Feeding, bed cleaning and spacing in silkworm rearing. Moulting and care at moulting. Mounting and density of silkworm larvae for spinning.

Unit-III

Processing of Silk: Physical and commercial characters of cocoons and silk. Cocoon sorting, stifling and cooking. Silk reeling devices – charaka, cottage basin, multi end, auto and semi-automatic reeling machines. Process of silk reeling, throwing, wet processing and weaving. Medicinal value of products and by-products of sericulture industry and their utilization.

Unit-IV

Importance and history of apiculture. Species of honey bees; their morphology, anatomy, colony organization, life cycle and Social behaviour. Beekeeping equipment. Queen rearing. Collection and preservation of bee pasture.

Unit-V

Seasonal management. apiculture and crop pollination. Economics of beekeeping. Familiarization with bee enemies and diseases and their control. Handling of bee colonies and manipulation for honey production.

Recommended Books:

1. Indian Journal of Sericulture - Cumulative Index by J. Justin Kumar.
2. Biological control of Insects pests in Mulberry sericulture by J.B. Narendra Kumar, Vinod Kumar and V. Sivaprasad.
3. Dandin, S.B.; Jayant Jayaswal and Giridhar, K. (Eds.) (2003) Handbook of Sericulture Technologies. CSB, Bangalore.
4. Dilip De Sarkar (1998) The Silkworm – Biology, Genetics and Breeding. Vikas Publishing House Pvt. Ltd., New Delhi
5. Journal of Sericulture and Technology - Published by NASSI, Bangalore.





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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 460

Course Name: Aquaculture

Credit: 02

Programme Outcome: Aqua students will have comprehensive knowledge in the discipline of Fishery Science and Aquaculture. They will have ability of making comprehensive analysis, Hatchery Management and marketing

Course Outcome: Students will be able to define, comprehend, scope and significance of aquaculture. Acquire knowledge on taxonomy and morphology of fishes

Course Content:

Unit-I

Definition, History, Purpose, Scope and Status of Aquaculture, Kinds of Fisheries, Culture technology– freshwater (carps, Trout).

Unit-II

Abiotic (Physicochemical Factors in Freshwater Ecosystem): Physical characteristics of water: Temperature, thermal stratification, Light, Density, Water movement and thermal exchange.

Chemical characteristics of water: Hydrogen ion concentration (pH), Dissolved oxygen, Free carbon-dioxide, Total dissolved solids (T.D.S), Carbonates and Bicarbonates.

Unit-III

Integrated farming - fish-cum-live stock farming, paddy-cum-fish farming, Induced breeding, cryopreservation of gametes.

Unit-IV

Biochemical Composition, Preservation, Rigor mortis, feed types, manufacture and ingredients, Ailments and diseases of fishes, common fish pathogens, control of fish diseases.

Unit-V

Genetics approach to aquaculture – gynogenesis, androgenesis, triploidy, tetraploidy, hybridization, sex reversal and breeding, production of transgenic fish. Environmental impact of aquaculture - aquacultural

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wastes and future developments in waste minimization, environmental consequences of hypernutrification.

Recommended Books:

1. Aquaculture Principles and Practices, Pillay, T. V. R., Blackwell Publishing, USA.
2. Aquaculture and Fisheries Biotechnology Genetic Approaches, Dunham, R. A., CABI Publishing, USA.
3. Joseph, M. Aquaculture in Asia. Manglore: Asian Fisheries Society, 1990.

Palash *Renu* *Sonia*



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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