



List of Courses which focuses on Professional Ethics, Gender, Human Values, Environment & Sustainability and other value framework

Department : Zoology

Programme Name : B.Sc.

Academic Year :2018-19

Courses which focuses on Professional Ethics, Gender, Human Values, Environment & Sustainability and other value framework:

| Sr. No. | Course Code | Name of the Course |
|---------|------------------|-------------------------------|
| 01. | LS/ZOO/CC-102 L | Principles of Ecology |
| 02. | LS/ZOO/GE-101 L | Aquatic Biology |
| 03. | LS/ZOO/GE-201 L | Environment and Public Health |
| 04. | LS/ZOO/AE-201/ES | Environmental Science |
| 05. | AECC-EVS-I | Environmental Science |
| 08. | AECC-EVS-II | Environmental Science |
| 09. | ZOO-CC-XII | Environmental Biology |

A. V. K. Bhatnagar

विभागमध्यक्ष
HEAD
जन्तु विज्ञान विभाग
Department of Zoology
गुरु घासीदास वि.वि., बिलासपुर
Guru Ghasidas Vishwavidyalaya, Bilaspur



Scheme and Syllabus

B.Sc. Hon's (Zoology): CBCS 2018-2019

School of Life Sciences

| Semester I | | | | |
|--|------------------|--|-----------|-----------|
| Course Opted | Course Code | Name of the course | Credit | H/week |
| Core Course-1 Theory | LS/ZOO/CC-101 L | Non Chordates - I (Protozoa to Pseudocoelomate) | 4 | 4 |
| Core Course-1 Practical | LS/ZOO/CC-101 P | Lab Course | 2 | 4 |
| Core Course-2 Theory | LS/ZOO/CC-102 L | Principles of Biology | 4 | 4 |
| Core Course-2 Practical | LS/ZOO/CC-102 P | Lab Course | 2 | 4 |
| Generic Elective-1 Theory | LS/ZOO/GE-101 L | Aquatic Biology | 4 | 4 |
| Generic Elective-1 Practical | LS/ZOO/GE-101 P | Lab Course | 2 | 4 |
| Ability Enhancement Compulsory Course-1 | LS/ZOO/AE-101/EC | English Communication / MIL (Hindi Communication) | 4* | 4 |
| Extracurricular activity | | Tour, Field visit/ Industrial training/ NSS/ Swachhta/ Vocational Training/ Sports/ others | 2 | (2) |
| TOTAL | | | 24 | 28 |
| Semester II | | | | |
| Core Course-3 Theory | LS/ZOO/CC-201 L | Non Chordates - II (Coelomates) | 4 | 4 |
| Core Course-3 Practical | LS/ZOO/CC-201 P | Lab Course | 2 | 4 |
| Core Course-4 Theory | LS/ZOO/CC-202 L | Cell Biology | 4 | 4 |
| Core Course-4 Practical | LS/ZOO/CC-202 P | Lab Course | 2 | 4 |
| Generic Elective-2 Theory | LS/ZOO/GE-201 L | Environment and Public Health | 4 | 4 |
| Generic Elective-2 Practical | LS/ZOO/GE-201 P | Lab Course | 2 | 4 |
| Ability Enhancement Compulsory Course-2 | LS/ZOO/AE-201/ES | Environmental Science | 4* | 4 |
| Extracurricular activity | | Tour, Field visit/ Industrial training/ NSS/ Swachhta/ vocational Training/ Sports/ others | 2 | (2) |
| Total | | | 24 | 28 |
| Summer Internship: 15 days | | Swachta Swachhta (NSS / Industrial/ others | 2 | 100 |
| Semester III | | | | |
| Core Course-5 Theory | LS/ZOO/CC-301 L | Diversity of chordates | 4 | 4 |
| Core Course-5 Practical | LS/ZOO/CC-301 P | Lab Course | 2 | 4 |
| Core Course-6 Theory | LS/ZOO/CC-302 L | Physiology: Coordinating and Coordinating systems | 4 | 4 |
| Core Course-6 Practical | LS/ZOO/CC-302 P | Lab Course | 2 | 4 |
| Core Course-7 Theory | LS/ZOO/CC-303 L | Fundamentals of Biochemistry | 4 | 4 |
| Core Course-7 Practical | LS/ZOO/CC-303 P | Lab Course | 2 | 4 |
| Generic Elective-3 Theory | LS/ZOO/GE-301 L | Food Nutrition and Health | 4 | 4 |
| Generic Elective-3 Practical | LS/ZOO/GE-301 P | Lab Course | 2 | 4 |
| Skill Enhancement Course-1 | LS/ZOO/SEC-301 L | Sericulture | 2 | 4 |
| Skill Enhancement Course-1 | LS/ZOO/SEC-301 P | Lab Course | 2 | 4 |
| Total | | | 28 | 34 |
| Semester IV | | | | |
| Core Course-8 Theory | LS/ZOO/CC-401 L | Comparative anatomy of vertebrates | 4 | 4 |
| Core Course-8 Practical | LS/ZOO/CC-401 P | Lab Course | 2 | 4 |
| Core Course-9 Theory | LS/ZOO/CC-402 L | Physiology: Life Sustaining Systems | 4 | 4 |
| Core Course-9 Practical | LS/ZOO/CC-402 P | Lab Course | 2 | 4 |
| Core Course-10 Theory | LS/ZOO/CC-403 L | Biochemistry of Metabolic Processes | 4 | 4 |



Department of Zoology, GGV, Bilaspur (CG)

Semester III:

| Course type | Course Code | Title of Course | Credits | Hrs/ Wk | Hrs/ Sem |
|---|------------------------|--|---------|---------|----------|
| Zoology (H) | ZOO-CC301 | Animal Diversity: Chordates | 2 | 2 | |
| | ZOO-CC302 | Animal Physiology: Life Sustaining Systems | 2 | 2 | |
| | ZOO-CC303 Practical | Lab Course (301 + 302) | 2 | 4 | |
| <i>Total Credits</i> | | | 6 | | |
| Chemistry | CHEM | | | | |
| | CHEM | | | | |
| | Practical | | | | |
| (optional) Botany/ Biotech. | BOT/ BT | | | | |
| | BOT/ BT | | | | |
| | Practical | | | | |
| Foundation course/ Ability Enhancement Compulsory Course (AECC) | EVS-I | Environment Science- I/ DM | | | |

Semester IV:

| Course type | Course Code | Title of Course | Credits | Hrs/ Wk | Hrs/ Sem |
|---|------------------------|---|---------|---------|----------|
| Zoology (H) | ZOO-CC401 | Basic and Applied Genetics | 2 | 2 | |
| | ZOO-CC402 | Animal Physiology: Controlling and Coordinating Systems | 2 | 2 | |
| | ZOO-CC403 Practical | Lab Course (401 + 402) | 2 | 4 | |
| <i>Total Credits</i> | | | 6 | | |
| Chemistry | CHEM | | | | |
| | CHEM | | | | |
| | Practical | | | | |
| (optional) Botany/ Biotech. | BOT/ BT | | | | |
| | BOT/ BT | | | | |
| | Practical | | | | |
| Foundation course/ Ability Enhancement Compulsory Course (AECC) | EVS-II | Environment Science- II/ DM | | | |

Speci
7/7/17
Mouho
7/7/17

Anatom
7/7/17
Santosh Singh
7/7/17



(3)

Department of Zoology, GGV, Bilaspur (CG)

Semester V:

| Course type | Course Code | Title of Course | Credits | Hrs/ Wk | Hrs/ Sem |
|----------------------|---------------------|--|-----------|---------|----------|
| CC | ZOO-CC-IX | Comparative Anatomy of Non-Chordates and Chordates | 3 | 3 | |
| | ZOO-CC-X | Animal Physiology | 3 | 3 | |
| | ZOO-CC-Practical | Lab Course (VII + VIII) | 3 | 6 | |
| | ZOO-CC-XI IDLS C | Biostatistics and Computer Applications | 3 | 3 | |
| DSE | ZOO-DSE-1 | Elective-I (Endocrinology/ Fish Biology/ Toxicology) | 3 | 3 | |
| | Practical | Lab based on elective & Seminar to decide the project | 3+2 | 6 | |
| Total Credits | | | 20 | | |

Semester VI:

| Course type | Course Code | Title of Course | Credits | Hrs/ Wk | Hrs/ Sem |
|----------------------|------------------|--|-----------|---------|----------|
| CC | ZOO-CC-XII | Environmental Biology | 3 | 3 | |
| | ZOO-CC-XIII | Biotechniques | 3 | 3 | |
| | ZOO-CC-Practical | Lab Course (VII + VIII) | 3 | 6 | |
| | ZOO-CC-XIV | Molecular Biology and Genetic Engineering | 3 | 3 | |
| DSE | ZOO-DSE-2 | Elective-II (Endocrinology/ Fish Biology/Toxicology) | 3 | 3 | |
| | ZOO-DSE-3 | Dissertation/ Project work and Seminar | 3+2 | 6 | |
| Total Credits | | | 20 | | |

Note:

- Groups offered by the Department for Integrated UG/ PG students at entry level
 - Group I: Zoology, Chemistry and Botany (ZCB)
 - Group II: Zoology, Chemistry and Biotechnology (ZCBT)
- After the successful completion of IVth Semester students will have flexibility of changing of Core honors subject as per their interest and availability of the seats in the Department.

Head
 Department of Zoology
 Guru Ghasidas Vishwavidyalaya
 Bilaspur (C.G.)



Department of Zoology, School of Life Sciences, GGV, Bilaspur (CG)

CORE COURSE II

LS/ZOO/CC-102 L

PRINCIPLES OF ECOLOGY

THEORY

(Credits 4)

| | |
|---|-----------|
| Unit 1: Introduction to Ecology | 6 |
| History of ecology; Autecology and synecology; Levels of organization; Laws of limiting factors-Liebig's law of minimum and Shelford's law of tolerance; Study of physical factors | |
| Unit 2: Ecosystem | 12 |
| Types of ecosystems with one example in detail; Trophic levels; Food chain: Detritus and grazing food chains, Linear and Y-shaped food chains; Food web; Energy flow through ecosystem; Ecological pyramids and Ecological efficiencies; Nutrient and biogeochemical cycle (nitrogen cycle); Human modified ecosystem | |
| Unit 3: Population | 18 |
| Unique and group attributes of population: Density, natality, mortality, life tables, fecundity tables, survivorship curves, age and sex ratio, dispersal and dispersion, Exponential and logistic growth, equation and patterns, r and k strategies; Population regulation-density-dependent and independent factors; Population interactions; | |
| Unit 4: Community | 10 |
| Community characteristics: species richness, dominance, diversity, abundance, vertical stratification, Ecotone and edge effect; Ecological Succession, Types of Succession, Theories pertaining to climax community | |
| Unit 5: Human impact on environment | 10 |
| Environmental Pollution: Air, water and noise pollution; Global environmental issues: Greenhouse effect, Acid rain, Global Warming, Ozone depletion. | |
| Unit 6: Applied Ecology | 4 |
| Ecology in Wildlife Conservation and Management | |

Handwritten signatures:
Ramesh
Sandeep Singh

Handwritten signature:
Dangal

**विभागाध्यक्ष
HEAD
जन्तु विज्ञान विभाग
Department of Zoology
गुरु गहासीदास विश्वविद्यालय
कोनी, बिलासपुर - 495009**



Department of Zoology, School of Life Sciences, GGV, Bilaspur (CG)

GENERIC ELECTIVE COURSES

L¹ ZOO/GE-101 L

AQUATIC BIOLOGY

THEORY

(Credits 4)

UNIT 1: Aquatic Biomes

Brief introduction of the aquatic biomes: Freshwater ecosystem (lakes, wetlands, streams and rivers), estuaries, inter-tidal zones, oceanic pelagic zone, marine benthic zone and coral reefs.

UNIT 2: Freshwater Biology

Lakes: Origin and classification, Lake as an Ecosystem, Lake morphometry, Physico-chemical Characteristics: Light, Temperature, Thermal stratification, Dissolved Solids, Carbonate, Bicarbonates, Phosphates and Nitrates, Turbidity, dissolved gases (Oxygen, Carbon dioxide) Nutrient Cycles in Lakes-Nitrogen, Sulphur and Phosphorous.

Streams: Different stages of stream development, Physico-chemical environment, Adaptation of hill-stream fishes.

UNIT 3: Marine Biology

Salinity and density of Sea water, Continental shelf, Adaptations of deep sea organisms, Coral reefs, Sea weeds.

UNIT 4: Management of Aquatic Resources

Causes of pollution: Agricultural, Industrial, Sewage, Thermal and Oil spills, Eutrophication, Management and conservation (legislations), Sewage treatment Water quality assessment- BOD and CO₂.

Moulik

गुरु घासीदास
HEAD
अनु विभाग प्रमुख
Department of Zoology
गुरु घासीदास विश्वविद्यालय, बिलासपुर
Guru Ghasidas Vishwavidyalaya, Bilaspur

Moulik

Sankar Singh



Department of Zoology, School of Life Sciences, GGV, Bilaspur (CG)

GENERIC ELECTIVE COURSES

LS/ZOO/GE-201 L

ENVIRONMENT AND PUBLIC HEALTH

THEORY

(Credits 4)

Unit 1: Introduction

Sources of Environmental hazards, hazard identification and accounting, fate of toxic and persistent substances in the environment, dose Response Evaluation, exposure Assessment.

Unit 2: Climate Change

Greenhouse gases and global warming, Acid rain, Ozone layer destruction, Effect of climate change on public health.

Unit 3: Pollution

Air, water, noise pollution sources and effects, Pollution control.

Unit 4: Waste Management Technologies

Sources of waste, types and characteristics, Sewage disposal and its management, Solid waste disposal, Biomedical waste handling and disposal, Nuclear waste handling and disposal, Waste from thermal power plants, Case histories on Bhopal gas tragedy, Chernobyl disaster, Seveso disaster and Three Mile Island accident and their aftermath.

Unit 5: Diseases

Causes, symptoms and control of tuberculosis, Asthma, Cholera, Minamata disease, typhoid

Course Objective:

To understand the direct and indirect human, ecological and safety affects of major environmental and occupational agents.

Attain knowledge about genetic, physiologic and psychosocial factors that affect susceptibility to adverse health outcomes following exposure to environmental hazards.

Specify approaches for assessing, preventing and controlling environmental hazards that pose risks to human health and safety.

To understand various waste management techniques and risks involved in event of poor management.

Understand the outbreak of certain communicable and non-communicable diseases.

Course Outcomes:

Acquire skills in the application of epidemiologic methods to environmental health problems



Department of Zoology, School of Life Sciences, GGV, Bilaspur (CG)

GENERIC ELECTIVE COURSES

LS/ZOO/GE-201 P

ENVIRONMENT AND PUBLIC HEALTH

PRACTICALS

(Credits 2)

1. To determine Ph in soil and water samples from different locations.
2. To determine Cl in soil and water samples from different Locations
3. To determine SO₄ in soil and water samples from different Locations
4. To determine NO₃ in soil and water samples from different Locations
5. To determine BOD in water samples from different locations

SUGGESTED BOOKS

- Cutter, S.L. (1999) Environmental Risk and Hazards, Prentice-Hall of India Pvt. Ltd., New Delhi.
- Kolluru Rao, Bartell Steves, Pitblado R. and Stricoff (1996) "Risk Assessment and Management Handbook", McGraw Hill Inc., New York.
- Kofi Asante Duah (1998) "Risk Assessment in Environmental management", John Wiley and sons, Singapore.
- Kasperson, J.N. and Kasperson, R.E. and Kasperson, R.E. (2003) Global Environmental Risks, V.N. University Press, New York.
- Joseph F Louvar and B Diane Louvar (1997) Health and Environmental Risk Analysis fundamentals with applications, Prentice Hall, New Jersey.

(S)

Sharma
SK

Sharma



Department of Zoology, GGV, Bilaspur (CG)

B.Sc. (Hon's) Zoology SEMESTER - VI

ZOO-CC-XII: Environmental Biology

| | |
|---|--------------|
| Unit 1: Ecosystem Components of ecosystems, Ecological factors: Abiotic and Biotic; Trophic levels, food chains and food webs, Ecological pyramids, Energy flow in ecological systems. | 8 hrs |
| Unit 2: Population Ecology Population: Basic concepts, population characteristics – density, natality, mortality, age-structure, growth forms. | 5 hrs |
| Unit 3: Community Ecology Community: Basic concepts, community structure, habitat & niche concept, Concept of keystone species and ecotone; Succession: Concepts of succession, Types of Succession. | 8 hrs |
| Unit 4: Biodiversity and Conservation Biodiversity concept, types of biodiversity, biodiversity and human welfare, mega diversity zones and biodiversity hot spots with special reference to India. Concept of conservation, in situ and ex-situ methods. | 8 hrs |
| Unit 5: Pollution Pollution: types, sources and effects of major pollutants of air, water, soil and noise, Control of pollution | 7 hrs |

Books Recommended

1. Reece: Campbell Biology (9th ed. 2011, Pearson, New York)
2. Odum: Fundamentals of Ecology (2008, Indian Edition, Brooks/Cole)
3. Henry Joseph: Environmental Studies (2005, Tata McGraw Hill Publ. Co. Ltd.)
4. Primack: A primer of conservation biology (3rd ed. 2004, Sinauer Associates, Massachusetts)
5. Raven and Berg: Environment (3rd ed. 2001, Harcourt College Publishers, New York)
6. Ricklefs: Ecology, (5th ed. 2000, Chiron Pres)
7. Krebs: Ecology, 6th ed. 2001, Benjamin Cummings)


Head
Department of Zoology
Guru Ghasidas Vishwavidyalaya
Bilaspur (C.G.)