



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 :2021-22

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

Sr. No.	Course Code	Name of the Course
01.	ZOATA1	Human Health and Sex Education
02.	ZOUBTG1	Vectors, Diseases and Management
03.	ZOUCTG1	Food, Nutrition and Health
04.	ZOUDTT2	Ecology
05.	ZOUDTG1	Global Environmental Issues
08.	LS/ZOO/DSE-601 (B) L	Fish and Fisheries
09.	LS/ZOO/DSE-601 (C) L	Wild Life Conservation and Management

L. V. Khanna

सहायक
HEAD
समूह शिक्षण विभाग
Department of Zoology
गुरु घासीदास वि. वि., बिलासपुर
Guru Ghasidas Vishwavidyalaya, Bilaspur



Scheme and Syllabus

Semester wise Theory papers and Practical

B.Sc. Hon's (Zoology): LOCF 2021-2022

Department of Zoology, School of Life Sciences

Course Opted	Course Code	Name of the course	Credit	Hour/ week	Internal Assess	End Sem Exam
Semester I						
CC-I Theory	ZOUATT1	Systematics and Diversity of Life- Protists to Chordates	4	4	30	70
CC-I Practical	ZOUALT1	Lab Course	1	2	30	70
CC-II Theory	ZOUATT2	Developmental Biology and Evolution	4	4	30	70
CC-II Practical	ZOUALT2	Lab Course	1	2	30	70
AEC-I Theory	ZOUATA1	Human Health and Sex Education	4	4	30	70
GEC-I Theory	ZOUATG1	Exploring the Brain: Structure and Function	4	4	30	70
GEC-I Practical	ZOUALG1	Lab Course	1	2	30	70
TOTAL			19	22	210	490
Semester II						
CC-III Theory	ZOUBTT1	Comparative Anatomy and Physiology of Non Chordates	4	4	30	70
CC-III Practical	ZOUBLT1	Lab Course	1	2	30	70
CC-IV Theory	ZOUBTT2	Cell Biology and Histology	4	4	30	70
CC-IV Practical	ZOUBLT2	Lab Course	1	2	30	70
AEC-II Theory	ZOUBTA1	Human Nutrition	4	4	30	70
GEC-II Theory	ZOUBTG1	Vectors, Diseases and Management	4	4	30	70
GEC-II Practical	ZOUBLG1	Lab Course	1	2	30	70
Total			19	22	210	490
Semester III						
CC-V Theory	ZOUCTT1	Comparative Anatomy and Physiology of Chordates	4	4	30	70
CC-V Practical	ZOUCTL1	Lab Course	1	2	30	70
CC-VI Theory	ZOUCTT2	Genetics	4	4	30	70
CC-VI Practical	ZOUCTL2	Lab Course	1	2	30	70
SEC-I Theory	ZOUCTL1	Aquaculture	4	4	30	70
GEC-III Theory	ZOUCTG1	Food, Nutrition and Health	4	4	30	70
GEC-III Practical	ZOUCLG1	Lab Course	1	2	30	70
Total			19	22	210	490
Semester IV						
CC-VII Theory	ZOUDTT1	Biochemistry	4	4	30	70
CC-VII Practical	ZOUDLT1	Lab Course	1	2	30	70
CC-VIII Theory	ZOUDTT2	Behaviour and Chronobiology	4	4	30	70
CC-VIII Practical	ZOUDLT2	Lab Course	1	2	30	70
SEC-II Theory	ZOUDTL1	Sericulture	4	4	30	70
GEC-IV Theory	ZOUDTG1	Global Environmental Issues	4	4	30	70
GEC-IV Practical	ZOUDLG1	Lab Course	1	2	30	70
TOTAL			19	22	210	490
Internship	ZOUDLF1	As per choice of student	2	30*	15	35
Semester V						
CC-IX Theory	ZOUETT1	Ecology	4	4	30	70
CC-IX Practical	ZOUELT1	Lab Course	1	2	30	70
CC-X Theory	ZOUETT2	Molecular Biology	4	4	30	70
CC-X Practical	ZOUELT2	Lab Course	1	2	30	70
CC-XI Theory	ZOUETT3	Biotechniques	4	4	30	70
CC-XI Practical	ZOUELT3	Lab Course	1	2	30	70
DSE-I Theory	ZOUETD1	Mammalian Physiology	4	4	30	70
DSE-I Practical	ZOUELD1	Lab Course	1	2	30	70
DSE-II Theory	ZOUETD2	Endocrinology	4	4	30	70



Ability Enhancement Course (AEC): ZOUATAI

Semester	Core Course	Course Title	Credits
I	AEC-I	Human Health and Sex Education	Theory: 04

About the course

The course is designed to address problems associated with health and sex thereby, promoting fitness and well being.

Learning outcomes

After the completion of this course, the students will be able to:

- understand the importance of good health.
- observe clean sexual habits thereby warding off sexually transmitted diseases,

Theory

Unit I: Health: Physical and spiritual

14 Lectures

Health as a state of wellbeing, health awareness, Physical health, immunization and vaccination, healthy food, balanced diet, food supplements, proper sleep, exercise and keeping away from stress, pathogens and pollution. Reproductive health, adolescence, senescence. Prevention from mental illness and disabilities, alcoholism, tobacco addiction, de-addiction, lifestyle diseases. Spiritual health, yoga and meditation.

Unit II: Human reproductive and developmental cycle

14 Lectures

Human reproductive system: structural details of male reproductive system, semen, hormonal control. Female reproductive system- structure of ovary, puberty, reproductive cycles and hormonal control, gestation period, hysterectomy, menopause. Events of human reproduction: Gametogenesis- spermatogenesis and oogenesis, ovulation, fertilization, embryonic development, parturition.

Unit III: Infertility and assisted reproductive techniques

12 Lectures

Human intervention in reproduction: Contraception and birth control-barrier method, hormonal methods, natural methods, sterilization, termination of pregnancy. Infertility-male and female infertility, causes and treatment for infertility. Advanced Reproductive Technologies- IVF, GIFT, ZIFT, Donor Insemination (DI). Sperm transfer techniques. Surrogacy.

Unit IV: Sex education and prevention from Sexually transmitted diseases

12 Lectures

Sexually transmitted diseases: Syphilis, chlamydia, trichomoniasis, gonorrhoea, AIDS, Sex education: Adolescent sexual activity, teenage pregnancy, sexual harassment, sexual awareness and policies (legal aspects), lesbian and gay sex, bisexual, transgender youth, adolescent stress management

Recommended readings

1. Kothari P. (1994) Common sexual problems and solutions by, UBS Publishers and Distributors Ltd.
2. Hadley, Mac. E.. (2004) Endocrinology. (5th edition) Pearson Education, Singapore.
3. Taylor, D.J., Green, N.P.O., Stout G. W. (2005) Biological Science. (Editor R. Soper) 3rd Edition, Cambridge University Press.
4. The Complete Manual of Fitness and Well-being. The Reader's Digest Association, Inc. Pleasantville, New York / Montreal.
5. Guyton, A.C. and Hall, J.E..Textbook of Medical Physiology.

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Generic Elective Courses (GEC): ZOUBTGI and ZOUBLGI

Semester	Core Course	Course Title	Credits
II	GEC-II	Vectors, Diseases and Management	Theory: 04 Practical: 01

About the course

The course provides an insight into the common vector-borne diseases, their etiology, role of vectors in their spread, host-parasite relationship and finally the strategies to manage these vectors.

Learning outcomes

After successfully completing this course, the students will be able to:

- Develop awareness about the causative agents and control measures of many commonly occurring diseases.
- Develop understanding about the favourable breeding conditions for the vectors.
- Devise strategies to manage the vectors population below threshold levels, public health importance.
- Undertake measures or start awareness programmes for maintenance of hygienic conditions, avoidance of contact from vector, destruction of breeding spots in the vicinity of houses and cattle shed by public health education campaign.

Theory

Unit I: Vector and vector bionomics

13 Lectures

Brief introduction, types and morphological peculiarities of vectors such as mosquitoes, flies, fleas, lice, bugs, ticks and mites. Host-vector relationship. Primary and secondary vector concept. Vectorial capacity. Vector bionomics-larval habitats and host biting preferences, human and animal biting indices. Evolution of vector bionomics and its effect on disease transmission. Vector incrimination. Human practices and the occurrence of pests

Unit II: Disease vectors and the causes of disease outbreaks

13 Lectures

Salient features of the vectors belonging to Diptera, Siphonaptera, Siphunculata, Hemiptera, Arachnida, Blattaria, Acarina (families Ixodidae and Argasidae) etc. Role of non-blood sucking flies in myiasis; of blood sucking flies in transmission of plague and typhus; of lice (body, head, pubic) in transmission of typhus, relapsing and trench fevers, Vagabond's disease and Phthiriasis; of bugs in transmission of Chaga's disease of. Brief account of mites and the associated diseases. Population biology, Factors affecting abundance, Density dependence and independence, How do people cause outbreak?

Unit III: Vector management strategies

13 Lectures

Control of vector flies by screening, fly traps, electrocution, poison baits and outdoor residual sprays; biological control by natural parasites and predators. Chemical control. Efficacy of synthetic pyrethroids, residual spray of insecticides, treated bed nets/curtains and fumigations. Biological control of mosquitoes by the use of viruses, bacteria, fungi, parasites, nematodes and larvivorous fishes. Sterile insect technique, Eradication, Other genetic approaches, Pheromones/allelochemicals, Attract-and-kill, Mating disruptors, alarm pheromones and oviposition disruptors

Unit IV: Emerging concepts and approaches to vector management

13 Lectures

Legislation and regulation, Methods of sampling and monitoring, sampling plan, Allocation of sampling units. Exclusion and routes of entry. Controlled atmosphere, Risk assessment, The integrated control/IPM approach, Damage thresholds estimation, Forecasting, Increasing agroecosystem resistance, Pesticide selection, Eradication versus control, Up to what limits IPM should be adopted. Decision support

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Department of Zoology, School of Life Sciences

Course Opted	Course Code	Name of the course	Credit	Hour/week	Internal Assess	End Sem Exam
Semester I						
CC-1 Theory	ZOUATF1	Systematics and Diversity of Life- Protista to Chordates	3	3	30	70
CC-1 Practical	ZOUATL1	Lab Course	2	4	30	70
CC-2 Theory	ZOUATF2	Developmental Biology and Evolution	3	3	30	70
CC-2 Practical	ZOUALT2	Lab Course	2	4	30	70
GEC-1 Theory	ZOUATG1	Exploring the Brain: Structure and Function	3	3	30	70
GEC-1 Practical	ZOUALG1	Lab Course	2	4	30	70
AEC-1 Theory		To be drawn from the pool of AEC	1	1	30	70
AEC-1 Practical		To be drawn from the pool of AEC	1	2	30	70
SEC-1 Theory		To be drawn from the pool of SEC	1	1	30	70
SEC-1 Practical		To be drawn from the pool of SEC	1	2	30	70
		Additional Credit Course				
TOTAL			19	27	300	700
Semester II						
CC-3 Theory	ZOUBTT1	Comparative Anatomy and Physiology of Non Chordates	3	3	30	70
CC-3 Practical	ZOUBLT1	Lab Course	2	4	30	70
CC-4 Theory	ZOUBTT2	Cell Biology and Histology	3	3	30	70
CC-4 Practical	ZOUBLT2	Lab Course	2	4	30	70
GEC-2 Theory	ZOUBTG1	Vectors, Diseases and Management	3	3	30	70
GEC-2 Practical	ZOUBLG1	Lab Course	2	4	30	70
AEC-2 Theory		To be drawn from the pool of AEC	1	1	30	70
AEC-2 Practical		To be drawn from the pool of AEC	1	2	30	70
SEC-2 Theory		To be drawn from the pool of SEC	1	1	30	70
SEC-2 Practical		To be drawn from the pool of SEC	1	2	30	70
		Additional Credit Course				
Total			19	27	300	700
Semester III						
CC-5 Theory	ZOUCTT1	Comparative Anatomy and Physiology of Chordates	3	3	30	70
CC-5 Practical	ZOUCTL1	Lab Course	2	4	30	70
CC-6 Theory	ZOUCTT2	Genetics	3	3	30	70
CC-6 Practical	ZOUCTL2	Lab Course	2	4	30	70
CC-7 Theory	ZOUCTT3	Biochemistry	3	3	30	70
CC-7 Practical	ZOUCTL3	Lab Course	2	4	30	70
GEC-3 Theory	ZOUCTG1	Food, Nutrition and Health	3	3	30	70
GEC-3 Practical	ZOUGL1	Lab Course	2	4	30	70
AEC-3 Theory		To be drawn from the pool of AEC	1	1	30	70
AEC-3 Practical		To be drawn from the pool of AEC	1	2	30	70
		Additional Credit Course				
Total			22	31	300	700
Semester IV						
CC-8 Theory	ZOUBTT1	Behaviour and Chronobiology	3	3	30	70
CC-8 Practical	ZOUBLT1	Lab Course	2	4	30	70
CC-9 Theory	ZOUBTT2	Ecology	3	3	30	70
CC-9 Practical	ZOUBLT2	Lab Course	2	4	30	70
CC-10 Theory	ZOUBTT3	Molecular Biology	3	3	30	70
CC-10 Practical	ZOUBLT3	Lab Course	2	4	30	70
GEC-4 Theory	ZOUBTG1	Global Environmental Issues	3	3	30	70
GEC-4 Practical	ZOUBLG1	Lab Course	2	4	30	70
AEC-4 Theory		To be drawn from the pool of AEC	1	1	30	70
AEC-4 Practical		To be drawn from the pool of AEC	1	2	30	70
		Additional Credit Course				
TOTAL			22	31	300	700
		Summer Internship*	6	90*	30	70

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Generic Elective Courses (GEC): ZOUCTGI and ZOUCIGI

Semester	Core Course	Course Title	Credits
III	GEC-III	Food, Nutrition and Health	Theory: 03; Practical: 02

About the course

The course covers the basic concepts of balanced diet for people of different ages besides focusing on the consequences of malnutrition and the deficiency diseases and the diseases caused due to poor hygiene.

Learning outcomes

After successfully completing this course, the students will be able to:

- Understand the role of food and nutrients in health and disease.
- Provide culturally competent nutrition services for diverse individuals.
- Implement strategies for food access, procurement, preparation, and safety that are relevant for the culture, age, literacy level, and socio-economic status of clients and groups.
- Perform food system management and leadership functions that consider sustainability in business, healthcare, community, and institutional arenas.

Theory

Unit I: Nutrition and dietary nutrients

12 Lectures

Basic concept of Food: Components and nutrients. Concept of balanced diet, nutrient requirements and dietary pattern for different groups viz., adults, pregnant and nursing mothers, infants, school children, adolescents and elderly people.

Unit II: Macro nutrients and micronutrients

12 Lectures

Nutritional Biochemistry: Macronutrients: Carbohydrates, Lipids, Proteins- Definition, Classification, their dietary source and role. Micronutrients: Vitamins- Water-soluble and Fat-soluble vitamins- their sources and importance. Important minerals viz., Iron, Calcium, Phosphorus, Iodine, Selenium and Zinc: their biological functions.

Unit III: Malnutrition and nutrient deficiency diseases

15 Lectures

Definition and concept of health; Common nutritional deficiency diseases- Protein Malnutrition (e.g. Kwashiorkor and Marasmus), Vitamin A deficiency, Iron deficiency and Iodine deficiency disorders- their symptoms, treatment, prevention and government initiatives, if any. Life style dependent diseases- hypertension, diabetes mellitus, and obesity- their causes and prevention. Social health problems- smoking, alcoholism, narcotics. Acquired Immuno Deficiency Syndrome (AIDS): causes, treatment and prevention. Other ailments viz., cold, cough, and fever, their causes and treatment.

Unit IV: Diseases caused by microorganisms

13 Lectures

Food hygiene: Potable water- sources and methods of purification at domestic level. Food and Water-borne infections: Bacterial diseases: cholera, dysentery; typhoid fever, viral diseases: Hepatitis, Poliomyelitis etc., Protozoan diseases: amoebiasis, giardiasis; Parasitic diseases: taeniasis and ascariasis their transmission, causative agent, sources of infection, symptoms and prevention. Causes of food spoilage and its prevention.

Recommended reading

1. Mudambi, S.R. and Rajagopal, M.V. (2007). Fundamentals of Foods, Nutrition and Diet Therapy; Fifth Ed; New Age International Publishers
2. Srilakshmi, B. (2002). Nutrition Science; New Age International (P) Ltd.
3. Srilakshmi, B. (2007). Food Science: Fourth Ed; New Age International (P) Ltd.
4. Swaminathan, M. (1986). Handbook of Foods and Nutrition; Fifth Ed; BAPPCO.
5. Bangji, M.S.; Rao, N.P. and Reddy, V. (2009). Text Book of Human Nutrition; Oxford & IBH Publishing Co. Pvt Ltd.

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Core Courses (CC): ZOU DTT2 and ZOU DLT2

Semester	Core Course	Course Title	Credits
IV	CC-IX	Ecology	Theory: 03; Practical: 02

About the course

This course will take students on a journey through the physical workings of the Earth, the interactions between species and their environments. The course highlights on some of the important aspects viz. growth and survival of populations and communities in different habitats, energy flow in the ecosystems, interactions between the communities, exclusion of niches and consequences of changing environment on the biodiversity.

Learning outcomes

After successfully completing this course, the students will be able to:

- Know the evolutionary and functional basis of animal ecology.
- Understand what makes the scientific study of animal ecology a crucial and exciting endeavour.
- Engage in field-based research activities to understand well the theoretical aspects taught besides learning techniques for gathering data in the field.
- Analyse a biological problem, derive testable hypotheses and then design experiments and put the tests into practice.
- Solve the environmental problems involving interaction of humans and natural systems at local or global level.

Theory

UNIT I: An overview of Ecology, Ecosystems and Biomes

13 Lectures

Introduction and scope of Ecology. Structure and function of ecosystem; Abiotic factors affecting survival and sustenance of organisms e.g., water, temperature, light, pH and salinity. Role of limiting factors in survival of biotic components. Major ecosystems of the world: Ecological features, limiting factors, zonation and classification of organisms of fresh water and marine ecosystems. Introduction to Biome: Ecological features of Tundra, Desert, Savannah and Tropical Rain forest Biomes. Energy flow in ecosystem, food chain and food web. Productivity. Mineralization and recycling of nutrients: C, N, P & S.

UNIT II: Population ecology; Human population growth

13 Lectures

Ecology of populations. Unique and group attributes of population: Density, natality, mortality, life tables, fecundity tables, survivorship curves, age ratio, sex ratio, dispersal. Factors regulating population dispersal and growth: Exponential and logistic growth. Population regulation: density-dependent and independent factors; r and K strategies. Ecological efficiencies. Human population growth: Impacts on environment, carrying capacity, human health and welfare.

UNIT III: Biotic community, characteristics and attributes

13 Lectures

Community characteristics: stratification; Dominance, diversity, species richness, abundance, Evenness, Similarity. Diversity and food-web indices. Ecotone and edge effect; Types of interaction: Positive interactions: commensalism, proto-cooperation, and mutualism. Negative interactions: parasitism and allelopathy; predation and predator-prey dynamics; herbivory. Interspecific competition and coexistence, Inter and intra-specific; abundance. Niche overlap and segregation. Gause's Principle with laboratory and field examples. Ecological succession: Definition, Process, types, theories of succession.

UNIT IV: Environmental degradation; Environmental movement etc.

13 Lectures

Environmental ethics; Pollution: Air, water and noise pollution and their control; Natural resources: Mineral, water and forest, their significance and conservation; Types of biodiversity, Hotspots; Biodiversity: status, monitoring and documentation; major drivers of biodiversity change; Biodiversity mapping using GPS, GIS and remote sensing. Ecosystem and biodiversity services: Ecological,

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Generic Elective Courses (GEC): ZOUDTG1 and ZOUDLG1

Semester	Core Course	Course Title	Credits
IV	GEC-IV	Global Environmental Issues	Theory: 03; Practical: 02

About the course

This course focuses on the diversity of living forms particularly animals with a detailed inference on the loss of species due to various reasons and the need of their conservation.

Learning outcomes

At the end of the course the students will be able to:

- Understand the fundamental issues of environment.
- Analyze different sources of environmental problems and methods of measurement of pollution.
- Examine economic growth and quality of life.
- Examine the microbiology of waste water treatment and its various schemes.

Theory

Unit I: Environment and Environmental Problems

13 Lectures

Basic concepts and issues, global environmental problems - ozone depletion, UV-B, greenhouse effect and acid rain due to anthropogenic activities, Fisheries depletion, Eutrophication, their impact and biotechnological approaches for management.

Unit II: Environmental Pollution

11 Lectures

Environmental pollution - types of pollution, Air, water and land pollution, sources of pollution, measurement of pollution, fate of pollutants in the environment, Ocean acidification, Bioconcentration, bio/magnification.

Unit III: Environmental Economics

12 Lectures

Environmental Economics : Basic concept; methods of evaluation; Economic growth, Gross National Productivity and the quality of life, Tragedy of Commons, Economics of Pollution control, Cost-benefit ratio and cost effectiveness analysis.

Unit IV: Use of Microbes in Waste Water Treatment

15 Lectures

Aerobic decomposition process - activated sludge, oxidation ponds, trickling filter, towers, rotating discs, rotating drums, oxidation ditch. Anaerobic decomposition process - anaerobic filters, up-flow anaerobic sludge blanket reactors. Treatment schemes for sewage from dairy, distillery, tannery, sugar and pharma industries.

Recommended readings

1. Frances, H. (2012). Global Environmental Issues (2nd edition) Willey-Blackwell
2. Mahesh, R. (2007) Environmental Issues in India: A Reader. Pearson-Longman.

Practical

There are no structured class lab experiments involved. However the students are expected to visit various sites on the web, make teams for group-discussion indulge in debates, collect justifiable information from various sources, make historical report on major global environmental issues:

1. Atmosphere Management: Pollution, global warming/climate change, Stratospheric ozone depletion its impact and possible solutions.
2. Fresh water Management: Pollution, reasons, severity of problem, impact for the present and the future, its impact and possible solutions.
3. Marine Ecosystem: Pollution of marine ecosystem, its impact and possible solutions.
4. Soil degradation and Desertification
5. Solid Waste Management

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Core Course-10 Practical	LS/ZOO/CC-403 P	Lab Course	2	4
Generic Elective-4 Theory	LS/ZOO/GE-401 L	Insect Vectors and Diseases	4	4
Generic Elective-4 Practical	LS/ZOO/GE-401 P	Lab Course	4	4
Skill Enhancement Course-2	LS/ZOO/SE-401	Medical Diagnostics	2	2
Skill Enhancement Course-2	LS/ZOO/SE-401	Lab Course	2	4
TOTAL			28	34
Summer Internship: 15 days Swayam Swachhita / NSS / Industrial/ others			1	100
Semester V				
Core Course-11 Theory	LS/ZOO/CC-501 L	Molecular Biology	4	4
Core Course-11 Practical	LS/ZOO/CC-501 P	Lab Course	2	4
Core Course-12 Theory	LS/ZOO/CC-502 L	Principles of Genetics	4	4
Core Course-12 Practical	LS/ZOO/CC-502 P	Lab Course	2	4
Discipline Specific Elective-1 Theory	LS/ZOO/DSE-501(A) L LS/ZOO/DSE-501(B) L LS/ZOO/DSE-501(C) L	A. Basics of Neuroscience B. Endocrinology C. Immunology	4	4
Discipline Specific Elective-1 Practical	LS/ZOO/DSE-501(A) P LS/ZOO/DSE-501(B) P LS/ZOO/DSE-501(C) P	Lab Course A Lab Course B Lab Course C	2	4
Discipline Specific Elective-2 Theory	LS/ZOO/DSE-502(A) L LS/ZOO/DSE-502(B) L LS/ZOO/DSE-502(C) L	A. Animal Behavior and Chronobiology B. Parasitology C. Reproductive Biology	4	4
Discipline Specific Elective-2 Practical	LS/ZOO/DSE-502(A) P LS/ZOO/DSE-502(B) P LS/ZOO/DSE-502(C) P	Lab Course A Lab Course B Lab Course C	2	4
TOTAL			24	32
Semester VI				
Core Course-13 Theory	LS/ZOO/CC-601 L	Developmental Biology	4	4
Core Course-13 Practical	LS/ZOO/CC-601 P	Lab Course	2	4
Core Course-14 Theory	LS/ZOO/CC-602 L	Evolutionary Biology	4	4
Core Course-14 Practical	LS/ZOO/CC-602 P	Lab Course	2	4
Discipline Specific Elective-3 Theory	LS/ZOO/DSE-601(A) L LS/ZOO/DSE-601(B) L LS/ZOO/DSE-601(C) L	A. Biology of Insects B. Fish and Fisheries C. Wild Life Conservation and Management	4	4
Discipline Specific Elective-3 Practical	LS/ZOO/DSE-601(A) P LS/ZOO/DSE-601(B) P LS/ZOO/DSE-601(C) P	Lab Course A Lab Course B Lab Course C	2	4
Dissertation/ Project work / Academic Visit followed by report submission and seminar	LS/ZOO/DW/PW/AV		5+1=6	8
TOTAL			24	32
TOTAL CREDITS			152 + 4 (SI)	

As per UGC CDCS guidelines, University / departments have liberty to offer GE and SEC courses offered by any department to students of other departments. The No. of GE course is four. One GE course is compulsory in first 4 semesters each. In present scheme it is proposed to have minimum two GE courses (from one subject) in first two semester after which student shall change two GE for another subject in IIIrd and IVth semester, so that all the student can have exposure of one additional subject.
(Subject to approval by the competent authority)

Changela
External Expert

Dr. Rohit Seth
06/07/18

Sanjiv Singh
06/07/18

Mouk
06/07/18

Head of the Department

विभागाध्यक्ष
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Guru Ghasidas Vishwavidyalaya, Bilaspur



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

DISCIPLINE SPECIFIC ELECTIVE COURSE

LS/ZOO/DSE-601(B) I.

FISH AND FISHERIES

THEORY

(Credits 4)

Unit 1: Introduction and Classification	6
General description of fish; Account of systematic classification of fishes (upto classes); Classification based on feeding habit, habitat and manner of reproduction.	
Unit 2: Morphology and Physiology	16
Different types of fins and scales; Use of scales in classification and determination of age of fish; Gills and gas exchange; Swim Bladder: types and role in respiration, buoyancy, Osmoregulation and ionic balance in fishes; Reproductive strategies (special reference to Indian fishes); Electric organs; Bioluminescence; Schooling; Parental care; Migration	
Unit 3: Fisheries	10
Inland Fisheries; Marine Fisheries; Environmental factors influencing the seasonal variations in fish catches in the Arabian Sea and the Bay of Bengal; Fishing crafts and Gears; Depletion of fisheries resources; Application of remote sensing and GIS in fisheries; Fisheries law and regulations	
Unit 4: Aquaculture	16
Sustainable Aquaculture; Extensive, semi-intensive and intensive culture of fish; Qualities of culturable species of fishes; Types of pond in a fish farm; Pen and cage culture; Integrated fish farming; Composite fish culture; Brood stock management; Induced breeding of fish; Hatchery, Preparation of compound diets for fish; Role of water quality in aquaculture; Fishery by-products	
Unit 5: Fish Pathology and Cure	8
Sign of sickness in fishes, defensive devices in fishes against diseases, diseases of fishes: Nutritional diseases, bacterial disease (Infectious dropsy, Tail rot or fin rot), Fungal diseases (Dermatomycooses, Branchiomycoosis) and protozoan diseases (Ichthyophthiriasis, Costiasis).	
Unit 6: Fish in research	4
Transgenic fish, Zebrafish as a model organism in research	

Dargal

Sandhya Singh

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

DISCIPLINE SPECIFIC ELECTIVE COURSE

LS/ZOO/DSE-601(C) L

WILD LIFE CONSERVATION AND MANAGEMENT

THEORY

(Credits 4)

Unit 1: Introduction to Wild Life	12
Wildlife: Current status in India, Zones of Faunal-distribution in India and their characteristics; Values of wild life - positive and negative; Conservation ethics; Importance of conservation; Causes of depletion; World conservation strategies	
Unit 2: Evaluation and management of wild life	12
Habitat analysis. Physical parameters: Topography, Geology, Soil and water; Biological Parameters: food, cover, forage, browse and cover estimation; Standard evaluation procedures: remote sensing and GIS.	
Unit 3: Management of habitats	8
Setting back succession; Grazing logging; Mechanical treatment; Advancing the successional process; Cover construction; Preservation of general genetic diversity; Restoration of degraded habitats;	
Unit 4: Population estimation	14
Population density, Natality, Birth rate, Mortality, fertility schedules and sex ratio computation; Faecal analysis of ungulates and carnivores: Faecal samples, slide preparation, Hair identification, Pug marks and census method.	
Unit 5: Management planning of wild life in protected areas	8
National parks & sanctuaries, Community reserve; Estimation of carrying capacity; Eco tourism / wild life tourism in forests; Concept of climax persistence; Ecology of perturbation; Tiger conservation in India	
Unit 6: Management of excess population	6
Bio- telemetry; Care of injured and diseased animal; Quarantine; Common diseases of wild animal	

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